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FIRE BRIGADE INTERVENTIONS RELATED TO EXCEPTIONAL WEATHER CONDITIONS IN BÁCS-KISKUN COUNTY - TECHNICAL RESCUES RELATED TO STORM DAMAGE

ABSZTRAKT

A klímaváltozás, a szélsőséges időjárási hatások vizsgálata nagyon aktuális. Megvizsgáltam a Bács-Kiskun vármegyei viharkárokkal összefüggő műszaki mentések számosságát, megoszlását, ezek tendenciáját és egyes jellemzőit. A tömeges viharkárok okozta veszélyeztetettség egyértelműen növekszik. Összegeztem a műveleti tapasztalatokat, amelyek alapvetően jónak mondhatók. Mindezek alapján javaslatokat tettem a felkészülés, megelőzés és a beavatkozások hatékonyságának növelése érdekében. A növekvő veszélyeztetettségre tekintettel javasolt a kutatás folytatása, különös tekintettel a szakterületi és együttműködési gyakorlatokra, a döntéstámogató rendszerekre, az esetleges egyidejű hosszantartó és nagykiterjedésű erdőtüzekre, az önkéntes tűzoltó egyesületekre és mentőcsoportokra, Kecskemét környékére.

Kulcsszavak: műszaki mentés, vihar, időjárás, tapasztalatok, interdependencia

ABSTRACT

The study of climate change and extreme weather events is very topical. I have examined the number, distribution, trends and some characteristics of technical rescues related to storm damage in Bács-Kiskun County. The vulnerability to mass storm damage is clearly increasing. I have summarised the operational experience, which is basically good. On this basis, I have made recommendations to improve preparedness, prevention and the effectiveness of interventions. In view of the increasing vulnerability, it is recommended to continue the research, with special attention to interdisciplinary and cooperative practices,

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decision support systems, possible simultaneous long-lasting large forest fires, volunteer fire brigades and rescue teams in the area of Kecskemét.

Keywords: technical rescue, storm, weather, experiences, interdependence

INTRODUCTION

In my work, I often encounter events related to extreme weather situations, such as vegetation fires and storm damage. Both international and national research experience shows that climate change may increase the number and intensity of such events. We can expect our weather to become more extreme. Gale-force winds will continue to grow and sudden, brief but extreme rainfall events will become more frequent. [1] [2] [3] [4] [5]

The topicality of the subject is undisputed, given the research findings and the recent storms in the country. I therefore decided to investigate firefighting interventions associated with extreme weather events in my research. My present sub-research covered storm damage. My major scope is to examine the number and distribution, and to identify trends and some characteristics of technical rescues related to storm damage; moreover, to collect major experience on intervention. I will then draw conclusions and recommendations to improve preparedness, prevention and the effectiveness of interventions. It was not my intention to cover the topic in a complex way, but to provide inspiration and a starting point for further research.

Figure 1 Intervention in Kecskemét, 12 June 2018. [6]

STATISTICAL ANALYSIS

The fire brigades are obliged to collect data on all their interventions, the exact method and content of which is determined by the central body of disaster management (BM OKF). [7]

The earliest data available in the current database are from 2011. The research was extended to data for Bács-Kiskun county for the period up to 31 December 2022, i.e. 12 full years. [8] In addition, with the help of György Heizler, editor-in-chief of the Fire Protection Journal, I obtained county-level data for 8 full years between 1998 and 2005.

The two datasets span more than two decades, with significant differences in data collection methodology. The "tree fall" type is included in both technical rescues. In addition, it has a clear definition, so I have chosen this aspect for comparison.

Between 1998 and 2005, the average number of technical rescues for tree fires was around 250. The trend for each year varies considerably, but is also clearly upwards.

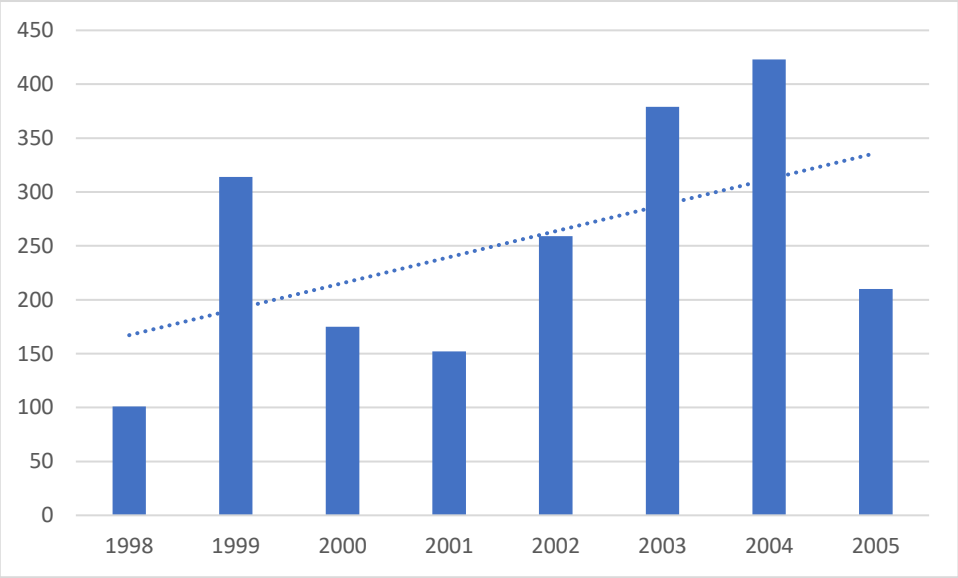

Figure 2 Evolution of technical rescue in tree fires between 1998 and 2005 (own ed.)

The years 2011 to 2022 show a significant jump from 2011 to 2017, with almost double to the avarage of 430. The average has increased by about 70% over roughly a decade and a half.

Among the types of technical rescues in the period 2011-2022, natural disaster storm damage, water damage and tree felling may be linked to storms with damaging winds and large amounts of rain in a short period of time. Therefore, these values have been considered together.

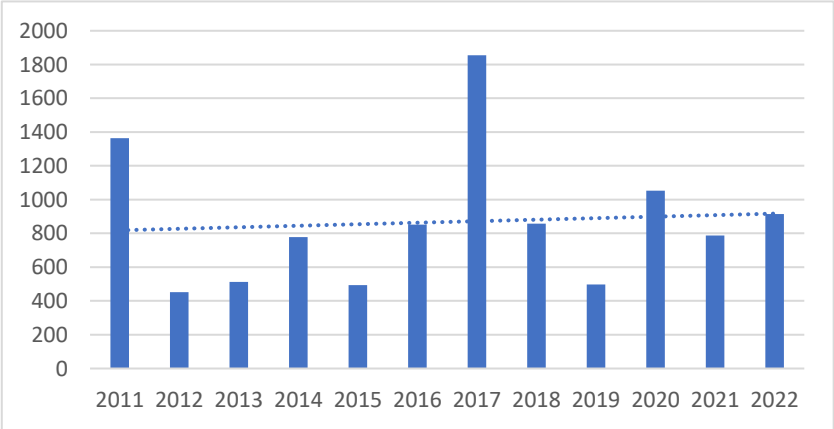

Figure 3 Technical rescues in the event of natural disaster-storm damage, water damage and tree felling (own ed.)

The combined 2011 and 2017 values show a significant spike, which is similar to the values for tree felling alone. The average is almost 900, which shows an increasing trend. 2011 and 2013 were also priority years for water damage. The former was the last major flooding period to date. If water damage (445 cases) is subtracted from the total, 2011 is still just behind 2020 in the third place. In 2013 there was a minor flood on the Tisza and a historic one on the Danube. Water damage repairs account for approximately 35% of all interventions. The figures for the other years are thus basically related to classic storm damage. However, the 2011 inland flood and the 2013 flood can also be linked to extreme weather events (high rainfall). [9] [10]

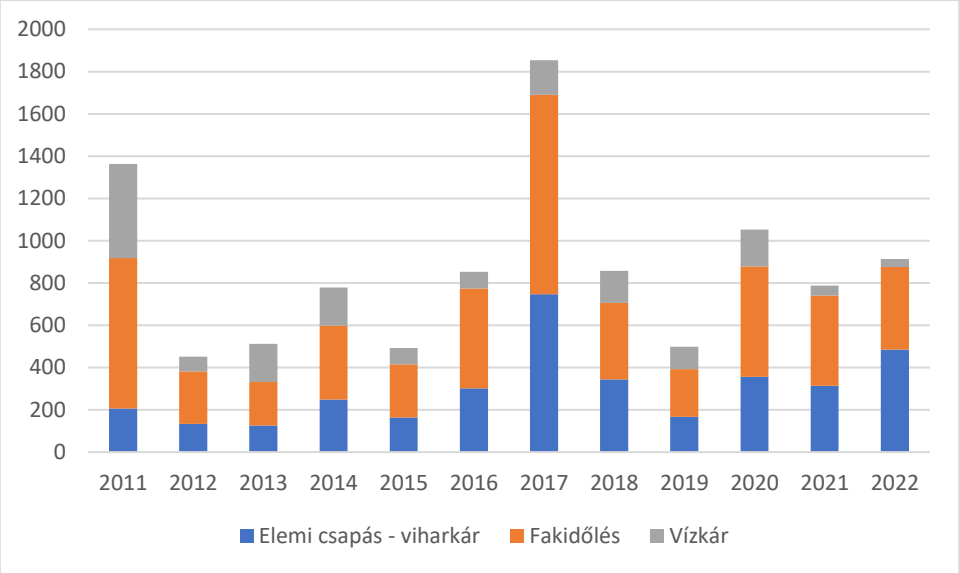

Figure 4 Distribution of types of technical rescue examined by year (own ed.)

As shown in Figure 4, most of the interventions are related to tree felling (on roads, vehicles, buildings, etc.). Water pumping accounts for approximately one sixth of the incidents. The affected areas are generally recurrent in the respective municipalities. Also, objects hanging in the air appear to be of the elemental disaster - storm damage type. Massive building damage has not been typical of Bács-Kiskun county so far.

Figure 5 Intervention at Caesar's Charge, 17 June 2020. [6]

Storm-related events rarely result in personal injury, and there were no fatalities during the period under review. Typically, there is damage to property and spillover effects from damage to infrastructure (e.g. electricity).

Bács-Kiskun county is highly vulnerable to forest fires. [11] When comparing storm damage with forest and vegetation fires, we find that there are outlier years in both respects, especially in the second half of the period (2017, 2022). On average, the two categories together account for about half of all actual interventions.

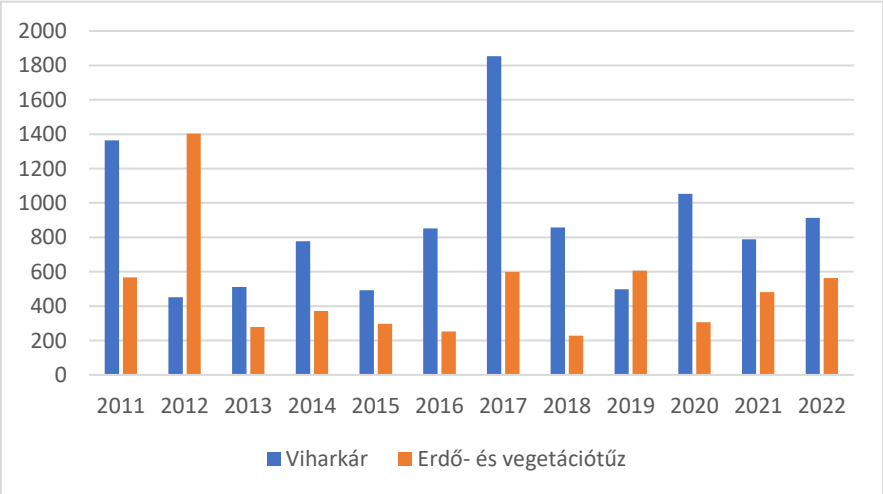

Figure 6 Fire fighting interventions related to storm damage and forest and vegetation fires (own ed.)

On average over many years, half of all technical rescues are linked to storm damage. The proportion is higher in stormier years.

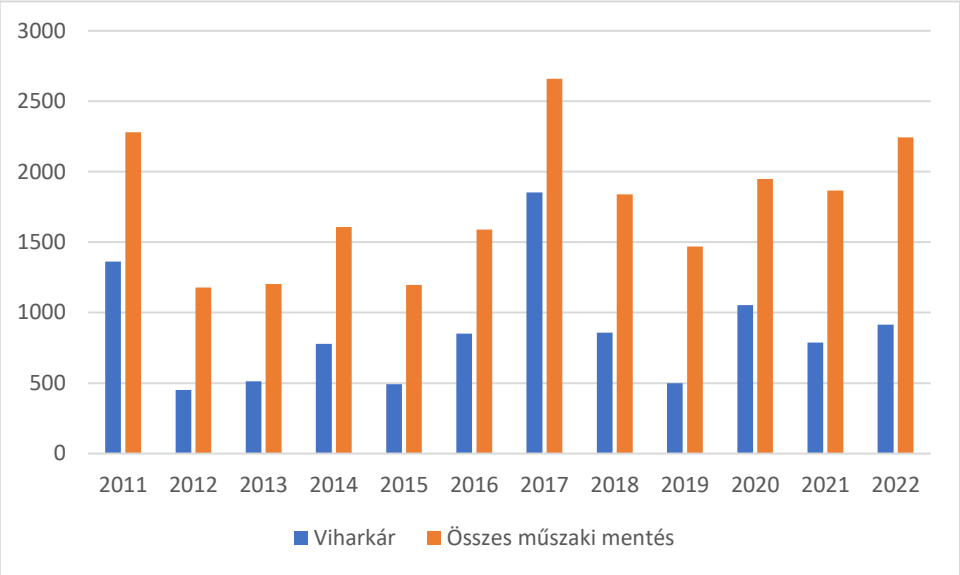

Figure 7 Storm damage - comparison of all technical rescues (own ed.)

I consider the series of events when there are at least 40 storm-related technical rescues in Bács-Kiskun county as a mass event. There was an average of 5.5 such events between 2011 and 2022. There were ten such events in three years (2014, 2017, 2020). The number of such events is clearly on an increasing trend.

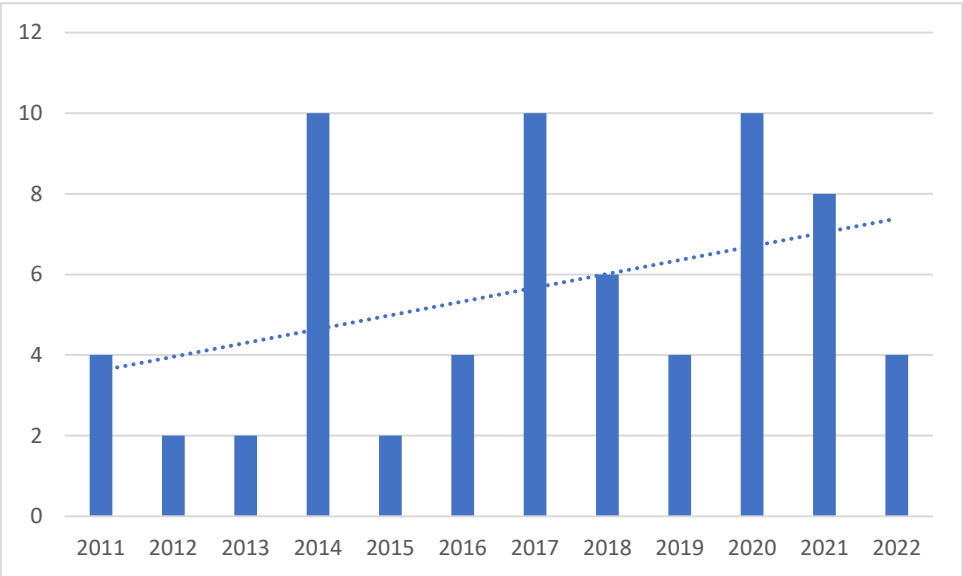

Figure 8 Incidence of mass storm damage (own ed.)

Massive storm damage occurred mostly in the summer, in June. Damaging wind storms also occurred several times in the autumn and winter. There is considerable overlap between the season of large-scale, long-lasting forest fires and the season of mass storm damage. [12]

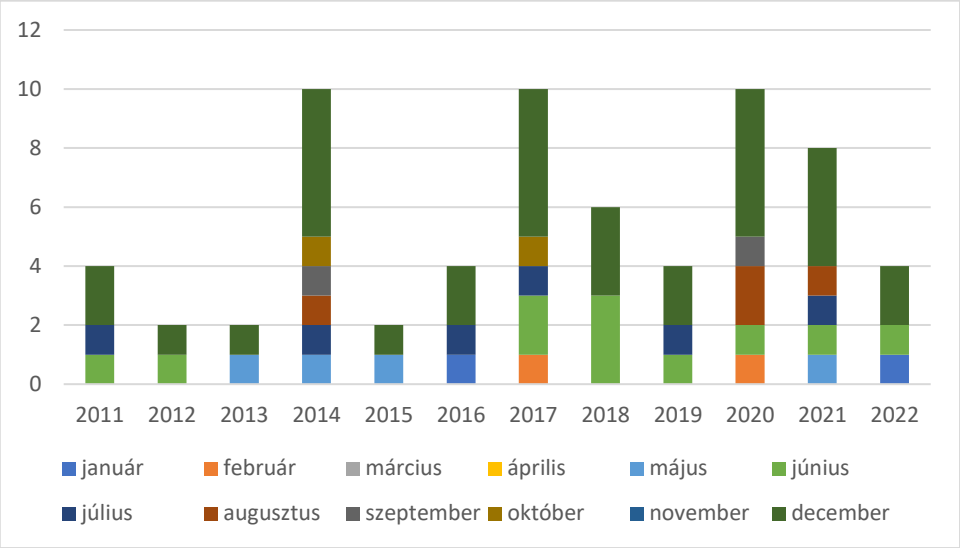

Figure 9 Frequency of mass events by month (own ed.)

The distribution of the number of mass events is shown in Figure 9. Around 60% of them do not reach 100 events, but there are some (and in the atypical October period) that just exceed 500. The latter took three days to repair the damage, with a typical delay of two days.

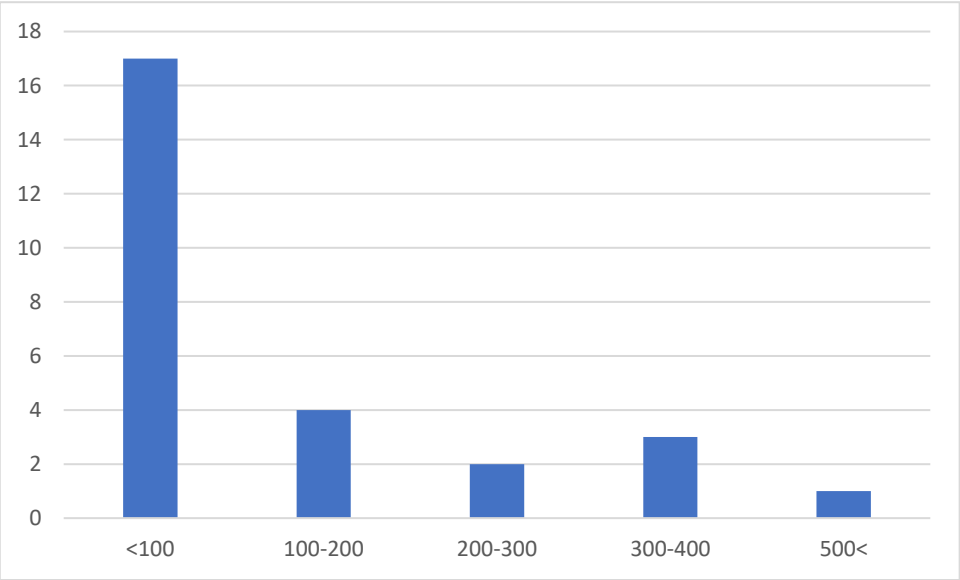

Figure 10 Distribution of the number of mass events (own ed.)

The spatial distribution of storm damage is proportional to the number of inhabitants and the extent of the built environment. For example, the order of the first 5 is the same as the population order. Kecskemét stands out among the other cities, but it is home to almost a quarter of the county's population. [13]

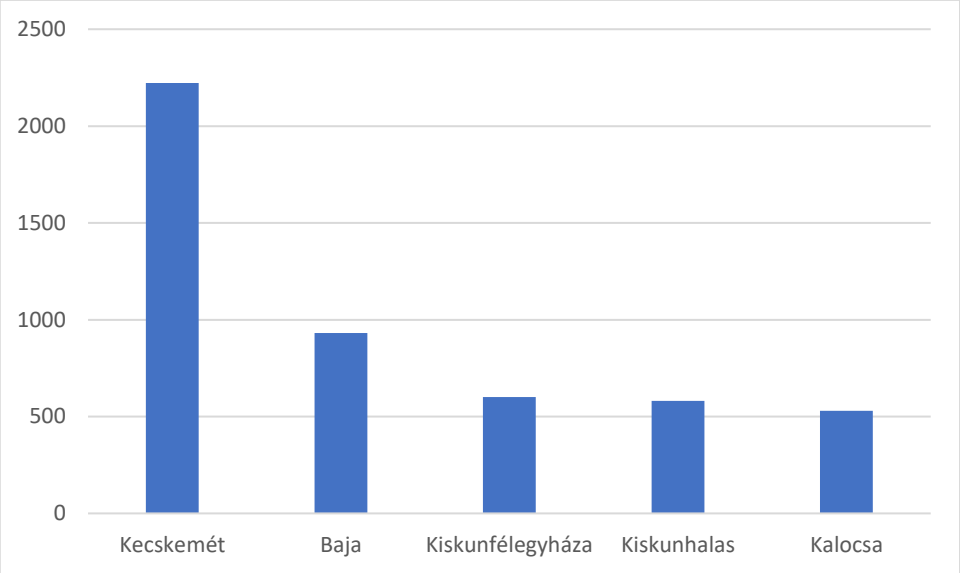

Figure 11 Aggregate storm-related technical rescues 2011-2022 (own ed.)

EXPERIENCE OF OPERATIONS

I have been involved as a manager in the clean-up of practically all the mass storm damages in Bács-Kiskun County since 2011, and we have also processed them afterwards. I draw from these experiences in this chapter.

Such a sequence of events typically involves all the disciplines of disaster management, including operations management, fire brigade, industrial safety, civil protection and public authorities, typically in that order.

Following strong winds, significant precipitation and possibly damaging ice, a large number of technical rescues will have to be carried out over a longer period of time. Incoming signals are typically property damaging and should be prioritised according to their importance, complemented by on-site reconnaissance of the affected areas. Among the many signals received, there are also reports of life-threatening incidents (e.g. building fires caused by lightning strikes, road accidents, etc.), and it is of paramount importance to identify them quickly and to intervene as soon as possible.

1. ábra Beavatkozás az 52-es úton, 2020. augusztus 4. [6]

The intervention is supported and assisted by other public and municipal organisations, companies, NGOs and individuals. The coordination of this complex activity is typically carried out by an ad hoc operational team. It brings together representatives of all the relevant disciplines and, where appropriate, of the relevant cooperating organisations. It operates on a continuous basis in damage repair. Thanks to training and exercises, cooperation and coordination and the implementation of concrete interventions are good.

As a large number of technical rescues have to be carried out at the same time, additional resources beyond the local firefighters have to be mobilised. On the one hand, this means redeploying fire-fighting units within the county and specialised fire-fighting techniques (e.g. rescue vehicle from height). On the other hand, volunteer fire brigades and rescue teams can be of great help. Volunteer firefighters from other municipalities are also regularly involved in the clean-up of storm damage in Kecskemét. The intervening firefighters apply many technical rescues over a long period of time, and special attention must be paid to the safety of their work, their care and rest.

2. ábra Beavatkozás 2022. május 28-án Madarason [6]

In addition to direct effects, a mass storm surge can have a number of indirect spill-over effects. For example, the electricity supply. Wind-blown support poles, fallen trees on power lines can cause power disruptions to entire communities or to infrastructure critical to the functioning of the state and its population. These disruptions and their effects must be identified as quickly as possible so that countermeasures can be taken. For example, a municipal drinking water supply or wastewater treatment system may be interconnected in such a way that a power outage in the latter may render the former inoperable.

Mass storm damage in conjunction with a long-lasting, large-scale forest fire has not yet occurred, but the likelihood of this is not negligible. A similar situation has been prepared for in a complex disaster management cooperation exercise.

SUMMARY

Looking at decade-long time series, the intensity and frequency of mass storm damage is clearly on an upward trend. In addition to typical summer periods, they can also occur in winter and autumn. Most incidents involving technical rescue occurred at the end of October.

The various interdisciplinary and cooperative exercises in preparation have worked well and implementation is good.

There is also good cooperation with state and municipal organisations, and maintaining it is an ongoing task through joint evaluation of experiences, regular meetings and exercises. Cooperation with electricity suppliers, municipalities and critical infrastructure operators is important.

The most typical period coincides with prolonged, large-scale forest fires, and special preparations should be made for this. Particular attention should be paid to the adaptation of the geographic information decision support system, which has proved its worth in forest fires, and to complex disaster management cooperation exercises.

The assistance of voluntary fire brigades and rescue teams is considerable, and efforts should continue to be made to maintain and develop them (e.g. trailer hoist). This is particularly true for Kecskemét and its surroundings.

In view of the increasing vulnerability, it is recommended to continue the research.

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