

III. Sakhalin Region

Overview of the Region

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Location

Sakhalin Island lies east of mainland Khabarovsk Krai, about 1,000 km. north of Vladivostok and 40 km. north of Hokkaido, Japan. It is surrounded by the Sea of Okhotsk to the north, the Tatar Strait to the west, the Sea of Japan to the south, and the Pacific Ocean to the east. The Kuril Islands stretch north to south from Kamchatka Peninsula to Hokkaido.

Size

The oblast covers 87,100 sq. km. Sakhalin Island is 950 km. long and 160 km. at its widest point. The Kuril Island chain spans 1,200 km. and has a total land area of 13,900 sq. km.

Climate

Influenced by the sea, Sakhalin's climate is milder and wetter than that of mainland Khabarovsk Krai. Average temperatures range from -30C in January to 15C in July. Spring arrives one month earlier in the south than in the north. Summer is cool in all regions except in August. June and July are especially misty and foggy. Fall has typhoons with hurricane-force winds. Snow is heavy from November to March, reaching a maximum height of 50 cm. in the north, 70 cm. in the south, and up to 100 cm. in the east. The Tym-Poronaysk lowlands, where winter temperatures can reach -40C and in summer up to 38 C, have the most extreme temperature shifts. The Kuril Islands are less influenced by the monsoons than is Sakhalin, but there are swift weather changes. Winters are mild, summers are cool.

Geography and Ecology

Sakhalin Island

Mountains cover three-fourths of Sakhalin Island. The Tym and Poronay Rivers, the island's largest, flow between two parallel mountain ranges that extend north to south on either side of the island. These rivers meet in the Tym-Poronayskaya lowlands in central Sakhalin. Agricultural activity has polluted many wetlands along the Tym River floodplain. The highest point of the western range is Onor Mountain (1,330 m.), while Lopatina Mountain (1,609 m.) is the highest point of the eastern range. A third large mountain range Susunayskiy Ridge lies in the south near Sakhalin's capital, Yuzhno-Sakhalinsk.

Forests cover 60% of the island and differ greatly from north to south. Larch forests cover the northern mountain valleys. Sakhalin's widest stretches of forests (spruce and fir with bamboo undergrowth) are in the central regions. The southern half of the island was clear-cut during the Japanese occupation between the two world wars. However, old-growth fir forests grow along Susunayskiy Ridge, between the population centers of Dolinsk and Yuzhno-Sakhalinsk, and some fragments remain on Krilon Peninsula in the southwest. Southern and northern flora grow together in the south providing habitat for a large number of rare species. Rich wetlands stretch along the northwestern and northeastern coasts, along the shores of the Bay of Endurance, and in the south, near Aniva Bay.

High precipitation, low evaporation, and the mountainous relief have created more than 16,000 lakes and 65,000 rivers, most of which are less than 10 km. long and important spawning grounds. All of Sakhalin's rivers flow into the Sea of Okhotsk, the Tatar Strait, or the Sea of Japan.

The Kuril Islands

A chain of volcanoes broken by straits, the Kuril Islands are still in the process of being formed; there are 39 active volcanoes. Tyatya Volcano (1,819 m.) on Kunashir Island and Alaid Volcano (2,339 m.) on Atlasova Island are the highest. Hydrothermal springs that dot

many of the islands and frequent earthquakes are testaments to the islands seismic activity. Typhoons and tidal waves hit the islands, too. Primarily coniferous-broadleaved forests cover 55% of the southern Kurils (Kunashir and Iturup Islands). Bamboo is also widespread in the south. Only bush vegetation grows in the north. Dwarf Siberian pine grows at higher elevations on all the islands.

Flora and Fauna

Forty-three percent of all bird species, 27% of all mammal species, and 94% of all whale species in the former Soviet Union live in or migrate to the region. Birds such as whooper swans, white-winged scoters, mergansers, spoonbilled sandpipers, and oystercatchers migrate to the island's coastal wetlands from as far away as Australia. Rare birds include the white-tailed sea eagle, Steller's sea eagle, spotted greenshank, and Blackiston's fish owl. Brown bears, sable, river otters, musk deer, and foxes all depend on the forests. Whales, dolphins, sea lions, walruses, and a variety of seals feed off Sakhalin's shoreline and along the Kurils.

Sakhalin's geographical position, length, and proximity to the cold Sea of Okhotsk, warm Japan Sea, and Pacific Ocean determine the unique and mosaic nature of its vegetation. Of the 1,313 species of wild plant growing in the oblast, 88 are found nowhere else.

Around the Kurils, warm and cold currents come together to create an extraordinary diversity and wealth of marine life. In addition to many rare marine mammals, the Kurils have huge seabird colonies. Along with southern Primorskiy Krai, Kunashir Island has the greatest number of Red Book species in the Russian Far East.

Forests

Sakhalin Oblast's vegetation ranges from tundra, mountain deserts, and marshland to larch, fir/spruce, and conifer-broadleaved forests.¹⁷ Sakhalin and Kuril Island forests are distributed unevenly, with the widest stretches in Sakhalin's mountainous central region and on the southern Kuril Islands, Kunashir and Iturup. The least forested areas are the agriculturally developed northern Sakhalin Plain, Tym River valley, and the Susunayskaya lowlands. The northern Kurils are virtually treeless. The state controls 692,600 ha. of forested land (79.5% of the total land area), containing about 623 million cu. m. of timber. Of that, about 342 million cu. m. are considered to be mature and over-mature trees. Almost 94% of Sakhalin's forests are coniferous. The average lesistost is 55.7%.

Sakhalin Island

The main forest species are Ayan fir, larch, Sakhalin spruce, stone birch, and silver birch. In the far south, typical southern flora (e.g., Kuril bamboo and liana vines) grows together with northern types (such as spruce and dwarf Siberian pine). Forests of Ayan fir, Sakhalin spruce, and stone birch thrive, together with broadleaved varieties (e.g., Mongolian oak, Manchurian ash, cork, maple, elm, Sakhalin cherry). Deciduous poplar and willow forests grow in river valleys, with undergrowth of gigantic ferns and large umbrella-type plants. Bamboo and liana grow underneath the conifer-broadleaved forests.

Southwestern forests are primarily Sakhalin spruce, yew, Amur cork tree (*Phellodendron amurense*), oak, and bird cherry. In mountain foothills, stone birch and dark-conifer species increase, and, higher up, sparse stone pine forests with bamboo undergrowth are dominant. Small stands of oak with a thick ground covering of bamboo grow along the coast. In mountain regions, vegetation belts are clearly visible. Fir and spruce forests give way to mixed forests higher up, which are then replaced by dwarf Siberian pine. High mountain tundra vegetation grows above the dwarf Siberian pine thickets.

The mountain forests south of the 48th parallel are made up of Sakhalin fir, with Ayan fir, yew, and stone birch. The dark-conifer forests of the southeast are made up of Sakhalin spruce with Glana fir, yew, oak, maple, bird cherry, and vines. Maira fir predominates on Aniva Cape.

North of the 48th parallel, Kuril bamboo and broadleaved species gradually disappear and larch plays a more and more dominant role. In mountain regions dark-conifer fir and spruce forests begin to dominate, covering the mountain slopes. Dwarf Siberian pine forests grow at higher elevations. The turf marshes of the Poronaysk lowlands and along the Tym River valley are dotted with sparse larch forests mixed with silver birch and dwarf birch. The Tym River watershed and its tributaries have tall poplar forests with some alder, willow, and bird cherry. Larch forests along the Tym River are productive.

On Schmidt Peninsula, in the far north of the island, fir and spruce forests cover the mountain slopes to a height of 300 m. At higher altitudes they are replaced by a belt of short stone birch, and, lastly, by thickets of dwarf Siberian pine.

The Kuril Islands¹⁹

Among the islands 1,000 species of plant are 45 varieties of deciduous trees, 95 varieties of bush, 6 species of conifer trees and 11 species of liana.

The southern islands of Kunashir and Iturup have the most diverse forests, particularly southern Kunashir with its rich conifer-broadleaved forests. The main broadleaved species are oak, maple, elm, Amur cork tree (*Phellodendron amurense*), dimorphant, bird cherry, birch, Sakhalin fir, spruce, and yew. Glenna fir, ash, magnolia, and holly also grow here. The main coniferous species are fir and spruce. Larch forests cover the central part of Iturup.

Bamboo is widespread on the southern and central islands and grows quickly on logged areas forming dense thickets, thereby making natural forest regeneration virtually impossible. Stone birch forests, which stretch as far north as Matua Island, are interspersed with maple and cherry trees. Only bush vegetation grows on the more northern islands. Thickets of dwarf Siberian pine can be found on all the islands except on Shikotan, Matua, and Alaida; it becomes the dominant form on Urup Island and all islands further north.

Forest Hotspots

1. River Basins on the Southeast Coast
2. Vaida Mountain
3. Nabil'skiy Ridge and the Pursh-Pursh and Vengeri River Basins
4. Kril'on Peninsula
5. Schmidt Peninsula

Main Resources

Fish, timber, oil and gas, coal, and gold. Proven off-shore oil reserves are estimated at 1.5 billion barrels. The Kuril Islands have considerable marine resources and mineral deposits including titanium, sulfur, and gold.

Main Industries

Fishing and fish processing represent 30% of the oblast's total industrial activity. The Kuril Basin and Sea of Okhotsk are some of the richest fisheries in the world, providing about 50% of the total seafood supply for the former Soviet Union. Kuril Island rivers alone yield more than 25,000 tons of salmon every year. Forestry (timber, pulp, and paper) is the second largest industry. Industrial production of coal, oil, and gas is declining due to high transport costs, loss of federal subsidies, outdated machinery, and intensive resource exploitation. Commercial production of the huge off-shore oil and natural gas reserves is likely to increase in the next 5 to 10 years. The oblast remains a source for raw materials and has poorly developed processing industries.

Sakhalin's Protected Area System

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Zapovedniks (Strict Nature Reserves)

Poronayskiy Zapovednik

Area: 56,669 ha.

Established in 1988, this zapovednik protects the remaining intact conifer forests on Terpeniye (Endurance) Peninsula, which extends from central Sakhalin to the southeast. The forest protected by the reserve is not a top-quality forest, the best was logged long ago. Protected fauna include Sakhalin musk deer, Siberian spruce grouse, Steller's sea eagle, white-tailed sea eagle, and Aleutian tern. In addition to protecting forest, the reserve also protects important wetland sites for migratory waterfowl.

The reserve is made up of two unconnected sections that almost meet along the coast. A much larger reserve was originally planned, but it proved impossible to reach agreement with logging ventures based in Sobolinoe, a village situated between the two protected sections. Unfortunately, many protected species wander over to the unprotected zone and are hunted by villagers. Zapovednik staff have been trying to change the reserve boundaries, but, so far, have been unsuccessful. The staff are also trying to bring Tyuleniy [Seal] Island (just off the southern tip of Terpeniye Peninsula) under their jurisdiction; it is now under the control of the Fisheries Commission (rybkhoz) and seals are often poached.

The zapovednik needs to develop an ecological education program to increase local awareness of the reserve's important role in protecting the region's ecology, but it is poorly equipped to do so. The zapovednik has no information center, no tourist paths, and no organized plan for small-scale tourism. The zapovednik's scientific research department is severely understaffed.

It is also important to connect the two pieces of the reserve. But it must be done in a way that takes the needs of the local populations into consideration, which means that regulated hunting, fishing, small-scale logging, and tourism should probably be allowed in the currently unprotected zone.

Kurilskiy Zapovednik

Area: 65,365 ha.

Established in 1984, the zapovednik protects the northern and southern parts of Kunashir Island (49,899 ha. in the north and 15,266 ha in the south), and Demida and Oskol'ka Islands. There are limitations on some forms of commercial activity in the area between the two sections and there is a one-mile coastal buffer zone around each section. The reserve protects varied and unique landscape including the Golovina Volcanoes and Goryachee ("Hot"), Kipyashchee ("Boiling"), and Tyatya Lakes. The islands lie on the northern habitat border for many southern species of plant. Protected species of mammal include: brown bear, sable, mink, ermine, and sea lion. Rare birds inhabiting the reserve include albatross, Japanese crane, and Blackiston's fish owl.

The zapovednik also controls the Maliy Kurils (Little Kurils Zakaznik (45,000 ha.), which protects some of the smaller Kuril Islands including Shikotan and Zelyoniy. This zakaznik protects migratory waterfowl habitat and marine mammals including whales and dolphins.

Zakazniks (Wildlife Refuges)

Federal-Level zakazniks

1. Maliy Kurils (Lesser Kurils)

Regional Level zakazniks

1. Dobretskoe Lake
3. Krilon Peninsula
4. Krasnogorskiy
5. Makarovskiy
6. Losiniy
7. Aleksandrovskiy
8. Tundroviy
9. Oleniy
10. Severniy
11. Ostovniy
12. Urup Island
14. Lyavro Island

Source: Sakhalin Committee on Environmental Protection, 1997.

Sakhalin Forest Hotspots

Overviews of Sakhalin's Forest Hotspots have been coordinated by Dmitriy V. Lisitsyn, Director of Sakhalin Environment Watch (NGO). Specialists who prepared reports on each hotspot are listed at the end of each report.

1. **River Basins on the Southeast Coast**
2. **Vaida Mountain**
3. **Nabil'skiy Ridge and the Pursh-Pursh and Vengeri River Basins**
4. **Kril'on Peninsula**
5. **Schmidt Peninsula**

1. *River Basins on the Southeast Coast (Anna, Sima and Bakhura Rivers)*

Description of the territory

The Anna, Sima and Bakhura River basins begin from their headwaters on the eastern slope Susunaiskiy Ridge, flowing east into the Sea of Okhotsk. Dark coniferous forest characterize these basins, with a predominance of fir. The area's topography is highlighted by five peaks: Shuya (612 meters); Sokol'skaya (839 meters); Pervomayskaya (749 meters); Bykova (954 meters); and Avgustinovicha (1,034 meters), which are interspersed by numerous rock slides and steep, narrow valleys.

Sakhalin's southeast coast differs from other areas of the island with its relatively mild winters. January temperatures average approximately -13°C , falling to -15° on mountaintops. The warmest month is August, when temperatures average $16-17^{\circ}$. Absolute high temperatures are much higher, however, exceeding 30° . Annual precipitation totals 800-1000 millimeters, with 130 frost-free days. The area is also one of Sakhalin's snowiest. Because of the heavy snow cover, mild temperatures and fast currents, the rivers do not freeze over in the winter. The area's ground cover is predominated by alpine podsol, alluvial/humus and brown forest soils, usually with high clay content.

The territory's flora communities are dominated by spruce and fir forest, which cover 70% of the territory and serve as a defining factor throughout the landscape. The remaining forest cover in the Anna River basin is occupied by willow, alder, Japanese stone pine shrubs (*Pinus pumila*) and stone birch (*Betula ermani*). Thanks to the rarity of forest fires and the absence of past timber harvesting, these virgin, old-growth forests have been allowed to evolve into complex ecosystems with high biodiversity.

The flora in the Anna River basin consists of 272 vascular plant species, or 23% of all such species found on Sakhalin Island. Many species were first discovered in this area, and twenty are listed as Red Book species (RFE, Russian and/or USSR). Numerous species of moss, lichen and fungus are found in the territory as well.

The basin's fauna includes 201 vertebrate species: 162 birds, 35 mammals, two amphibians and two reptiles, totaling about 40% of all vertebrates in Sakhalin Oblast. 18 animals are designated as Red Book species: one mammal—the endemic Sakhalin musk deer (*Moschus moschiferus sachalinensis*), and 17 birds including Mandarin duck (*Aix galericulata*), bean goose (*Anser fabalis*), whooper swan (*Cygnus cygnus*), eagle owl (*Bubo bubo*), jer-falcon (*Falco rusticolus*), peregrine falcon (*Falco peregrinus*), cuneate-tailed gull (*Rhodestethia rosea*) and others.

The ecosystems of the other two basins (Bakhura and Sima) are not as well studied, however they do differ significantly from the Anna basin. The Sima basin particularly distinguishes

itself with scenic cliffs and waterfalls not found in the Anna basin. There are also wild groves of Ainu cherry (*Prunus ainensis*).

The watershed of the Bakhura River is significantly larger than that for the other two rivers, totaling 36.7 km². These valleys are dominated by large poplar and willow trees frequently used for nests by white-tailed and white-shouldered eagles, as well as magnificent stands of oak and other broadleaf species. These add a distinctive, east Asian accent to the otherwise boreal nature of the area's flora communities.

All three rivers are important spawning grounds, and thanks to the dense forest cover along their banks they are the most productive along the entire southeast coast of Sakhalin. Char (*Salvelinus*), sea trout (*Salmo trutta*), humpback salmon (*Oncorhynchus gorbuscha*), chum salmon (*O. keta*), and Japanese salmon (*O. masu*) are the most common species spawning in these rivers.

From 1940 to 1990 the territory did not experience any significant impacts from human economic activity. The absence of roads and alpine topography helped prevent the region from being settled. This has begun to change, however, with the appearance of commercial timber harvesting and logging roads on nearby lands. Fishing, hunting and collection of wild herbs (both legal and poaching) have also begun to take their toll, as well as an increasing recreation load. One company, for instance, which has a permit to harvest salmon in the Anna River ("Feniks-2"), typically strings a large net across the mouth of the river in order to obtain its catch, severely violating the natural reproductive cycle of this salmon population.

Another notable example of the increasing anthropogenic influence is the construction of a gravel road along all three rivers, which was accompanied by destruction of many scenic cliffs, ground leveling (and with it the disappearance of entire flora communities) and other problems. Further upstream the road construction required clearing of a 20-50 meter strip along a seven-kilometer stretch of road, as well as placement of terraces and catchments along steep cliffs. This road will likely bring about a number of changes in the rivers' hydrological regimes, initiate erosion processes and wind-throws, and most importantly will provide access to previously inaccessible areas—bringing with it an increased likelihood of forest fires and poaching.

Existing protection initiatives

In general the region is the one area in all of southern Sakhalin that has not been significantly impacted by human development. Climax ecosystems have remained intact in the Anna River basin, part of which was designated as a natural monument in 1983 (3,000 hectares). There is also an initiative to create Susunaiskiy National Park, which would protect the headwaters and basins of all three rivers. This effort, which is supported by the Regional Committee on Ecology, is also included in a federal Program for Creation of New Protected Areas by 2005.

Recommended steps

- Improve protection regime at the Anna River natural monument;
- Phase out leases for salmon harvesting in all three rivers;
- Enlarge the Anna River natural monument to 50,000 hectares since the area at its present small size cannot adequately protect a number of species requiring larger habitats, such as eagles, brown bears, otters, sables, minks and others;
- Raise the protection status of the natural monument;
- Encourage the creation of Susunaiskiy National Park.

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2. Vaida Mountain

Description of the territory

Vaida Mountain, once called Okadayama by the Japanese, is the largest ancient rift formation on Sakhalin Island. It is located at the headwaters of the Vitintsy River, twelve kilometers southeast of the town of Izvestkoviy. Its two peaks (835 and 947 meters) are among the highest points in the Rukutama River watershed, which includes the Vitintsy and Melkaya Rivers. Vaida's uniqueness stems from its 24 karst cavities, which are of colossal interest to geomorphologists, while its environs in general have great geological, archaeological and zoological interest, as well as the presence of rare flora species.

The most impressive features of Vaida Mountain are its caves, particularly Vaida Cave, Medvezhikh Tragediy ("Ursine Tragedy") Cave and Kaskadnaya Cave. The unique formations and the brilliance of their stalactites, stalagmites, as well as the presence of petroglyphs, artifacts and a variety of animal remains have attracted specialists for decades.

The areas around the mountain that have remained undisturbed by fire host fine examples of alpine flora, including two species of lady's slipper (*Cypripedium calceolus*), as well as a number of rare insects including swallowtail butterflies (*Papilio machaon*).

Two kilometers to the south of Vaida is remarkable Lake Pereval'noe. This kettle lake, approximately 6 km² in area, was formed by a landslide, with multi-year peat formations along its shores. The lake may be the only one in eastern Sakhalin that does not dry out.

In the watershed above the lake there is a tiny population of East Sakhalin poppy, endemic to these mountains. In the ten years between 1986 and 1996 the number of these rare plants increased from 3-5 to 30-40.

Although Vaida Mountain was declared a natural monument in 1983, there have been numerous violations of its protection regime that have been reported in the local press, including logging and mining activities. All these operations were approved by the local raion administration, despite the regulations protecting the natural monument. In addition, construction of a new road in the late 1980s led to a complete extirpation of caribou because of hunting pressures. Future threats include possible limestone mining at Vaida once existing deposits elsewhere are depleted; the presence of the new road makes Vaida a very convenient location for an open-pit quarry.

Existing protection initiatives

The natural monument at Vaida Mountain was established by the Sakhalin Oblast administration in 1983. Nonetheless, the existence of the road and the ease with which the protective regulations of the natural monument could be repealed at any moment (particularly with the emergence of a demand for the mountain's limestone resources) leave the area highly vulnerable.

Recommended steps

In the future it is advisable to convert the natural monument at Vaida Mountain to a nature park, strengthening its protection regime. Recreational visits to the mountain's caves could be led by experience guides.

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3. Nabil'skiy Ridge and the Pursh-Pursh and Vengeri River Basins

Description of the territory

The area encompassing Nabil'skiy Ridge and its adjacent river basins is one of the last large-scale intact ecosystems on Sakhalin Island. Located in the central part of the island, the region is characterized by dark coniferous forest dominated by spruce.

The region is distinguished by its highly complex geomorphological structure, with steep, jagged mountains ridges running north to south. Nabil'skiy Ridge includes the island's highest peaks, reaching 1,400-1,600 meters in elevation, while Tsentral'niy Ridge's peaks are somewhat smaller—700-900 meters. The mountains are interspersed with numerous rivers and streams. These landscapes are highly attractive for tourists.

The headwaters of the Pursh-Pursh and Vengeri Rivers rise in the eastern slope of Nabil'skiy Ridge, running east into the Sea of Okhotsk. Pursh-Pursh River's length is 30 kilometers, while Vengeri's is 35 kilometers. Both rivers are important spawning grounds. The region's climate is influenced by the topography and the North Sakhalin current in the Sea of Okhotsk; winter temperatures average -22°C , with 70-80 centimeters of snow. Snow covers the coastal areas for about 6.5 months of the year, while the mountaintops are snow-covered 7.5-8.5 months per year. Summers are cool and rainy with frequent mists. Average temperatures in August, the warmest month, do not exceed 15°C .

The soils in this region are predominantly podsol, at higher elevations varying among alpine forest brown soils, alluvial/humus and peat. The soils support highly productive, virgin coniferous forests.

At present the natural complexes of the Pursh-Pursh and Vengeri basins are well studied thanks to financial support from Friends of the Earth-Japan and the Regional Committee on Ecology. Of particular value in this region are large tracts of spruce/fir and larch forests that have not been disturbed by commercial logging or fire. Stone birch and aspen communities are also found in the area, along with poplar/willow, white birch (*Betula verrucosa*), alder, elm, oak, maple and others. There is a high degree of endemism, particularly among the high-mountain vegetation.

The features of the region's topography and climate, along with the mosaic of various vegetative communities, provides conditions for a maximum of species diversity. The flora of the river basins consists of 374 vascular plant species, or 33% of all known to inhabit Sakhalin Island. Thirty of these species are rare and endangered, including Redovskiy's rhododendron (*Rhododendron redovskiyi*), Koizumi's lousewort (*Pedicularis koizumii*) whole-leaf miyakeya and many others. The miyakeya is a monotypic genus, endemic to Sakhalin and found nowhere else in the world.

The fauna of the region consists of thirty terrestrial mammals, 186 bird species, five amphibians and reptiles, comprising 60%, 52% and 70% respectively of the species found on Sakhalin. 28 species are listed in the Russian, Japanese and South Korean Red Books, as well as IUCN's. Mammals include Sakhalin roe deer and caribou; for the latter the area is important for the rutting season, and also for calving and rearing the young. Rare birds include brent goose (*Branta bernicla*), swan goose (*Cygnopsis cygnoides*), whooping swan, Mandarin duck, osprey, golden eagle (*Aquila chrysaetus*), Siberian spruce grouse (*Tetrao falcipennis*), eagle owl, white-tailed and white-shouldered eagles and others. Eagles in particular form large populations in the area. It's not uncommon to encounter 8-9 individuals

in one day during the autumn; this is facilitated by the presence of a rich feeding base, the abundance of convenient nesting sites and the absence of humans.

The region's forests have been well preserved by optimal thermal and hydrological features, and as a result the Pursh-Pursh and Vengeri Rivers are productive spawning grounds for humpback salmon, as well as chum salmon, Japanese salmon, coho salmon, char and sea trout.

The landscapes of the area are highly attractive for tourists. In the summer, the deep snows of the mountainsides are a favorite for skiers, with a ski camp run every year at Chamginskiy Saddle.

In all, the territory is a unique natural complex, with a high degree of biodiversity and many (58) rare and endemic species. Although the Pursh-Pursh and Vengeri basins comprise only 1% of Sakhalin's land area, about a third of the island's flora and 60% of its terrestrial fauna can be found here.

Until 1995 the area experience no anthropogenic impacts other than minimal recreational and hunting activity. This is probably due to the relative inaccessibility of the region, for which Nabil'skiy Ridge serves as a formidable barrier. However, with the lease of part of the territory to Smirnykhovskiy lespromkhoz, including construction of logging roads and projected helicopter transportation of felled timber as well, the virgin old-growth forests and their considerable biodiversity are under significant threat.

At the present time work continues on construction of roads and bridges. Within a few years, after logging has been conducted in the area and a road through the area has been completed, these unique virgin forests will be lost for hundreds of thousands of years.

Existing protection measures

Thanks to the efforts of activists and scientists, with the support of Friends of the Earth-Japan, in 1998 initial documentation was completed and approved for the creation of Vostochniy zakaznik, which will cover 66,400 hectares of old-growth forest in the Pursh-Pursh and Vengeri Rivers.

Recommended steps

For effective protection of this unique area it is necessary to:

- End commercial logging in the forest;
- Terminate the lease of the site to Smirnykhovskiy lespromkhoz in connection with repeated violations of logging regulations;
- End construction of roads and bridges in the area;
- Complete organization of Vostochniy zakaznik

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4. Kril'on Peninsula

Description of the territory

Kril'on Peninsula forms the southwestern tip of Sakhalin Island, bounded on the east by Aniva Bay, on the west by the Tatar Strait and on the south by La Perouse Strait. The

peninsula's climate is heavily influenced by its southern location and its proximity to the western branch of the warm Tsushima Current. The warmest part of Sakhalin Island, Kril'on has mild, snowy winters, with average January temperatures at -10° C, while summers are warm and humid with August temperatures averaging 17° C. Spring comes to the peninsula in early April, while autumn continues until mid-November; there are 140-160 frost-free days each year.

The peninsula's topography is highlighted by the South Kamyshoviy Ridge (elevations 250-500 meters), with mountains criss-crossed by numerous rivers and paleolithic geological layers. Thin sea terraces line the shores, occasionally interrupted by scenic cliffs.

Alpine forest soils cover much of the peninsula, supporting primarily fir and coniferous/broadleaf stands. In general, the ecosystems are characteristic of southern dark coniferous taiga, mixed with species usually found further to the south. For this reason the peninsula boasts some of the highest species diversity found on Sakhalin.

In the 1930's and 1940's, and also during the post-war years, this part of Sakhalin was heavily clear-cut, often with little or no management and accompanied by fires. Large portions of the native forests have been destroyed, replaced by birch plantations of minimal productivity interspersed with large stands of Kurile bamboo (*Bambusa kuriliana*). In some areas clearings have developed, while on steep slopes erosion processes have begun to take their toll. Misguided land use practices have caused microclimatic changes, leading to degradation of unique southern Sakhalin flora communities. There have been noticeable declines in animal populations, including rare species. At the same time the peninsula's forest cover has fallen by 40%, threatening a wide range of the forest's hydrological functions. Continued commercial harvesting will lead to irreversible losses in populations of vulnerable plant and animal species.

Because of its high species diversity, the peninsula has global importance for biodiversity conservation. Its flora includes over 500 vascular plant species, and even more mosses, lichens and fungi. No fewer than 31 species are listed in the Russian Red Book, and 48 in the Red Book of the Russian Far East. These include Wright's haw (*Viburnum wrighti*), spurred coral root (*Epipogum aphyllum*), Sakhalin catchfly (*Silene sachalinensis*) and others.

The peninsula's fauna is no less diverse. In addition the typical brown bear, fox, sable, raccoon-dog, and others, the area is also inhabited by 100 bird species, including twenty that are listed in the Russian Red Book including osprey, white-tailed eagle, Mandarin duck, peregrine falcon, Japanese snipe (*Capella japonica*), eagle owl and Japanese white-eye (*Zosterops japonica*). In the peninsula's river valleys nest the red-legged crane (*Porzana porzana*), a very rare visitor to Russia, as well as Japanese cranes (*Grus japonica*) and Far Eastern white storks (*Ciconia ciconia*). The cliffs of the extreme southern tip of the peninsula hosting colonies of black guillemot (*Uria grylle*), ancient auk (*Synthliboramphus antiquus*) and puffin (*Fratercula arctica*). The rivers on Kril'on are important for the reproductive cycles of a number of fish species: Japanese salmon, humpback salmon, chum salmon, Sakhalin sturgeon (*Acipenser medirostris*) and also Sakhalin sea trout, recently listed in the Russian Red Book. The peninsula also hosts ten Red Book species among its insects.

Thanks to its distinctive natural conditions, Kril'on is considered as representing its own geographical and botanical subzone, and its ecosystems serve as important baselines for research. Coniferous/broadleaf forests dominate the peninsula, with a prevalence of deciduous species: oak, maple, Sakhalin cork tree (*Phellodendron sachalinense*). Nut tree, cherry trees, Chinese magnolia vine (*Schizandra chinensis*), Kolomikta vine (*Actinidia kolomicta*) and climbing hydrangea (*Hydrangea petiolaris*) can also be encountered.

Equally important are the southern taiga communities dominated by Sakhalin fir (*Abies sachalinensis*) and its intermingling with yew trees, *Scimmia*, and holly. Higher elevations host stone birch and Middendorf's honeysuckle (*Diervilla middendorffii*), while coastal terraces are covered by halophytes.

Despite the damage done to the region, it's southern extreme—particularly in the middle and upper reaches of the rivers, have been spared clear-cuts and retain their natural character. In addition, the low population density and absence of significant settlements, industrial centers and transportation links, as well as favorable climatic and soil characteristics, facilitate self-regeneration of those ecosystems that have been degraded.

At the present time economic activity occurs most frequently near the peninsula's settlements further north: Nevel'sk, Gornozavodsk and Shebunino. However, realization of plans to begin logging in the Uryum River basin could threaten the integrity of unique communities, damage populations of rare animal and plant species, and threaten salmon spawning. The fishing industry also exacts harm on the area because of poaching and pollution. Forest fires are also a concern with increasing visitation on the western shores by tourists.

Existing protection initiatives

An oblast-administered hunting zakaznik was established in 1972 on 52,000 hectares of the peninsula's eastern portion near Aniva Bay to protect game populations; it includes a protected aquatorium up to 500 meters off its shores. The existence of this zakaznik provides minimal protection against fires and poaching on the eastern part of Kril'on.

Recommended steps

A number of eco-manipulations measures are planned, including reconstruction of a dam between the Ulyanovka and Maksimikha Rivers to rehabilitate muskrat populations, regulation and relocation of raccoon-dogs, expeditions to explore artificial regeneration of Sakhalin sea trout populations and construction of small-scale facilities for hikers and sportfishermen.

In order to ensure a broad-spectrum preservation of the region's ecosystems, it is necessary to re-establish South Sakhalin zapovednik, which had initially function in the late 1940's. Its land boundary should be the Uryum and Lugovka River basins in the north, with a buffer zone no less than 1 kilometer in width. A one-kilometer protected zone should also be organized off its shores. It is also recommended to incorporate the existing zakaznik within the zapovednik. Until the zapovednik is created there should be a moratorium on logging in the area, as well as strict controls on hunting, plant gathering and through transportation.

In order to scientifically justify the re-establishment of the zapovednik it will be necessary to conduct a full inventory of the area's flora and fauna. This work could be undertaken by the Sakhalin Botanical Gardens (FEBRAS) with the participation of specialists from other institutions and with support from the Sakhalin Oblast Administration and international environmental organizations.

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5. Schmidt Peninsula

Description of the territory

Schmidt Peninsula is located on the extreme northern tip of Sakhalin Island, connected with the rest of the island by narrow Okhinskiy Isthmus in the south. The peninsula is mountainous, with two hilly ridges (maximum elevation 623 meters) running northwest to southeast. Pil'-Dianovskaya Lowlands sits between the ridges.

The peninsula's climate differs somewhat from the rest of the peninsula, with prevailing winds moderating temperatures in winter. Low temperatures do not fall below -28° C, and the winter months in general are 2-5° warmer than those on the main part of the island just to the south. The peninsula also has ten more days of above-freezing temperatures per year than the neighboring area to the south. Because of the climatic and topographical differences, the forest communities of the area are also richer and more diverse than those immediately to the south.

Soils are primarily podsol, occasionally mixed with peat and clay. In well-drained areas and on hillsides protected from the prevailing winds, Yeddo spruce (*Picea jezonensis*) forests are most prevalent, with stone birch dominating the more windswept slopes and larch most common at lower elevations. Willow and alder communities thrive in the flood plains. Japanese stone pine shrubs dot the seacoast and mountain peaks.

In general, Schmidt Peninsula's flora is quite distinctive, including a number of alpine species not found elsewhere on the island such as Pallas' erysimum (*Erysimum pallasii*). Despite frequent references in scientific literature, little is known about the peninsula's vegetation overall; research has not been conducted within the last 20-30 years.

The peninsula's fauna communities are also quite diverse with brown bear, fox, sable, river otter, ermine (*Mustela erminea*), caribou and others. Upland fowl are also abundant, including hazel hen (*Tetrastes bonasia*), willow grouse (*Lagopus lagopus*) and Siberian spruce grouse. Swan and geese also migrate through the area. A number of rare bird species nest on the coasts as well, including white-tailed and white-shouldered sea eagles, accompanied by large seabird colonies.

The peninsula's rivers are valuable for salmon reproduction, particularly for humpback salmon, thanks to the integrity of the forests in the river basins. Amur sturgeon (*Acipenser schrencki*) and kaluga (*Huso dauricus*) also migrate in the peninsula's bays.

The picturesque cliffs and island's largest waterfalls add significant aesthetic value to the peninsula. On the whole, Schmidt Peninsula is a uniquely valuable place, as a region generally dominated by larch forest suddenly transforms into a dark coniferous forest at its northern tip—where virgin Yeddo spruce forms an outlying oasis well removed from its more typical habitats further south.

At the same time, these valuable stands of Yeddo spruce are increasingly becoming a tempting morsel for Sakhalin's timber enterprises as timber reserves are depleted elsewhere on the island. This threat is compounded by the construction of new roads, existing mining activities and planned expansions into new serpentine mineral deposits. There is also a concern raised by increasing and unregulated tourism, poaching, and repeated attempts to bury toxic chemicals (especially DDT) in the peninsula's forests.

Existing protection initiatives

At the present time the peninsula is designated as a Severniy regional hunting zakaznik; however, this does not ensure sufficient protection of its ecosystems. As a hunting zakaznik, for example, there is no prohibition on commercial logging or mining.

Recommended steps

In order to prevent the irretrievable loss of the unique ecosystems it is necessary to:

- Increase the protection status of Severniy zakaznik to a comprehensive nature zakaznik or zapovednik, including the preparation of a scientific justification to this effect;
- Urgently conduct thorough research on the area's flora and fauna;
- Halt construction of new roads and mines.

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