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Is enough water supplies for extinguishing forest fires in the Czech Republic?

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Abstract

Long periods of drought and mild winters have significantly affected the forests of the Czech Republic in recent years. If this trend continues, forest trees will be weakened and dehydrated, which will increase the probability that forest fires occur and spread. It is essential that fire managers (the Fire Rescue Service of the Czech Republic) prepare for this possibility. A main requirement for the extinguishing of large forest fires is the availability of water supplies. In this study, we determined whether the Czech Republic has enough water to fight forest fires and whether these water supplies are distributed so that all forest stands will have sufficient nearby water to fight fires. We analyzed forests, water supplies, and forest roads in three study areas. Water supplies were divided into several categories according to the database of water supplies currently used by the Fire Rescue Service of the Czech Republic; we also considered water supplies that are not currently used but that could be used. Forest roads were considered useable only if they permitted passage by commonly used firefighting equipment in the Czech Republic. Using GIS software and mathematical algorithms, we assessed the distance of forest stands (based on movement of water tanker trucks on passable road) to the nearest water supply and depending on water supply category. We found that there are currently sufficient water supplies in the studied areas of the Czech Republic to extinguish forest fires. One reservoir is sufficient to cover tens to hundreds of hectares of forest. The results indicate that any shortage in water availability can be eliminated by water supplies that are useable but that are not currently part of the database used by Fire Rescue Service of the Czech Republic. A thorough and regular updating of the database of water supplies is therefore required. This updating is especially important because some water supplies are incomprehensibly missing from the database and because some supplies in the database may disappear due to the current climatic conditions.

Keywords: water availability, Central Europe, Support decision system

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