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The role of voluntary forest certification in solving the problem of minimizing the impact on the environment in the process of logging

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Abstract. Conservation of forest biodiversity is a global challenge. These goals are the main objectives of voluntary forest certification. This article presents the results of the activities of one of the enterprises of the Krasnoyarsk Territory, Russian Federation, aimed at sustainable forest management and biodiversity conservation. The company is certified by the PEFC RUSSIA system and is guided by their requirements and recommendations. In order to minimize the environmental impact, adjustments were made to the process of logging. The change in the technological process made it possible to reduce the damage of the soil and undergrowth of trees. As a result of research activities of the enterprise, it should be admitted that during logging negative effects on forest ecosystems dominate, a significant transformation of the natural environment takes place. However, with the help of certain organizational measures, this damage can be minimized. Voluntary forest certification systems are designed to reduce the impact of the activities of enterprises and promote the best management of forest resources. To simplify the use of certification requirements, an algorithm for minimizing the impact on the environment through the tools of voluntary forest certification has been proposed.

1. Introduction

In order to develop sustainable forest management in the world, international forest certification systems such as the FSC (Forest Stewardship Council) and the PEFC (Program for the Endorsement of Forest Certification) have been established. They are widely distributed and have become part of the business associated with the production and trade of forest products [1, 2].

Voluntary forest certification is one of the ways to confirm that the applicant is operating in accordance with the requirements.



Currently, one of the most rapidly developing system is the PEFC system, which is the world's largest international organization. It includes national forest certification systems of various countries [3, 4].

2. Solution of problems and discussion of the results

The need for forest management certification in the world is increasing [5]. The area of certificated forests in the PEFC system already exceeds 300 million hectares. In Russia, as at May 2019, more than 25 million hectares were certified under this system. According to certificated areas, Russia is among the top three, but in relation to the forest spaces of the whole country, this figure can be much higher. The dynamics of certificated forest management areas in the PEFC system are presented in figure 1.

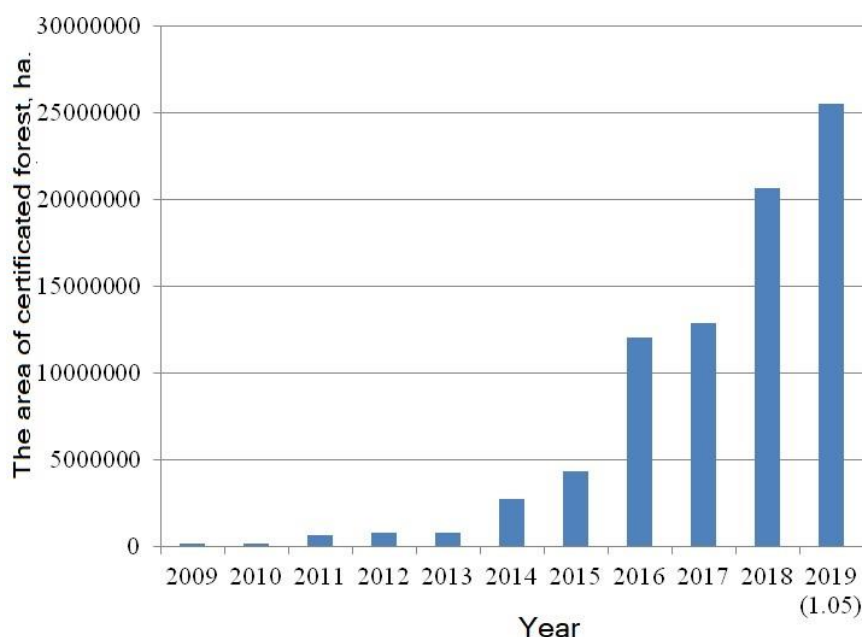


Figure 1. Dynamics of the area of certificated forests in Russia according to the PEFC system.

The main reasons influencing on logging and timber processing enterprises in Russia to make a decision on certification of processes are maintaining and expanding sales markets, increasing the investment attractiveness of an enterprise, raising the price of certified products, a tendency of sustainable forest management [6]. However, in deeper market international relations, forest certification is considered to be one of the forms of trust [7].

The above-listed international forest certification systems have high demands to enterprises who want to sell their products with a statement of compliance of activities with applicable norms and standards [8].

The idea of sustainable forest management is based on the concept that forest management should be carried out in such a way and with such intensity as to ensure the conservation of biological diversity, the productivity of forest resources, the ability of the forest to regenerate, and the ability to perform now and in the future relevant environmental, economic and social functions at local, national and global levels, with no harm to other ecosystems and the preservation of cultural and spiritual needs of present and future generations of mankind [9].

Within the framework of the environmental aspect, the key requirements for the enterprise are preserving biological diversity in the places of logging and road construction; prevention of soil erosion, soil compaction and waterlogging; preservation of vulnerable and rare ecosystems and landscapes; prevention of pollution of adjacent land and water bodies with combustive-lubricating, etc.

In order to fulfill environmental requirements established by international standards of voluntary forest certification, enterprises must take a responsible approach to the organization of the logging process. The machines used in the process of logging should have a minimal impact on the environment [10].

The purpose of this research is to develop recommendations and measures aimed at preserving biodiversity objects and minimizing the environmental impact during the logging process through voluntary forest certification tools.

3. Conclusion

These studies were conducted at the JSC “Novoyeniseiskiy Wood-Chemical Complex”. This enterprise was the first enterprise of the Krasnoyarsk Territory that passed the certification process. Today, the company has a certificate of the forest management process and a chain of “supplier-consumer” under the scheme of voluntary forest certification PEFC RUSSIA. The enterprise is a large complex for processing 1,200-1,400 thousand cubic meters of raw material per year. Timber is harvested at logging sites (LZU) in the Boguchansky, Yeniseisky and Motyginsky districts of the Krasnoyarsk Territory. The company is engaged in logging, using the so-called Scandinavian technology, which involves the use of multi-operation machines (harvester and forwarder).

To reduce the environmental impact on the forest and to pass successful certification at the logging sites of JSC “Novoyeniseiskiy Wood-Chemical Complex”, together with research organizations, corrective measures have been proposed and partially implemented. Activities are aimed at adapting the existing technological processes to the requirements of forest certification and the preservation of biodiversity objects [11].

In order to minimize the environmental impact, the following adjustments (modifications) were made in the logging process:

- during the operation of feller bunchers, the forest swath is divided into sectors, where 3-4 meter zones running parallel to the logger-road are cut down completely, the rest of the forest swaths are partially developed, leaving seed trees and other objects of biodiversity and undergrowth;
- stacking of packs of trees in the feller buncher is done on a logger-road, behind the machine, what prevents damage to the living ground cover and the undergrowth left;
- on wheeled vehicles there are chain tracks are used, which allows to reduce the pressure on the ground and reduce soil compaction;
- heaped wood remains are crushed and scattered around the loading platform, logging road and logging trails, this also reduces the pressure on the ground and provides the accumulation of organic matter necessary for the restoration of the forest ecosystem in the future.

The system of environmental protection measures adopted at the enterprise in the line of biodiversity conservation includes the obligatory leaving of key biotopes or forest clumps in the cutting area. Planning and maintenance of logging operations are carried out in accordance with the internal document of the enterprise “Instructions for the conservation of biodiversity in the design and maintenance of logging operations”. This document contains a guide of actions performing in the case of detection of areas with special conservation value for the conservation of biological diversity in the cutting area, including a list of rare and endangered species of plants and animals listed in the Red Book.

The selection of key biotopes is made in a snowless period during the diversion of cutting areas. Forest areas targeted for the diversion are examined for the presence of specially protected areas and key biotopes, the land topography, the direction of water courses are determined, and the condition of the soil is estimated. Based on the results obtained, the placement of technological roads, main and logger-roads, loading platforms and other technological objects taking into consideration the minimizing of the impact on the environment and preserving protected forest areas are projected.

Forest areas classified as key habitats are allocated to the non-operating area and recorded in the technological map of the cutting area. Borders are determined by the natural contour of the communities, taking into account the buffer zone. Haul-roads should not cross key habitats.

Forest areas representing key habitats are necessarily mapped on the ecological network of the enterprise and must be protected.

If there are no key habitats in the cutting area, separated forest stands are left. Separated forest stands (including, together with seed strips) in the amount of more than 1 pc are preserved on 10 hectares of land. The location of the left separated forest stands is displayed in the routing, and must be saved.

During the economic development of the territory, a number of factors appear that have a negative impact on the state of the animal world. By the nature of the impact, these factors can be divided into direct and indirect.

Indirect exposure is associated with changes in habitat and is revealed in noise and light effects from working equipment and human activity, a disturbance of the usual ways of daily and seasonal movements of animals.

In the zone of direct impact - in the cutting area, the habitat of animals is destroyed.

As the logging teams progress, there is a gradual displacement of animals from the affected territory. As the disturbance factor diminishes, animals can be expected to return and their former numbers recover.

The following measures for the protection of objects of the animal world are held throughout the entire rental territory:

- in order to avoid an increase in the disturbance factor of wild animals, the keeping of dogs in the field camp is carried out only on a leash;
- work is being done to prevent the death of animals and provides assistance to animals in distress;
- campaign against violators of hunting legislation is held;
- trees with large nests (more than 0.4 m in diameter) are conserved, leaving a buffer zone with a radius of 500 meters (with a nest habitability);
- trees with hollows are left with full preservation of the surrounding stand with a radius equal to the average height of the surrounding over storey, but not less than 10 m;
- the places of high seasonal concentration of animals (capercaillie court ship, places of concentration of ungulates, salt licks) are kept in an intact form; borders of leks and saline soils, places of concentration of animals are determined by the natural boundary of the object, taking into account the buffer zone of 300 m;
- animal shelters are preserved in an intact form (residential lairs, burrows, lairs), taking into account the buffer zone from 50 to 100 m for burrows and lairs and 300 m for dens, burrows and holes;
- anthills remain intact, around which the buffer zone is allocated from 50 to 100 m, depending on its size;
- great explanatory work is conducted among the population and citizens involved in the protection of forest animals.

In the process of conducting environmental activities on the territory of the leased land of the enterprise, places of concentration (routes of migration, feeding, laying out, calving) of hoofed animals — elk, wild reindeer, capercaillie and grouse leks — are identified and maintained. The habitats of rare birds - eagle owl, osprey, peregrine falcon, pygmy owl are under protection. Key habitats are also mapped on the ecological network of the enterprise, subject to protection in order to conserve biological diversity in the lease area, and are excluded from the operating fund.

Despite a number of conservation measures taken, it should be recognized that during logging negative effects on forest ecosystems dominate, and the natural environment undergoes a significant transformation. However, taking certain organizational measures, this damage can be minimized. Voluntary forest certification systems are designed to reduce the impact of the activities of enterprises and promote the best management of forest resources not only in the present, but also in the future generation.

As a result of the study, an algorithm for minimizing the impact on the environment was developed (figure 2) through the tools of voluntary forest certification. The key elements here are the blocks that identify the compliance of the activity of a logging company with the requirements of PEFC according to the “Logging roads”, “Logging machines”, “Logging works” standards. In each case, the correspondence of the marked parameters and procedures of voluntary forest certification is established. Ultimately, it is concluded that the logging company’s activities correspond to the requirements of the PEFC. The most important consequences of these aspects are increasing the safety of ecosystems, the increase in socio-ecological and economic effects. In the future, the company will need to work to maintain its work within the requirements of the PEFC.

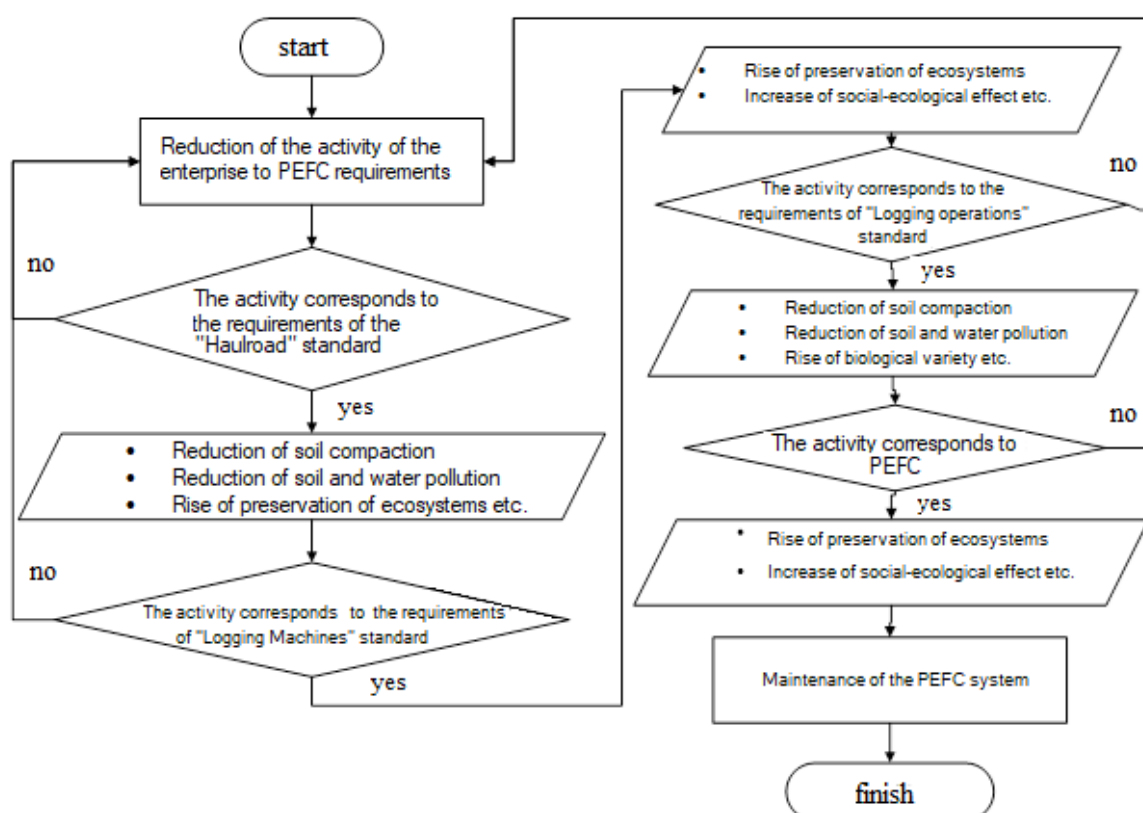


Figure 2. The algorithm for minimizing the impact on the environment through the tools of voluntary forest certification.

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