Protections for primary forest areas in the Angara region need more support from robust legislation.

**BASIC METRICS**

- **Primary forest area:** 6.3 million ha
- **Carbon storage/sequestration:** 620 million tonnes (from an above ground biomass carbon layer estimated for 2018 at MODIS resolution (Wayne Walker et al, forthcoming). In Angara, carbon storage is 1.96 B tonnes, including soils.
- **Keystone species:** bears, marals, musk deers, wolverines, sables, lynxes, peregrine falcon, peregrine owl, osprey, black stork, greater spotted eagle
- **Supporting indigenous groups/local people:** local people profit economically from the forest sector and are accustomed to hunting, fishing and gathering non-wood forest products
- **Threats:** industrial logging, fires and mining, habitat fragmentation, lack of effective management

**Context and values**

Russia comprises several important Global 200 ecoregions – a science-based ranking of the Earth’s most biologically outstanding habitats. The Angara region, located in Central Siberia, is a prime example of the valuable forest regions in Russia. Despite limited industrial and agricultural expansion in Siberia due...
to a harsh climate, marginal soils and difficult land to cultivate, the Angara region is highly fragmented and disturbed by human activities. With a warming climate, increasing demand for resources in world markets, exhaustion and poor management of high-quality timber resources in the southern boreal, and pressure from international logging interests, the frontier of primary forest degradation and deforestation continues northward and poses a serious threat to much of the previously undisturbed taiga in Siberia.

Despite fragmentation and degradation, 45% of the Angara region is still covered by forests close to their natural state. A recent satellite-based assessment identified 6.3 million ha of old-growth forests in the region, which harbour considerable understory floristic biodiversity and a range of native species of birds (e.g., peregrine falcon, peregrine owl, osprey, black stork, greater spotted eagle) and animals (e.g., bears, marals, musk deers, wolverines, sables, lynxes).

These ecosystems are home to a number of Red Book species such as forest reindeer, otter, taimen and others that require special protection measures. Angara also contains large tracts of high-quality Scots pine forests, well-known worldwide for their rare physical and mechanical properties of wood.

Threats

Due to a long history of forest exploitation, the Angara region has been identified as a hotspot of rapid forest cover change in boreal Eurasia. The unique Angara pine forests and many rare species of plants and animals are threatened by logging, fires and mining, among others. Owing to the large forest resources concentrated in the region (~12.7 million ha), the basis of industry is timber production. Although the national harvest volume is presently much lower than during Soviet times, logging activity has remained high in this region given its adequate road and river networks. Logged areas and the surrounding primary forests are also highly susceptible to fire due to a combination of high fuel loads and accessibility for human ignition.

Finally, the Angara region has significant reserves of oil, gas and other natural resources of commercial importance. Intensive extraction of these resources contributes to further deforestation and forest degradation.

The dramatic alteration of Angara landscapes has served as an arena for a long-lasting environmental conflict in Siberia. The current State forest management system does not ensure participation of NGOs or the general public in forest management and the development of forest policy. Poor efficiency of old harvesting technology and usage of heavy machinery have negative impacts on soil, forest undergrowth and young trees. Despite the fact that several major third-party forest certification schemes are present in Russia (e.g. Forest Stewardship Council, FSC), many forests still suffer from deforestation caused by extensive logging. The Criteria and Indicators of Sustainable Management of Russian Forests adopted in 1998 does not include parameters for sustainable...
forest management, nor does it provide any change to the forest management system. The general type of logging is clear-cutting on large areas (up to 50 ha). This causes heavy soil erosion, swamping and catastrophic changes to the forest environment, with an absence of reforestation and disappearance of many species of forest flora and fauna.

Solutions and responses

Angara’s forests have been extensively used for more than half a century. Although forest cover is rapidly decreasing, there is not a single federal strictly protected conservation area in the region. To compensate for the substantial disturbance impacts in Angara, several natural protected areas have been organised at the regional level. With the aim of conserving and restoring biological and landscape diversity, unique natural complexes and habitats, these areas account for 547,200 ha (or 4.3% of the total area). According to the Decree of the Government of the Krasnoyarsk krai of 2017, two new protected areas will be organised in the Angara region by 2030. This should increase the forest area protected from timber harvesting by 325,800 ha.

In addition to the non-governmental bodies involved in forest conservation (e.g. Greenpeace Russia, WWF), there are a number of community-based environmental conservation organisations operating at a regional level and focusing on old-growth forest protection (e.g. Friends of Siberian forests). However, it is difficult to efficiently protect these forests without precise knowledge of their location. There are also deficiencies in legal and institutional frameworks to protect old-growth forests, as well as a lack of sufficient resources—human and financial—to implement conservation management. Altogether, these have resulted in leaving the most valuable areas unprotected while protection status is granted to less-valuable forests.

Most primary forests are considered industrial forest under Russian law. Logging of primary forest, instead of pursuing responsible forest management in already transformed forest, has put these forests at extreme risk. For example, conservation of species under special protection is usually not addressed because these species are not identified within the scope of forest planning and management, which are entirely aimed at accounting for timber resources.

In addition, the current Forest Legislation often neglects international conventions for biodiversity conservation and does not include up-to-date scientific guidelines for sustainable forestry. Hence, some of the old-growth forests, including those protected from clear-cutting, are logged for timber export in the guise of thinning, sanitary or maintenance logging. Preserving the global ecological value of Russian forests requires an improved long-term State policy to establish principles...
and mobilise adequate resources for primary forest protection, biodiversity conservation and an optimised forestry sector with no future encroachment into existing primary forests.

References