Analyzing of the Situation with Forest Fires in the Primorsky Region

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Abstract. Forest fire is a terrible disaster. Even a surface fire, leads to the fact that the forest planting passes into the stage of weakened, unproductive, which requires centuries to recover, as a result of the fire, the undergrowth dies, the habitats of animals and birds are destroyed, and the CO₂ emission into the atmosphere grows. Currently, information is increasingly being received that many countries suffer from forest fires, Russia among them. The situation with fires in the Primorsky Territory is complicated due to the small number of forest protection, the large number of abandoned agricultural land and the presence of a large number of forest fund tenants. There is no well-coordinated work on fire detection, patrolling the territory with a small number of forest guards is impossible, satellite monitoring allows you to detect a fire when a deflagration is already gaining strength and it is difficult to determine the accessibility, and often the possibility of access to the fire, by coordinates. Most of the region’s state forest fund has been leased, tenants do not always have good neighborly relations with local residents, if all kinds of conflicts arise, then revenge or set fire to become synonymous with words. And often hiding a crime scene in the forest with a fire is a way to avoid punishment.

1. Introduction
Forest fires are a powerful natural and anthropogenic factor, a regulator of forest ecosystems. In addition to direct damage, they are much more dangerous for humanity in the long run. Forest plantation, passed by a surface fire, goes into the rehabilitation stage, part of the trees dies, part continues to grow, but this is a physiologically weakened growing stock, which has changed its cenotic structure, which needs time for recreation. Unlike past centuries, when there was time for natural regeneration of forests in 100-200 years, today due to the processes of human activity and accelerating climate change this time is gone. There is no need to talk about catastrophic changes after crown fires.

2. Actuality
The growing frequency of fire occurrence of forests around the world leads to significant economic and biological losses. Therefore, in recent years there has been a relevance in clear understanding of the need to take into account post-fire environmental consequences and their role in global
environmental and social processes.

Russia plays a main role in maintaining the global functions of the biosphere, since a large part of the Earth’s biodiversity is represented on its vast territories occupied by forests. Under conditions of well-known climate change, forest losses will increase, under the extreme scenario of anthropogenic impact on the climate system throughout the European part of Russia, in western and partially in Eastern Siberia, by the end of the 21st century, an increase in the fire hazard period is expected by 20-29 days, and in some areas by 30-50 days.

In the long run, with climate change in most of Russia, conditions will be created to increase CO2 emissions from soils and reduce soil carbon reserves. CO2 emissions from soils of forest ecosystems may increase in 15%. With consideration to the increase in throwing volumes and the intensity of wild fires, it is expected that the total carbon budget of forest ecosystems will decrease. [3]

The conceptual approaches to the organization of forest protection from fires are the same. However, forest fire strategies are different in different countries. In North America, for example, it is common practice to suppress fires if they are dangererous for infrastructure elements or human settlements. Canada turns maximum efforts at preventing fire occurrences, they tries to detect and extinguish forest fire for minimizing areas covered by fire in case if the economically justified worth it. If the fire is large enough, then it is given the opportunity to spread to natural or artificially created barriers. In China, much attention is also being paid to fire-fighting forest management, timely detection and quick fire fighting. It also uses the most modern fire fighting equipment and applies the best technical and tactical methods for eliminating fires. [4]

3. Formulation of the problem
The situation with forest fires in our country is very difficult. Professor Goldammer conceive that, Russia, with its 1.3 billion hectares of forest, has enormous potential for climate regulation, but it should be used correctly. If not, Russia will turn into a colossal CO2 bomb, especially taking cue from the thawing of permafrost. The current situation is further aggravated by the fact that obtaining reliable information about the state of affairs with forest fires and the picture in the whole country is very difficult. There are lot of conflicting data on their number, area, location and elimination. In our work, we will try to analyze and compare official facts on forest fires in the Far Eastern region.

4. The main part
In each region of our country, wild fires takes place every autumn and spring. The Far East, the place of concentration of the main forest resources, occupies a leading position due to the low development of its territories. (fig. 1)

Figure 1. The number of forest fires in the federal districts of the Russian Federation, cumulative total from 01.01.2019 (data of the Federal Aviation Protection Agency as of 13.08.2019).
In our country, the territory of the state total forest area, depending on the economic and environmental importance of forests, the socio-economic development of territories and natural fire hazard, is divided into zones for protecting forests from fires in various ways: above ground or aviation-related.

In accordance with the current Russian legislation, executive branch authorities in the area of forestry affairs, constituent entities of the Russian Federation, in territories located in remote and inaccessible areas can be established control zones, in which work to extinguish forest fires can be stopped or suspended. Cessation or suspension of work based on decisions of the Commission of the Prevention and Control of Emergencies and the Fire Safety of executive branch authorities of the Russian Federation and carried out in the absence of a threat to settlements or objects of the economy, in cases, where the expected losses of extinguishing forest fires exceed the projected detriments that they might cause. In cases of suspension and cessation of fire extinguishing, forest fire departments and regional dispatching services of forest management continuous monitoring, including using space tools ISDM-Roslekhoz, over the dynamics of their development. [2]

Compare evidence in Russia and world conceptions, we are forced to note an extremely low level of financing, the reorganization of the government service of forest management (due to the adoption of the Forest Code 2006), insufficient material and technical support for forest fire services and vast areas of forest division. The real extent of frequency of fire occurrence in Russia and the size of the damage caused by wild fires are approximate.

The Russian Far East includes up to 50% of the all-Russian abundance of species and from 5 to 10% of all species that live on the planet. [1] Moreover, in the Primorsky Territory, the level of biodiversity is the highest. The territory of the region regularly suffers from forest fires.

![Figure 2](image_url)

**Figure 2.** The number of forest fires in the territory of the subjects of the Far Eastern Federal District, pcs. (figures from the Federal Aviation Protection Agency in to 13.08.2019).

The number of forest fires on the lands of the state forestry fund in the Primorsky Territory by years is shown in Fig. 2. It stands to mention that the figures for 2019 are presented excluding the autumn period.
The number of forest fires in the Primorsky Territory on an annual basis (units) (hereinafter in the graphs the figures of the Forestry Department of the SC in to 16.03.2019).

The number of forest fires is closely correlated with weather conditions. In dry years, winters with little snow, the number of fires increases sharply. Moreover, the total area of forest fires is proportional to the number of combustion occurrences. (fig. 3)

The figures shows that in recent years the number of areas covered by the fire has been growing. Efficiency of detection, localization and quenching are very important points, therefore, the quenching rate in the first period of 24 hours is crucial.
Figure 5. The correlation between the total number of forest fires and the number eliminated in the first day.

If the fire cannot be stopped quickly, it grows in area rapidly, covering more and more large areas. In the context of forest districts, the situation with forest fires is as shown in figure 5.

Figure 6. The number of forest fires in spring period of 2019, pcs.

Staff members of forest districts should not deal with extinguishing forest fires, they are obliged to register, record and evaluate them. There is a special unit of the Forestry Department of the Regional State Treasury Institution “Primorsky Air Base”, which has 515 people of staff, 285 of them are
involved in extinguishing the entire area of the state forest fund and, by agreement, in municipalities, military forest divisions, Special Protected Natural Areas and other territories.

There are several main causes of forest fire occurrence: 1. Nonobservance by the population the fire codes in forests and careless handling of fire; 2. The spread of fire from abandoned agricultural land; 3. Arson, in order to conceal crimes related to illegal logging; 4. The natural factor. The practice shows us that 9 of 10 forest fires occur due to human faults.

![Figure 7. The causes of forest fires.](image)

There are a lot of abandoned agricultural lands in the Ussuriysk forest district and adjacent territories; it is from there fire comes to the state forest fund. A small forest service can not to detect a fire in time, and the mobile teams do not know the specifics of the place and can not get to it.

For violation of fire-safety procedure in forests, the legislation of the Russian Federation provides for administrative and criminal liability. Administrative liability arises for violation of fire-safety procedure: making fires, burning grass, throwing burning matches, cigarette butts and hot ash from smoking pipes provides for a penalty of 1.5 to 100 thousand rubles. Criminal liability arises for the destruction or damage of forest stands as a result of careless handling of fire and provides a penalty in the amount of 100-200 thousand rubles. Even to imprisonment for a period of 3 (4) years (in case of causing major damage). For deliberate destruction or damage of the forest stands by arson, imprisonment can be up to 8 (10) years with a penalty in the amount of 10 thousand rubles. up to 400 thousand rubles. However, it is not possible to find statistics of court decisions on punishing perpetrators of offenses related to forest fires. The colossal damage remains to be just damage that no one will indemnify.

5. Findings

The situation with forest fires in the Primorsky region, as well as in the whole country, is very difficult, and it worsens every year. Due to the monsoon climate of our region, fire control can be called effective. Today, there is not a single living creature on the planet who, one way or another, does not feel the effects of forest fires raging in different countries. To relaxation the existing and expected negative consequences of climate change on the planet, we need more advanced monitoring methods and technologies, a reliable regional forecast and effective elimination of fire sources.
References

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