fatigue, diminishing output and the quality of work. On this basis, the importance of selection, training and alternatives for the organization of fire fighting is discussed, concluding that Ergonomics, with its multidisciplinary approach, is a useful tool to improve the organization of work that can contribute to reduce the risks for workers and the social and economic damage caused by forest fires.

Sustainable forest management under fire risk: ecological options to reduce the fuel loads

Teresa de Jesus Fidalgo Fonseca[1,2], Marina Meca Ferreira de Castro[3,4], Filipa da Conceição Silva Torres Manso[1,5]
[1]Universidade de Trás-os-Montes e Alto Douro, Vila Real, Portugal; [2]Centro de Estudos Florestais, Universidade de Lisboa, Lisboa, Portugal; [3]Instituto Politécnico de Bragança, Bragança, Portugal; [4]Centro de Investigação de Montanha, Bragança, Portugal; [5] (tfonseca@utad.pt; marina.castro@ipb.pt; tforres@utad.pt)

Wildfire is a major abiotic disturbance in natural and planted forests, historically affecting larges areas of forests all over the world. In forest areas prone to forest fire, such as in the Mediterranean region, the risk of disturbance is continuously present (or recurrent) and need to be considered explicitly by the forest managers. As shown by the dramatic events of October 2017, in Portugal, wildfire suppression response does not guarantee, by itself, to be an adequate procedure to avoid damages caused by this disturbance. It is necessary to begin earlier, at the stand scale level, with preventive forest management procedures. Typical options include the selection of the tree species to plant, promoting the use of the essences most resistant to fire, coupled with their organization in space through compartmentation, and at the stand level, with the reduction of fuel loads of the understory vegetation and downed woody material. For existing forests, reduction of fuel loads can be achieved artificially by a prescribed burn or mechanical removal, or through ecologically based procedures of reducing the understory. This communication brings to analysis, under the umbrella of Project (Forestation of Agricultural Land with More Silviculture, Silvopasture, Innovation and Value), reduction of the understory fuel loads (a) by the management of the average density among trees; (b) by grazing. The effectiveness of the approaches to address the reduction of fuel loads over competing alternatives are evaluated and discussed for real case of studies.

Joint international efforts and challenges for enhancing fire management capabilities in the Chernobyl Exclusion Zone, Ukraine

Sergiy Zibtsev[1], Victor Myroniuk[1], Alan Ager[2], Richard Lasko[3], Joe Reinarz[4], Johann Georg Goldammer[5], Vladimir Usenia[6], Vasyl Gumeniuk[1], Oleksandr Soshenskyi[1]
[1]Regional Eastern Europe Fire Monitoring Center, National University of Life and Enviornmental Sciences of Ukraine, Kyiv, Ukraine; [2]Rocky Mountain Research Station, US Forest Service, Pendleton, USA; [3]US Forest Service, Missoula, MT, USA; [4] NIMO, United State Forest Service, Lakeview, Oregon, USA; [5]Global Fire Monitoring Center, Freiburg, Germany; [6]Institute of Forest, NAS, Gomel, Belarus (sergiy.zibtsev@nubip.edu.ua; victor.myroniuk@nubip.edu.ua; aager@fs.fed.us; rich.lasko920@gmail.com; jreinarz@fs.fed.us; johann.goldammer@fire.uni-freiburg.de; usenyaforinst@gmail.com; vasyl.gumeniuk@gmail.com; soshenskyi@nubip.edu.ua)

Three major wildfires in Chernobyl Exclusion Zone (CEZ) (2015) burnt 25,000 ha of contaminated lands, contributed to doses of firefighters, regional pollution outside the CEZ by releasing 137Cs, 90Sr, 238Pu, 239-240Pu and 241Am. For preventing future catastrophic fires in CEZ two projects were implemented by U.S. Forest Service (USFS) and the Organization for Security on Cooperation in Europe (OSCE). Within the USFS project (2016-2018), five fire detection cameras installed that increased monitored area from 136,000 to 190,000 ha. Chernobyl firefighters were equipped with fire clothing and breathing-protection means. Improved inter-agency communication were achieved by convening five National Coordination Meetings. Within 12 trainings with USFS instructors firefighters trained with knowledge on fires, safety and incident management. A risk assessed to help manage the long-term effect of re-suspended radionuclides from wildfires. For development of fire management plan spatial dataset was created (fuel loads, contamination, suppression) to develop a cohesive fire management strategy and fire management goals. Within the OSCE project, attention was paid to preparedness of Belorussian and Ukrainian fire services for management of trans-border fires (TBF). Guideline for fire suppression and Belarussian-Ukrainian-English fire terminology were developed for improving coordinated response to TBF, as well as software for predicting doses to firefighters and analysis of legislation of two countries. A table-top exercise for fire command staff was organized by the OSCE, the Global Fire Monitoring Center (GFMC) and the Ukraine-based Regional Eastern Europe Fire Monitoring Center (REEFMC) aimed at strengths of interoperability in addressing radioactive fires.

Sustainable forestry under fire risk: the use of fire operations research to inform forest operations in the interior Western United States

Matthew Thompson[1], Nathaniel Anderson[1]
[1]US Forest Service, Fort Collins, USA (mpthompson02@fs.fed.us; nathaniel.m.anderson@usda.gov)

Forest operations implement treatments that are prescribed to meet landowner and societal objectives, which on federal lands in the western United States continues to emphasize mitigating wildfire risk. The primary objectives of fuel treatments are to reduce the likelihood and intensity of wildfire, and to improve conditions for the control of fire when it occurs. Design principles for fuel treatment operations tend to be well-aligned with fire management objectives, and treatment strategihes have been the subject of engineering optimization for at least 15 years. However, for a variety of reasons, on-the-ground implementation rarely aligns with theory, and questions persist regarding treatment return-on-investment (ROI). Although treatment benefits are often estimated by evaluating post-treatment fire behavior, assessing the likelihood of such fire-treatment encounters even occurring is an equally if not more important determinant of ROI. Further, although facilitating fire control operations is often an assumed benefit of treatment, how this could or ought to materialize is not systematically incorporated into treatment design. Arguably what is needed is a treatment prioritization framework that jointly considers fire-treatment encounter likelihood with factors relevant to fire control operations. Recent progress on the latter front includes proactively differentiating landscapes on the basis of suppression difficulty and determining the likely effectiveness of various potential fire control locations, both of which could be ported from the incident response to the fuel treatment prioritization domain. This presentation highlights several ways that fire operations research can be used to inform and enhance the implementation of sustainable forestry under fire risk.