**НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ
БІОРЕСУРСІВ І ПРИРОДОКОРИСТУВАННЯ УКРАЇНИ**

**НАВЧАЛЬНО-НАУКОВИЙ ІНСТИТУТ ЛІСОВОГО
І САДОВО-ПАРКОВОГО ГОСПОДАРСТВА**

**НАУКОВО-ДОСЛІДНИЙ ІНСТИТУТ ЛІСІВНИЦТВА ТА ДЕКОРАТИВНОГО
САДІВНИЦТВА**

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«СТАЛЕ УПРАВЛІННЯ ЛІСОВИМ КОМПЛЕКСОМ ТА
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FIRE MANAGEMENT PLAN AND DECISION-SUPPORT SYSTEM FOR THE CHERNOBYL EXCLUSION ZONE

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Between 2015 and 2017 a number of large wildfires occurred in highly contaminated by radionuclides Ukrainian and Belorussian parts of the Chernobyl Exclusion Zone (CEZ). During April 2015 two large fires burnt 9 241 hectares of forests in central part of Ukrainian CEZ and 10 159 ha in the Polesskiy State Radioecological Reserve of Belarus, during August 2015 another fire burnt 5 698 hectares of forests in western part of Ukrainian CEZ. In July 2016 around 300 ha of an area with highest level of contamination were burned within so called "Red Forest" that consists of remains of trees that faced direct impact of nuclear fuel "hot particles" in April 1986 and mixed pine-birch-aspen forest that grew up instead of died due to acute impact of radiation old growth pine forest in 1986. In July 2017 another large fire occurred near nuclear waste facility "Vector" within 10-km zone of Ukrainian CEZ. Modelling of the fires of April and August 2015 in the Ukrainian CEZ shows that about 10.9 TBq of ^{137}Cs, 1.5 TBq of ^{90}Sr, 7.8 GBq (10^9 Bq) of ^{238}Pu, 6.3 GBq of ^{239}Pu, 9.4 GBq of ^{240}Pu and 29.7 GBq of ^{241}Am were released from both fire events. Radioactive smoke from fires spread to territories of Belarus, Germany, Poland, Russia, Turkey, Ukraine, the Nordic countries, the Balkans and the Aegean Sea (Evangeliou et al., 2016).

Regional fire management strategy, fire management plan and decision-support system (DSS) for CEZ will be developed with support of

a GEF / UNEP project for prevention of large fires, regional radioactive contamination and additional doses for firefighters in future. Since April 2016 the Chernobyl Biosphere Radiological Reserve with an area up to 240 000 ha is under establishment by Government of Ukraine. Main objectives of the reserve are biodiversity, landscapes and ecosystems protection, support of ecosystem services and prevention of migration of radionuclides outside of CEZ. This require justification of balance between protection status of the CEZ and fire prevention measures, including fire breaks location, fuel treatment approach. AS part of the fire management maps will be developed that include wildfire hazard, risk / probability of ignition and spread, fire sensitivity and fire tolerance. The overall fire management strategy for CEZ will consider the specific needs / objectives and envisaged approaches in the different fire management units and the coordination of proposed measures with other national and internationally supported projects, including a national fire management strategy. Special attention will be given to the potential use of fire as an alternative to traditional mechanical fireline / firebreak construction and activation of radioactively contaminated soil particles (dust) and safe fire suppression techniques in contaminated terrain.

A Decision-Support System (DSS) will be developed for the support of daily fire management decisions in CEZ for proper preparedness and includes routing service and fire engines tracking, daily advises on patrolling needs, strategic location of engines depending on the fire-weather rating index, fire behavior prediction models, module for doses of firefighter's prediction. The DSS will be based on the Python QGIS, database management system (MySQL) and the telematic service on Ubuntu VPS hosting server.