

IV. Amur Region

Overview of the Region

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Location

Amur Oblast is situated in the upper and middle Amur River basin; the river provides the natural border with China to the south. It is bordered by the Republic of Yakutia (Sakha) in the north, Chita Oblast to the west, and Khabarovsk Krai to the east. It is 8,000 km. from Moscow.

Size

Amur Oblast is 363,700 sq. km.

Climate

The Amur region is where continental winds and monsoon streams meet; this meeting does not occur anywhere else in the world at this same latitude. Temperature fluctuations are dramatic, ranging from 42 C in the summer to -58 C in the winter. Spring is dry and clear. Hot, short, and moist summers result in rapid vegetation growth. Fall is clear and warm. Winter is dry and cold, with little snow. The Zeya-Bureya region, in the southeast, is frost-free 140 days a year, making it the main farming land in the RFE. In the mountainous eastern region, there is a high level of precipitation - up to 800 mm. per year. The western region is drier.

Geography and Ecology

The Stanovoy Mountains form the dividing line between Yakutia and Amur Oblast and spread across the entire northern border of the territory. Dwarf Siberian pine and alpine tundra grow at higher elevations on these mountains and larch forests with small stands of flat-leaved birch and pine forests grow along the river plains. The Zeya River begins in these mountains in the northeast. The middle reaches of this great river were dammed to create the huge Zeyskiy Reservoir, which sprawls over 2,500 sq. km. between the Stanovoy Mountains and a southern parallel range running across the center of the oblast. The lowlands between these two mountain ranges make up the Upper Zeyskiy Plain, which is primarily marshland with larch and pine forests. South of the second ridge is the vast Amur River plain which makes up 40% of the oblast.

Along the eastern border of Amur territory is another series of mountain ridges separating Amur from Khabarovsk Krai. These ridges of larch and fir-spruce forests form the watershed of the Selemdzha River, which flows south into the Zeya, continues to the city of Blagoveshchensk, and then into the Amur River. Southeast of the Selemdzha are the Bureya and Arkhara Rivers, which have the richest forests left in the oblast with Korean pine, limmonik, Mongolian oak, and other Manchurian flora. The Zeya, Amur, and Bureya Rivers form a cradle for the highest biodiversity in the Amur region the Zeysko-Bureinskaya Plain. Much of this plain has been ploughed up or burned for agriculture, but large patches still remain. Japanese, Daurian, and Far Eastern white cranes nest here, as does a host of other rare birds.

Flora and Fauna³

Amur Oblast has four distinct habitat zones each with different types of fauna: eastern Siberian (e.g., brown bear, wood grouse, sable, elk, wolf), Priamursk (e.g., Far Eastern white stork, Japanese crane, and raccoon), Daurian-Mongolian (e.g., white-naped crane, gopher); and high-mountain (snow sheep).

Manchurian deer and Far Eastern roe deer live in the mixed conifer-broadleaved forests. Many rodents inhabit the forest-steppe zone including the field vole and gopher, while rivers and lakes are home to many waterfowl. There are 362 species of bird, 67 species

of mammal, 64 species of fish, 7 species of amphibian, and 10 species of reptile in the oblast. Rare and endangered species include a number of crane species, Himalayan black bear, goral (horned mountain goat), Baer 犴 pochard, Far Eastern stork, black stork, Mandarin duck, and osprey.

Forests

Amur Oblast forests are primarily larch (60%), soft-leaved deciduous species such as birch and aspen (22.3%), dwarf Siberian pine (5.7%), common pine (3.2%), fir and spruce (2.3%), and broadleaved species (2.1%). Larch, pine, and birch forests have the greatest commercial value. The lesistost of the oblast is 60.1%. Larch forests grow throughout the region, excluding the unforested areas of the Zeysko-Bureinskaya Plain. Mountain larch usually occur in pure stands, except for small stands of dwarf Siberian pine. Larch forests in the foothills and valleys grow with smaller bushes such as rhododendron, foxberry, Labrador tea, and hazel-oak, or grow as mari (sparse larch forest and marshland).

Broadleaved species are found in mountain valleys. Silver birch and aspen regenerate on land burned by forest fires or after logging. Fir and spruce forests have a very low distribution (only in the the subalpine vegetation band), and grow with moss, sedge, and foxberry. Dwarf Siberian pine, mountain moss, and lichen tundra (goltsi) cover the highest mountain slopes.

Intensive clear-cutting is shrinking the intact pine forests. They must be protected and any cutting must be sustainable. Pine forests grow in the western part of the oblast (west of the Selemdzha River and the lower reaches of the Zeya River). On the eastern boundary, patches of pine can be found in the Byssa, Tomya, Bureya, and Arkhara River valleys. Floodplain pine forests which grow alongside poplar, larch, and willow are the most productive. Intensive agriculture and logging have destroyed large portions of the forest-steppe zone in the Zeysko-Bureinskaya Plain. However, some of the conifer and mixed forests here still remain and are rich in plant species. Deciduous oak, lime, elm, and ash thrive together with the conifer varieties. There are also fragments of Mongolian oak and black birch forest.

Amur Forest Hotspots

- 1. Arkhara lowlands and the Lesser Khingan foothills (forest/wetlands)**
- 2. Mukhinka natural area (pine forests)**
- 3. Nora-Selemdzha Interriparian Zone (forests)**
- 4. Nyukzhinskiy ridge and the Amur pine barrens (pine forests)**
- 5. Mountains and uplands surrounding the Zeiskiy reservoir (forests)**

Industry

Population

The total population is 1,062,500, of which 1,502 are native Evenki.

Main Resources

Two billion cu. m. of timber, tremendous gold deposits and other rare metals, 63,500 million tons of coal, 3,600 million tons of iron deposits, hydropower, oil, and gas.

Main Industries

Gold mining - gold flakes make up 95% of gold production, food processing, hydroelectric power production, coal mining, and timber, pulp, and paper.

Economic Importance in the RFE

- The oblast provides 8% of the RFE's industrial output.
- With more than 55% of the RFE's arable land, it produces one-third of all milk and meat, 70% of soybeans, and 60% of grain.

Protected Area System of Amur Region

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The only realistic way to conserve the region's biodiversity is to develop a more comprehensive protected areas system. Protected areas in Amur Oblast today cover 215 million hectares, or 5.9% of the oblast's total area. There are three *zapovedniks* in the oblast, the most recently created of which is *Norskiy zapovednik*. The total area covered by *Norskiy* and the older *Khinganskiy* and *Zeyskiy zapovedniks* is 404,500 hectares, or 1.11% of the oblast's total area. This is the smallest percentage of strictly protected land among all of the RFE's ten regions. Also existing are 25 *zakazniks* designated for hunting, an ichthyological *zakaznik* preserving a spawning-ground, a botanical *zakaznik* protecting medicinal plants, two *zakazniks* with comprehensive protection regimes and 128 natural monuments.

In 1991 an agency-led program was developed to create a protected areas network for Amur Oblast. This program included creation of a minimum of 4 new *zapovedniks* and 2 national parks. Because the entire program cannot be fulfilled under the current economic conditions, it is necessary to focus attention on those territories that are most important for biodiversity conservation, and, at the same time, those most threatened by anthropogenic disturbances—'Hotspots.'

Five Hotspots were identified at the first 'Hotspots' Conference in Vladivostok (January 1995). In accordance with its recommendations, two new protected areas were created within the two subsequent years: *Norskiy zapovednik*, *Bekeldeyul zakaznik*, and a third—*Ganukan zakaznik*—expanded. In February 1998, in connection with this second Hotspots effort, specialists gathered at a regional roundtable to identify new priorities for biodiversity conservation. The 'forest' hotspots are listed below.

Table of Protected Areas in Amur Region

Type of PA	Name	Raion	Area (1000 ha)	Establishment date
Zapovednik	Zeyskiy	Zeyskiy	99.4	10-3-1963
Zapovednik	Khinganskiy	Arkharinskiy	97.8	10-3-1963
Zapovednik	Norskiy	Selemdzhinskiy	213.6	?.?.1995
Federal Integrated Zakaznik	Orlovskiy	Mazanovskiy	119.6	?.?.1999
Federal Integrated Zakaznik	Khingano-Arkharinskiy	Arkharinskiy	44.8	4-23-1958
Oblast' Game Zapovednik	Amurskiy	Konstantinovskiy	16.5	11-27-1967
Oblast' Game Zakaznik	Berezovskiy	Ivanovskiy	11.3	5-14-1975
Oblast' Game Zakaznik	Blagoveshchenskiy	Blagoveshchenskiy	48.0	5-14-1975
Oblast' Game Zakaznik	Verkhne-Depskiy	Zeyskiy	156.8	9-15-1976

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Oblast' Game Zakaznik	Voskresenovskiy	Seryshevskiy	16.8	8-31-68
Oblast' Game Zakaznik	Gerbikanskiy	Selemzhinskiy	87.6	8-24-1995
Oblast' Game Zakaznik	Zhelundinskiy	Bureiskiy	67.2	11-27-1967
Oblast' Game Zakaznik	Zavitinskiy	Zavitinskiy	35.2	7-5-1963
Oblast' Game Zakaznik	Iverskiy	Svobodnenskiy	50.0	7-5-1963
Oblast' Game Zakaznik	Lopchinskiy	Tyndinskiy	142.4	5-19-1976
Oblast' Game Zakaznik	Magdagachinskiy	Magdagachinskiy	67.2	7-5-1963
Oblast' Game Zakaznik	Muravyevskiy	Tambovskiy	34.0	11-27-1967
Oblast' Game Zakaznik	Simonovskiy	Shimanovskiy	77.8	7-5-1963
Oblast' Game Zakaznik	Tashinskiy	Romnenskiy	90.8	11-27-1967
Oblast' Game Zakaznik	Tolbuzinskiy	Magdagachinskiy	80.1	3-26-1959
Oblast' Game Zakaznik	Urkanskiy	Tyndinskiy	141.0	11-27-1967
Oblast' Game Zakaznik	Urushinskiy	Skovorodinskiy	36.8	7-5-1963
Oblast' Game Zakaznik	Ust'-Tygdinskiy	Shimanovskiy	67.5	7-5-1963
Oblast' Game Zakaznik	Khar'kovskiy	Oktyabrskiy	15.0	12-15-1995
Oblast' Ornithological Zakaznik	Ul'minskiy	Mazanovskiy	162.0	3-6-1981
Oblast' Ornithological Zakaznik	Ganukan	Arkharinskiy	35.0	7-25-1985
Oblast' Botanical Zakaznik	Ust'-Norskiy	Mazanovskiy	2.7	2-11-1981
Oblast' Ichthyologic Zakaznik	Tomskiy	Romnenskiy	Not given	6-15-1976

Forest Hotspots of the Amur Region

1. Arkhara lowlands and the Lesser Khingan foothills (forest/wetlands)
2. Mukhinka natural area (pine forests)
3. Nora-Selemdzha Intertropical Zone (forests)
4. Nyukzhinskiy ridge and the Amur pine barrens (pine forests)
5. Mountains and uplands surrounding the Zeiskiy reservoir (forests)

1. *Arkhara lowlands and the Lesser Khingan foothills*

Description of the territory

The Burey River serves as the western boundary of this area, which hosts a wide range of Manchurian animal and plant communities. For this reason the Arkhara lowlands and the adjacent outcroppings of the Lesser Khingan mountain range (elevation from 100 to 600 meters) distinguishes itself with the most diverse natural communities found in Amur Oblast. A unique combination of habitat types, from East Asian prairies and Korean pine/broadleaved forests to Ayan fir and northern larch complexes, creates conditions for a high level of biodiversity. Here is the only place in the oblast where pine and broadleaved forests mix with Amur oak, eleutherococcus root, Amur grape (*Vitis amurensis*) and Kolomikta vine (*Actinidia kolomikta*).

The vast area of wetlands and marshes in the oblast (about 250,000 hectares) offers nesting grounds for 18-20 pairs of Japanese cranes (*Grus japonica*) and 10-11 pairs of Daurian cranes (*Grus dahurica*). The Arkhara lowlands host the largest nesting population of Far Eastern white storks (*Ciconia ciconia*): in 1994 there were 34 nests, and in better years up to 50 nests, or over 200 birds. The number of vascular plant species in these lowlands approaches 1000, at least 20 of which are listed in the Russian Red Book like Komarov's lotus (*Nelumbo komarovi*) and water shield (*Brasenia schreberi*). At the same time there are over 300 species of birds found here, 15 of which are listed in the Russian Red Book, and 50 species of mammals including Siberian roe deer (*Capreolus capreolus pygargus*), wild boar (*Sus scrofa*), Manchurian wapiti (*Cervus elaphus xanthopygus*), brown bear (*Ursus arctos*), black bear (*Solenarctos thibetanus*), lynx (*Lynx lynx*), gray wolf (*Canis lupus*) and otter (*Lutra lutra*). The presence of Far Eastern wildcat (*Felis sylvestris*) and yellow-throated marten (*Martes martes*) has also been noted.

The biodiversity conservation potential of this territory remains intact, since economic activity has so far been limited only to a narrow strip adjacent to the Trans-Siberian Railroad. The vast marshes of the lowlands have not been drained for agriculture due to the regular flooding that occurs when the Amur reaches a peak width of dozens of kilometers. The valuable forest massifs have been spared from clear-cuts because of a prohibition on harvesting Korean pine and because of the steep slopes found in the Lesser Khingan foothills. Selective logging earlier in the 20th century did not bring on a significant degradation in forest stand quality and allowed for the preservation of native dark coniferous forests. Rivers, including the entire basin of the Arkhara, are practically free of pollution thanks to the absence of human settlements within their watersheds. Because of both the high biodiversity and absence of environmental degradation, this territory is considered the first priority among the Hotspots identified for Amur Oblast.

Despite the reduction in economic activity in recent years, however, this territory is severely threatened by the possible appearance of anthropogenic disturbances in the near future. In flatland habitats the grasslands are marred every year by agricultural burning that spreads into natural areas protecting nesting sites for cranes, storks and many other bird species. Fires in

the late spring and fall degrade the remaining oases of flood plain forest stands. Exacerbating the problems caused by fire is the completely unregulated collection of firewood by local residents. All these factors could lead to the complete deforestation of the Arkhara lowlands.

Although timber production and harvest area have declined in recent years, the threat of 'salvage' cutting in the remaining large coniferous forest massifs is increasing, particularly in the Korean pine forests of Khingan-Arkhara Federal wildlife *zakaznik*. In the area near the town of Boguchan, open-pit coal mining is gradually creating a lunar landscape. Meanwhile, the headwaters of the Urin, Uril and Biryra rivers, which are important spawning grounds, are being threatened by gold mining. Especially frightful consequences are expected to arise from the Burey hydroelectric power station, whose construction will be completed within the next few years. It will create an enormous reservoir, flooding large tracts of valuable forest. Significant populations of large mammals may also be destroyed with the closure of their migratory routes. In the still waters below the dam a gradual cutting of the riverbank is expected, with reductions in the frequency and volume of floods. This would have a grave effect on the wetlands in the flood plains of the Burey and Amur rivers.

The Arkhara lowlands and the foothills of the Lesser Khingan range are quite well studied by scientists, dating to the earliest arrival of European Russians to the region. Khinganskiy *zapovednik* is particularly well studied, as it was originally established as a research station for the Soviet Academy of Sciences. This is one of only a few areas in Amur Oblast where comprehensive observations of natural dynamics have been recorded over an extended time. Especially valuable studies have been conducted on the Far Eastern white stork, Japanese crane and Daurian crane. Within the *zapovednik* lies a station for reintroduction of these and other rare bird species, the only facility of its kind in the RFE. It is presently involved in an international program focused on increasing populations of Japanese and Daurian crane.

Existing protection initiatives

In 1958 the Khingan-Arkhara Federal hunting *zakaznik* was created in the Urin-Dydov intertribarian zone, protecting the only large Korean pine massif remaining in the oblast within its 48,800 hectares. This was followed in 1963 with the creation of Khinganskiy *zapovednik* between the Uril and Khingan river basins, which was supplemented in 1978 with additional lands between the Uril and Gryazniy rivers—protecting a total of 93,900 hectares of wetlands and Korean pine, river birch (*Betula nigra*) and oak forests. In 1985 another seasonal hunting *zakaznik*, Ganukan, was established to protect the last remaining unprotected crane nesting sites in the Arkhara lowlands. Ganukan was later expanded to 64,000 hectares in 1997, and reorganized within Khinganskiy *zapovednik*.

In 1994 a federal resolution designated Khinganskiy *zapovednik* as a wetland of international importance under the Ramsar Convention, resulting in strengthened protection status agreed upon by all adjacent land users and the Amur Oblast regional government. In 1997 the site was included into an international network of key crane habitats of Northeast Asia.

A regional hunting *zakaznik*, Zhelundinskiy (67,200 hectares), has been protecting the typical Manchurian alpine broadleaved forests on the left bank of the Burey River since 1967. The importance of this protected area will increase in coming years as the territory will be influenced by the reservoir that will be created by the projected Burey hydroelectric station. In addition to the *zakaznik* there are also ten natural monuments threatened by the dam. The Tarakan River, for example, hosts one of the westernmost salmon hatcheries in the Amur basin. In all, the protected areas network of this region is the most extensive found in the oblast, covering 15% of its lands.

Recommended steps

Nonetheless, the uniqueness of the natural complexes found in the Arkhara lowlands and foothills of the Lesser Khingan require ever increasing vigilance. It is imperative to complete the process of designating the lowlands as a wetland of international importance and confirming its status with the Ramsar Convention Bureau. It is also necessary to strengthen the protection of flood plain forest oases in Ganukan *zakaznik*. In order to protect the only population of Komarov's lotus in the oblast a natural monument should be established under the jurisdiction of Khinganskiy *zapovednik* on the shores of Lake Krivoye. A science station near Lake Dolgoye should also be transferred to the *zapovednik*. Finally, the Rare Birds Reintroduction Station should be strengthened materially, as should Khinganskiy *zapovednik* itself. The *zapovednik* should also be designated a biosphere *zakaznik*, further stabilizing its protection regime.

The decree on Khingano-Arkharinskiy federal *zakaznik* requires a re-evaluation of the protection regime, including a full prohibition on all logging activity within its boundaries. Ecological inventories should be conducted in the area as well, at least on a minimal basis. In the zone to be affected by the Burey hydroelectric station, it is necessary to strengthen the protection regime of the existing Zhelundinskiy hunting *zakaznik*. A new regional biological *zakaznik* of 36,000 hectares in area should also be created to protect migratory routes along the right bank of the Burey, Verkhnyaya and Zavitsinskaya rivers. This new protected area has been included in a list of top priority initiatives for creation of a protected areas network of Amur Oblast. Furthermore, so as to avoid repeating the tragic effects of the Zeya hydroelectric station, funding must be made available to conduct monitoring as the reservoir forms behind the dam on the Burey.

2. Mukhinka Natural Area

Description of the territory

Mukhinka Natural Area is located on the right bank of the Zeya river, about 30 kilometers north of Blagoveshchensk. This landscape is unique for Amur Oblast, enjoying a favorable microclimate and a multitude of kettle lakes and springs having significant recreational value. The eastern and southern slopes of the area's hills are protected from the prevailing cold northwesterly winds that chill other areas nearby. As a result, winter in Mukhinka is quiet, with only small fluctuations in temperatures, and its rich mineral and thermal springs do not freeze over on even the coldest days.

Mukhinka hosts the last natural pine forests located near Blagoveshchensk, an eastern flank of what was once a solid band of pine forest along the Amur-Zeya plateau. It also serves as the eastern border for many species typical of Manchurian flora such as Amur oak, Manchurian walnut (*Juglans mandshurica*), Amur maackia (*Maackia amurensis*), Chinese magnolia vine, Amur grape and others which migrate to the area along the Zeya River basin. This juxtaposition of communities within a rather small area present excellent possibilities for a botanical garden for scientific and educational purposes.

As a whole, the area offers a beautiful landscape attractive for ecotourism, particularly for horseback trail riding and river rafting. In addition to the forest vegetation on the eastern slope of the Amur-Zeya plateau, the wide (2-3 km) Zeya flood plain extending from the foot of the hills also has great importance. The system of marshlands dotted with numerous lakes further adds to the biodiversity conservation value of this region.

Mukhinka has always attracted attention as a vacation spot, with many of the oblast's high-ranking bureaucrats building their dachas here. In the 1970's, large-scale construction of sanatoria and tourist complexes began in earnest. Five years ago this dangerous trend was halted, but not before the poorly controlled construction had taken its toll on Mukhinka's forests and slopes. Recreational use remains completely unregulated, which is causing degradation of the area's vegetation, increasing soil erosion, and the appearance of vast ravines and gullies. Lake Galyanye has accumulated great quantities of pollution, with no mitigation efforts having been conducted for many years.

Existing protection initiatives

Efforts to conserve this unique example of the Amur region's natural beauty have been undertaken for many years. In 1975, the Blagoveshchensk regional hunting *zakaznik* was established on 60,000 hectares (reduced to 48,000 in 1995), encompassing part of the Mukhinka area; this portion itself is designated as a natural monument administered by the Blagoveshchensk *leskhoz*. Scientists from FEB RAS and Blagoveshchensk State Pedagogical Institute were also able to achieve governmental support for a Botanical Gardens here in the late 1980's, but only in 1994 were 300 hectares of pine and flood plain forest communities officially set aside for this purpose. In 1997 the proposed design of the Gardens was completed and the first of three sites were put under protection; at present work continues on reallocating land and structures (hotel and offices) managed by a sanatorium to the Botanical Gardens.

Recommended steps

A proposal to create Mukhinka nature park has at last become supported by the Regional Forest Service and the Blagoveshchensk municipal administration, and its establishment on 35,000 hectares has been included in the oblast's workplan for creation of new protected areas between 1998 and 2000. Only such a unified nature protection structure covering the entire Mukhinka area can ensure sufficient protection that is implemented side-by-side with controlled recreational activity. The Botanical Gardens could serve as a strictly protected nucleus for this structure, but this effort also needs urgent support of its own. Recreation areas and tourist trails need capital for their construction, and funds are also needed to provide for sufficient enforcement of the protection regime and a broad campaign to raise public awareness.

3. Nora-Selemdzha Interriparian Zone

Description of the territory

This region is noteworthy for its goosefoot (*Chenopodiaceae*) communities that are so typical of this part of Amur Oblast, where the southern boundary of the permafrost zone leaves its distinct mark on the area's vegetation and landscapes. The larch forests and accompanying fauna serve as a representative landscape of the Amur basin. 481 species of vascular plants (about 25% of all the oblast's species) are found here, many of which are Manchurian in origin and forming the northern reaches of their habitat: elm, eleutherococcus root, Mongolian oak, Daurian birch, Manchurian ash, Asian moon-seed (*Menispermum dahuricum*), Sargent's haw (*Viburnum sargentii*) and others.

Aside from the taiga and goosefoot communities, Manchurian-type communities dominated by river birch and Transbaikalian rhododendron pine ecosystems also occur here. The Nora and Selemdzha river valleys act as corridors through which species more common to the south can migrate northward to create mixed ecosystems.

Zoogeographically the region is characterized by an intermingling of four fauna zones: East Siberian, Mongolian-Daurian, Amur and Okhotsk-Kamchatkan. Ornithologically the latter

two are more apparent, whereas for mammals the East Siberian influence is more noticeable. In all the area is inhabited by about 300 different vertebrate species, including 70% of the birds found in Amur Oblast and about 50% of the mammals. Of special importance are the nesting sites of rare birds: Far Eastern white stork (4-6 nests), black stork (3 nests), white-tailed eagle (*Haliaeetus albicilla*, 3 nests) and osprey (at least 6 pairs). There is also a self-sustaining population of about 70 black cranes, which plays a key role in maintaining population health for these birds on a regional scale. Whooper swans (*Cygnus cygnus*) are also common (about 80 individuals), whose population density here is greater than anywhere else in the oblast.

Another unique feature of the Nora-Selemdzha interriparian zone is the world's largest migrating population of Siberian roe deer (about 7,000 individuals); population density in the summer approaches 40-50 head per 1,000 hectares. In winter the roe deer leave the area, migrating to the Orlovka-Gramatukha valley, with moose (250-300 head) descending from the nearby ridges to replace them in the Nora-Selemdzha. These wintering populations of roe deer and moose a key role in maintaining herd populations for both species.

With construction of the Baikal-Amur Mainline came an increase in industrial harvesting of forests. At the same time gold placer mining has been conducted all along roe deer migratory paths, resulting not only in habitat destruction but also in their being hunted and shot by temporary human residents. In recent years the water quality in the Nora has worsened significantly due to exploration and extraction of precious metals in mineral springs along the basin, and also due to open-pit mining of semi-precious stones (chalcedony), with severe effects on water quality. This, combined with increased poaching of fish reserves—often with the application of electric current to the watercourse—has drastically reduced fish stocks. At the same time, migrating populations of roe deer have been cut in half because of widespread poaching on their wintering grounds. Urgent protection measures are needed. Further damage is threatened by the proposed construction of the Dagmarskiy hydroelectric station, whose reservoir would flood most of the low-lying Nora-Selemdzha basin.

Existing protection initiatives

In order to better protect the Nora-Selemdzha, Norskiy regional hunting *zakaznik* was established in 1968 on 40,000 hectares. It was significantly enlarged in 1984 to 213,600 hectares, and its status upgraded to federal zoological reserve. Finally, after five years of analysis and advocacy, the *zakaznik* was converted to a *zapovednik*, its area lessened somewhat to 211,200 hectares. Other protected areas include Mamynskiy and Maiskiy *zakazniks*, established in 1959 and 1978 respectively to support roe deer conservation efforts and consolidated in 1995 into a single Oryol regional hunting *zakaznik* protecting 119,600 hectares. Ust-Norskiy botanical *zakaznik* is also located in the Nora-Selemdzha basin, as well as five natural monuments.

Recommended steps

In order to ensure reliable protection of the Nora-Selemdzha basin it is necessary to provide Norskiy *zapovednik* with funding to acquire and maintain sufficient material and technical capacity to enforce the *zapovednik's* protection regime, including personnel and equipment. It is also urgently necessary to incorporate an existing biological research station on an island within the Sorokaverstka branch of the Selemdzha at Norskiy. The *zapovednik* also requires a satisfactory buffer zone with various limitations on economic activity.

In the future, it should be a priority to include the Nora-Selemdzha wetlands in the Ramsar list of wetlands of international importance. It is also important to upgrade Oryol regional hunting *zakaznik* to federal status so as to ensure adequate protection of roe deer populations.

4. Nyukzhinskiy ridge and the Amur pine barrens

Description of the territory

This territory is located in a unique climatic subzone where severe Siberian winters are juxtaposed with relatively low annual precipitation. In this region the influences of the monsoon climate reach their northernmost limits, resulting in distinctive flora communities. Pine barrens similar to those found in the Baikal region serve as indicators for ecosystem health, while many plant species of Mongol-Daurian origin manage to penetrate into this region as well. Especially distinctive are the communities found in the flood plains in this part of the Amur, which are inhabited by flora found nowhere else in the oblast, including several that are listed in the Russian Red Book, such as Altaian onion (*Allium altaicum*). No less interesting are the flora of Nyukzhinskiy ridge, where the transition from alpine pine forests to Japanese stone pine shrub communities can be observed.

Much study of the region's fauna remains to be conducted; nesting sites of osprey and white-tailed eagle have been encountered. Like the region's flora, its fauna also shows Mongol-Daurian influences—the only part of the oblast where this is the case. Cliffs along the Amur are inhabited by musk deer (*Moschus moschiferus*), a population isolated from the species' primary habitat by 100 kilometers. Forested valleys in the area also support a number of other ungulates, particularly Manchurian wapiti. Therapeutic mineral springs (Ignashinskiy and Urushinskiy) are also found in the area.

The region lies adjacent to the Trans-Siberian railroad, and it was intensively developed during World War II and immediately thereafter. As a result, clear-cuts and selective logging have been conducted on 80% of the area's pine forests, and at present the last remaining mature stands are being harvested. New logging roads have already been constructed in the headwaters of the Urka and Urusha Rivers. In the last decade gold mining has also begun in earnest—exploratory work is now being completed at the “Snezhinka” site in the Urka headwaters. Several other significant deposits have been discovered, and those in the Oldoy and Khakta River basins are already being mined. The once-existing Urushinskiy *zakaznik* has been closed to make way for a gold mine there as well. At the same time, work is underway to complete the transcontinental Moscow-Vladivostok roadway, which will bring increasing numbers of people to this previously inaccessible region. Development plans for two new hydroelectric stations on the Amur (Dzhalindinskaya and Amazarskaya) have also been completed; construction will depend on the financial inclinations of the Russian and Chinese governments.

Existing protection initiatives

At present there is only one hunting *zakaznik*, covering an area of 36,800 hectares as a replacement for the now-defunct Urushinskiy *zakaznik*, and the area surrounding Ignashinskiy mineral springs has been designated as a recreational zone. Finally, there are four natural monuments in the region, mostly preserving the scenic cliffs along the Amur—the most famous being those at Cherpelskie Krivuny.

Recommended steps

Two proposed reserves in the region are included in a Federal Program for New Protected Areas. One is Urkinskiy *zapovednik*, whose establishment is proposed in the headwaters of the Urka, Urusha and Omutnaya Rivers. This *zapovednik* would ensure preservation of a typical Transbaikalian alpine forest landscape, as well as compensate for and monitor the damage being done by gold mining activity in the nearby Khakta River basin. Creation of this *zapovednik* is strongly supported by local residents; a 1989 petition drive collected more than 500 signatures supporting the initiative. Because of this support the Urka headwaters were excluded from logging by the Erofeevskiy *lespromkhoz*. The creation of a similar protected area in the Urka, Omutnaya and Nyukzha headwaters is included in the oblast's own program for creation of new protected areas.

The second *zapovednik* proposed in the Federal Program, Verkhneamurskiy, would ensure protection of the pine barrens typical along the upper Amur. One variant envisioned establishing the *zapovednik* along the Kutamanda River basin, but this had to be scrapped due to damage caused by extensive clear-cutting. The remaining alternative was to establish the protected area as a federal botanical *zakaznik* in the pine barrens found in the border zone near Cherpelskie Krivuny. Even more valuable for flora protection is the region near the village of Ignashino and the flood plains at the confluence of the Amuzara and Amur Rivers—a regionally administered protected area is suggested at this location. Another area proposed for protection is the pine forests along the Gerbelik River in the vicinity of the village of Chernyaevo. Finally, included in the oblast's program for new protected areas is an initiative to explore the possibility of creating a national park in this portion of the Amur basin.

5. Mountains and uplands surrounding the Zeiskiy reservoir

Description of the territory

The Tukuringra-Soktakhon-Dzhagdy chain of mountain ridges represents a distinct boundary between the southern taiga and the middle taiga of Amur Oblast. On the southern slopes and in river plains, Manchurian and Mongol-Daurian ecosystems protrude into a zone more dominantly inhabited by East Siberian flora and fauna. The primary paths for the northward migration of these more typically southern communities were the Zeya and Ogoron River basins. The first of these was closed off by construction of the Zeya hydroelectric station, whose reservoir flooded over 240,000 hectares of forest and river plains when the dam was constructed in the early 1980's. The Zeya Reservoir, as it is now called, serves as a grandiose testing grounds for the study of human impacts on the nature of the Amur basin. The second pathway for species migration, the Ogoron basin, has also seen its share of anthropogenic degradation thanks to the construction of the Baikal-Amur Mainline. As a result, this entire complex ecosystem has fallen into an unsustainable condition, constantly attracting the alarmed attention of ecologists.

In spite of these developments, vast massifs of virgin forest and accompanying flora and fauna remain intact in these highlands, whose landscapes also have great recreational potential. *Zeyskiy zapovednik*, which abuts the vast reservoir, preserves alpine ecosystems typical of the northern Amur basin. Thanks to its location on the northern boundary of the southern taiga biome, valley floors in the *zapovednik* are inhabited by 637 vascular plant species, many of which are Manchurian in character. 230 bird and 52 mammal species also make this landscape home. Among the inhabitants are five bird species listed in the Russian Red Book: golden eagle (*Aquila chrysaëtus*), white-tailed eagle, osprey, slender-billed curlew (*Numenius tenuirostris*), and Siberian spruce grouse (*Tetrao falcipennis*).

The scientific staff of *Zeyskiy zapovednik*, along with a multitude of scientists from other research institutions, have been studying the Reservoir's effects on the flora and fauna inhabiting Tukuringra Ridge. Sadly, monitoring at the *zapovednik* has tapered off in recent years due to an absence of sufficient funding to cover the expenses incurred by conducting on-site analyses.

At the same time the water quality in the Reservoir is worsening, with fish stocks declining to a tenth of earlier volumes, and water level regulation is conducted with no regard to issues of nature protection. Meanwhile the construction of Gilyui hydroelectric station where the reservoir narrows to become the Gilyui River will bring new anthropogenic incursions into *Zeyskiy zapovednik* as silt from the reservoir builds up in the wide bay that will form behind the new dam. The Gilyui basin itself is now actively mined for gold, exacerbating the situation. Finally, these uplands have high recreational potential, whose associated development will additionally complicate nature protection efforts.

Clear-cutting has been conducted throughout the foothills of these ridges, with timber firms now moving into river headwaters for their harvesting. The last dark conifer forests within Verkhne-Depskiy *zakaznik* are presently being logged. This, together with the discovery of gold that has led to placer mining in all the tributaries along the right bank of the Dep river, has left the region a lunar landscape of barren hills and mining waste. Nearby Lake Orogon and its surrounding marshes have also become polluted by this activity.

Existing protection initiatives

Zeyskiy *zapovednik* was established in 1963 on Tukuringra Ridge, and enlarged in 1986 to 99,400 hectares. When the Zeya Reservoir was formed, part of the *zapovednik* was flooded, including many of its most valuable flood plain ecosystems. Meanwhile, creation of a new national park on the rest of the uplands surrounding the reservoir is proposed in the Federal Program for Creation of New Protected Areas. Also, in response to the first Hotspots Conference, oblast authorities established Bekeldeul regional hunting *zakaznik* on 104,700 hectares; special conditions were applied to this territory prohibiting industrial logging within its boundaries. This *zakaznik* was initially envisioned as a future addition to Zeyskiy *zapovednik*, but thus far a lack of funds has prevented the *zapovednik* from annexing this territory.

Verkhne-Depskiy regional hunting *zakaznik* was organized in 1976 on the Dep River, including all of Lake Ogoron in its boundaries. Sadly, of its 156,800 hectares, 5,000 have been commercially logged while another 15,000 have been degraded by placer mines. This constant source of concern has caused declines in a number of protected animal species, while the Ogoron basin has lost its value as a migration route for moose and roe deer.

In addition to the *zapovednik* and *zakaznik*, there are nine regional natural monuments and four county natural monuments in the area.

Recommended steps

A top priority is to obtain financial and technical support for Zeyskiy *zapovednik*, first and foremost for thorough monitoring of the Zeya Reservoir's ecological effects. It is also important to enlarge the *zapovednik*'s northern portion to include the watersheds along the left bank of the Gilyui River. In addition, funding should be secured to incorporate Bekeldeul *zakaznik* into the *zapovednik*. Finally, the forests along the mountainous shores of the reservoir should be designated for recreational use. In the future, it is desirable to create a national park on the entire upland area, for which Zeyskiy *zapovednik* could serve as a core natural area.

Appendix A: Resolution on the Development of Protected Areas in Amur Oblast

Having reviewed the report of Yu.A. Darman, "Development of a Network of Protected Areas in Amur Oblast," as well as the suggestions of all interested agencies, the participants of the Roundtable consider it necessary to:

1. Adopt as a foundation the program for the development of a System of Protected Areas in Amur Oblast (Yu.A. Darman), including the additional suggestions of Roundtable participants; within one month complete work on the program and prepare a draft of a resolution to be enacted by the Head of the Amur Oblast administration.
2. Devote particular attention to those territories of Amur Oblast that are of greatest significance for biodiversity conservation, under threat of anthropogenic disturbance, and that are key to the Russian Federation's compliance with international agreements (Hotspots):
 - a. Arkharinskaya Lowland and the foothills of the Lesser Khingan range;
 - b. The southern portion of the Zeiskiy-Bureinskiy Plain;
 - c. "Mukhinka" natural area;
 - d. Nora-Selemdzha river system;
 - e. Nyukzhinskiy ridge and the Amur pine barrens;
 - f. Mountains and uplands surrounding the Zeiskiy reservoir.
3. Place priority on the maintenance of the existing Protected Areas network, first and foremost *zapovedniks*, Federal wildlife refuges, and wetlands of international significance (e.g., Ramsar Convention).
4. Establish new Protected Areas of varying status to preserve the Hotspots of the region, first and foremost in the following territories:
 - a. Upper Zavitsinskiy biological (hunting) *zakaznik*;
 - b. Orlovskiy Federal biological *zakaznik*;
 - c. Urkinskiy *zapovednik*;
 - d. Mukhinskiy Nature Park and Botanical Garden.
1. Begin work on creating a system of botanical *zakazniks* to be administered by the Amur Regional Forest Service that preserves exemplary forest massifs of the region, first and foremost in the zone of projected clear-cuts along the Baikal-Amur Mainline railroad (BAM). The possibility of creating Amur Oblast's first National Park should also be explored.
2. Expand the existing Ust-Tygdinskiy and Voskresenskiy hunting *zakazniks*, and strengthen the nature protection status of *zakazniks* administered by the Regional Hunting Directorate.
3. Create a working group to conduct an inventory and reorganization of Regional Natural Monuments.
4. Provide for broad public awareness of the importance of a system of Protected Areas in conserving the biodiversity and promoting sustainable development in Amur Oblast.

Chairman,

A.T. Koval, Chairman of the Amur Regional Committee on Environmental Protection

Secretary,

Yu.A. Darman, Ph.D., Director of the Amur Branch of the Socio-Ecological Union

Blagoveshchensk, 20 Feb 1998

Appendix B: Workplan for the Development of Protected Areas in Amur Oblast
(Resolution #139 of the Amur Oblast Administration, 1 April 1998)

No.	Protected Area Name	Year	Area, ha.
1	Creation of Urkinskiy State <i>Zapovednik</i>	1998-2000	72,600
2	Creation of Upper Zavitinsky biological (hunting) <i>zakaznik</i>	1998	36,100
3	Completion of Botanical Gardens	1998	600
4	Creation of Orlovskiy Federal comprehensive <i>zakaznik</i>	1998	119,600
5	Feasibility study on creation of Kuprianovskiy biological <i>zakaznik</i>	1998	15,000
6	Feasibility study on increasing the protection regime of Urkanskiy hunting <i>zakaznik</i> to Federal status	1998-99	141,000
7	Expansion of Voskresenskiy Regional hunting <i>zakaznik</i>	1998-99	60,000
8	Creation of Mukhinskiy Regional nature park	1998-2000	35,000
9	Feasibility study on creation of a National Park	1999	100,000
10	Expansion of Ust-Tygdinskiy Regional hunting <i>zakaznik</i>	1999-2000	100,000
11	Reorganization of the system of Regional Natural Monuments	1998-2001	
12	Creation of two botanical <i>zakazniks</i> in the vicinity of the BAM	1999-2001	100,000
13	Feasibility study on the creation of the Upper Amur State <i>Zapovednik</i>	1999-2001	100,000