

Forests and Water on Sakhalin Island: an example of the unsustainable forestry management

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Sakhalin Region – what and where is it?

The Sakhalin Region - alone in Russian Federation administrative territory disposed on 59 islands. Its composition enters Sakhalin island with small islands, disposed about it and Kuril islands. The basis of the area is constituted by Sakhalin island - the largest island in Russian Federation (76,6 thousand sq. km), extended on a meridian on 950 kms with a population around 600 thousand the man. The Sakhalin island is separated in the south by Lapheruz channel from the Japanese Hokkaido island. From east Okhotsk Sea washes the Sakhalin island. The area is disposed for eastern shores of the Euroasian continent in a transfer geographical band from continent to Pacific Ocean.

Background

The forest has a special place among Sakhalin's natural resources, not only in view of its economic significance but also to a great extent due to its ecological importance. The main forest species are Ayan spruce (Karamatsu) and Sakhalin fir, Maira fir, Kuril larch, stone birch and silver (white) birch. Sakhalin lies entirely within the *taiga* (Russian boreal) forest zone. Most of the island's forests are dark conifer. Fir dominates in the south; spruce in the central regions; while in the south-west the conifer forest is mixed with some broadleaved varieties. Larch covers the northern Sakhalin plain. The spruce-fir *taiga* developed as a result of a combination of important factors: the cold moist climate, strong winds and abundant snow; the specific characteristics of the soils; and the low occurrence of forest fires. A forest such as this is extremely vulnerable to the effects of humans and fire. In contrast to most mainland second-growth forests, the Sakhalin forests of Ayan spruce and Sakhalin fir are much more poorly adapted to survive economic exploitation. Natural regeneration of dark conifer forests is virtually impossible on large areas that have been deforested by logging and fires. In good conditions, the territory becomes overgrown with larch, if not, then it becomes overgrown over with small, wasted birch trees, or simply turns into waste ground or marsh. In southern Sakhalin, large areas of mountain forest became wasteland and sparse forest, overgrown with Kuril bamboo. Before the start of forest exploitation, bamboo grew as mountain vegetation higher than the dark conifer forest, and also grew rather feebly in the undergrowth. Fires on logging sites have sharply altered the picture. Bamboo roots are resistant to high temperatures and it is able to reproduce wonderfully after fire, therefore it can quickly take over the new space, creating a thick, impenetrable 'carpet'. This hinders the rejuvenation of any other species, particularly spruce and fir. These same mechanisms are in play, more gradually, during logging. With successive selective cuts, bamboo may take over a greater and greater area, until the dense forest has become sparse. Huge areas of dark conifer forest have been transformed into bamboo wilderness in the South part of the Island. The inability of dark conifer forests to reestablish themselves quickly after clear cutting and fires, together with the focus on spruce and fir timber for the paper industry has led to the significant depletion of the dark conifer *taiga*. The virgin spruce and fir forests, once typical in Sakhalin's valleys, have either been cut completely or have been depleted and fragmented.

The timber industry has also had a very negative effect directly on Sakhalin's forest ecosystems. The risk of forest fire is greatly increased after logging. Thinned (or fully logged) timber stands cannot hold back the same volumes of snow in winter, in spring the snow melts much quicker, than it does under the cover of the thick forest. One consequence of this is that the forest undergrowth is more likely to burn. This is a

good environment for fire, especially if there are a lot of dry cut remains. The temperature of burning on the soil is much higher here, than in the saturated moisture of the natural forest. This enables a fire in the lower level of the forest to become a much more destructive upper level fire. Forest exploitation is accompanied by road construction, providing an easy route for local populations to get to large open areas. Groups of day-trippers, mushroom pickers, berry pickers, hunters, and poachers are often the source of destructive forest fires. Vast areas of mountain forests in the south-west have turned into bamboo thickets and lost their previous diversity as a result of barbaric logging followed by fires. In central Sakhalin large areas that were previously forested now have impoverished meadows and scrubby wastelands, sparse forests and thin copses of birch, aspen and willow.

Logging on Sakhalin has always been accompanied by replanting programs. But this has never compensated fully for the amount logged. Artificial forest regeneration has always been very difficult on Sakhalin. The most valuable local species – Ayan spruce – grows very slowly in the early period of its life and needs to grow in specific natural conditions: no sharp fluctuations in moisture and temperature levels, plenty of shadow, abundant snow cover. Forest plantations on large deforested areas cannot provide such conditions and many trees die in the first years of life from burned roots when the soil gets too hot, or due to the squeezing out of seedlings when they freeze. Attempts have been made over many years to cultivate pine on Sakhalin's wastelands and burned lands. However, these have been unsuccessful, as the trees go yellow and bushy, they break under the weight of snow, or their roots are eaten by mice. It is unlikely that a plantation of pine on Sakhalin could ever produce commercially valuable timber. In every case a significant number of planted trees are destroyed by fire.

Salmon spawning rivers suffer most of all

Sakhalin has about 65 000 rivers. Most of these are spawning rivers for valuable species of salmon (pink salmon [*gorbusha*], chum salmon [*keta*], coho [*kizhuch*], Japanese cherry salmon [*sima*]). Besides such cutaway views salmon, as endangered sakhalin taimen and also sea trout, trout live in basins of area. The total area of spawning grounds is 22 million sq. m.

The fishing complex has a large value in providing the population of area and other locales of Russia by the fish foods, is the supplier of stern and fish commodity for agricultural firms of agriculture complex, and also for other branches of economics. The fish economy for many cities and settlements of the Sakhalin area is a social and economic basis, one of the main sources of seizure of the population. Sakhalin area - one their basic regions on the Russian Far East, in which one is realized reproduction of the pacific salmon, most valuable in the nutritional relation of a trade aspect of fishes. Reproduction of the salmons - major factor stable and effective work of fish branch of the Sakhalin.

The density of the network of rivers and streams is such that wherever logging takes place, it unavoidably has a direct effect on the rivers. This is compounded by the ruggedness of the landscape – three quarters of Sakhalin is mountainous. Any damage to the soil during logging on steep slopes is accompanied by erosion: the earth is washed into rivers and settles on the spawning grounds as silt. This has an extremely negative effect on salmon productivity. The salmon need a spawning stream with large pebbles. The layer of lightly dispersed silt complicates the normal flow of water through the spawning mounds and stops oxygen getting through to the fish eggs and makes it difficult for them to get rid of the products of their metabolism. This sharply increases the death rate of embryos, and in spring, the young fish go to sea underdeveloped.

Ecological functions of forest, with special importance on Sakhalin

- ♦ flood regulation;
- ♦ support of water flow;
- ♦ prevention erosion and siltation of river beds;
- ♦ preservation of optimal temperatures for salmon

Often loggers set up transport routes across rivers, and sometimes even make temporary roads along streams. Frequently in mountainous areas, timber is hauled along small water flows that form the sources of rivers. Logging on steep slopes using steep slope terracing technology is a particularly serious threat. The huge earth disturbances necessary for making the terraces result in landslides some time after logging. This increases the time taken for suspended matter to get into the rivers. The river also suffers long-term negative effects from general deforestation in river basins due to logging and fires, most of which are a result of logging anyway. Deforestation of the drainage area lowers the water levels in the rivers and damages the hydrological regime. During thaws and abundant rain, the water is not held back by anything and runs quickly into the stream, causing heavy flooding, while in the low-water season the level of the water sharply decreases. Destructive spring floods sometimes wash away the spawning mounds and the young salmon washes into the sea before its time. In valleys, logging of the forest leads to lowland areas becoming marshes, as the timber stands stop fulfilling their evaporation functions, and the stagnation of the extra moisture rapidly leads to the formation of marshland. Forest will not grow back in an area like this. In northern larch forests that grow on sandy soils, logging leads to the loss of the productive layer of soil and to the formation of gullies on the slopes.

The conflicting interests of the 'Leskhozi' (Federal Forest Service) and the responsible management

The Russian Federal Forest Service is the primary government agency responsible for forest management and control. Under its administration are the 81 regional Forest Service departments; each of whom, in turn, has a number of the local branches (Forest Management Units) or 'Leskhozi' under their control. These Leskhozi are responsible for forest use, management, and protection on a local level around the country. Today, 1740 'Leskhozi' operate in the Russian Federation. Sakhalin region alone has 28 of them.

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

In recent years, the 'Leskhozi' have started to become timber producers. As well as forest protection, they are legally entitled to sell timber acquired from maintenance and sanitary cuts. The absence of independent control allows the Forest Service to obtain a large amount of commercially valuable timber, under the cover of these forest management activities. This contradicts the official reasons for such cutting and is often ecologically damaging to the forests. Much of the timber extracted like this is exported as high quality raw logs. On Sakhalin, such forest-service loggers include *Aleksandrovskiy*, *Anivskiy*, *Makarovskiy*, *Gastellovskiy*, *Krasnogorskiy*, *Kholmanskiy*, *Onorskiy leskhozy*. An important factor, pushing the forest services to break norms and rules, damage the forest, and evade their responsibilities, is the weak budget financing of the Forest Service.

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