LOSSES OF FORESTRY PRODUCTION AS A RESULT OF AMBER MINING

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The problem of amber confrontation, which arose in the north-western part of Ukrainian Polissya, led to significant changes in the structure and mineral composition of the soil layer of forest lands. Violation of the ecological balance of the forest at different stages of biological development can lead to irreversible consequences in the forestry sector [1].

The introduction of an economic and legal mechanism for compensation for losses by violators caused by illegal amber mining, non-performance of land revegetation works after the mineral deposits operation is completed, will provide more effective protection of interests of the state and local communities, rights of land owners and land users, and will have a positive effect on reducing land use violations [2]. After all, non-revegetation of disturbed lands belong to the violation that cause losses to owners and users of land, the territorial community and the state.

According to the Department of State Service of Ukraine for Geodesy, Cartography and Cadastre in Rivne region, total amount of forestry lands disturbed due to illegal amber mining is about 4.16 thousand hectares, which is 92% of the total number of state-owned lands disturbed due to illegal amber mining, or 73% of the total number of state-owned and private lands disturbed as a result of illegal amber mining [2]. Due to the fact that the area of disturbed lands is constantly increasing, there is a need to conduct an inventory of these lands and develop detailed land management projects for their revegetation.

In order to find out the scale of illegal amber mining, determine the terms of non-revegetation of disturbed lands and their areas, it is necessary to develop an identification method, conduct a detailed inventory of disturbed areas and quickly assess the damage caused by the state. Therefore, cartographic models built using remote sensing data are critical for monitoring environmental landscapes. The study has been conducted based on materials from the Landsat satellite system in the period from 2012 to 2016 [3], there has been added the calculated normalized relative vegetation NDVI index (Normalized Difference Vegetation Index) [4] to the set of spectral channels, which was calculated in QGIS 3.12 [5].

Solid masses of forestry lands near the village of Borove, Zarichne district, Rivne region, with an area of 62.83 hectares, are characterized by significant damage due to amber mining. According to space images, the area of damaged areas reached 56.43 hectares (90%) in 2016. It shall be noted that most of the solid masses
were occupied by mixed and deciduous forests.

Losses of forestry production caused by withdrawal of forest lands and shrubs (lands covered with forest vegetation, open forest crops, forest nurseries, plantations, sparse forests, burned areas, dead plantations, cutting areas, meadows, forest paths, forest swath, fire lines) for their use not related to forestry are determined by the formula [6]:

\[ R_v = P_d \times N_v \times K_i \]  \hspace{1cm} (1)

where \( R_v \) is the amount of losses of forestry production, thousand hryvnias;
\( P_d \) is the withdrawn area of forest land and shrubs, hectares;
\( N_v \) is the standard of losses of forestry production, thousand hryvnias;
\( K_i \) is the coefficient of forest lands and shrubs productivity by types of forest vegetation conditions.

Thus, the total losses of forestry production in these areas are UAH 6 397 638.

Reimbursement of illegally obtained income received in violation of land legislation does not exempt the violator from the need to reimburse real losses, i.e. the implementation of the whole set of measures for revegetation of disturbed land at his own expense, which are provided by the approved land management documentation.

References: