

Knysna fires: Lessons learnt

The Knysna fires saw the largest operational deployment of fire fighting resources and personnel in South Africa in a single incident

The 2017 Knysna Fires will be etched in the minds of many South Africans for years to come.

The fires claimed the lives of eight people and caused billions of Rands worth of damage to infrastructure, businesses and homes and had a major impact on the livelihood of this small South African coastal town. The incident resulted 1 059 formal dwellings destroyed or damaged with a further 385 informal dwellings destroyed or damaged.

There have been several reports released since the fires. Each with its own merit (or not). Some were

painstakingly researched using factual information, statistics and data.

In this article we will not be debating the cause of the fires or play the blame game but rather look at what can be learnt from this incident. The saying goes, 'Prevention is better than the cure' but could this incident have been prevented? Were the authorities prepared for this large scale disaster? What can you do to prepare yourself, your service/association for similar future incidents? One thing is certain and that is that our climate patterns will test your abilities and resources in the future.

Post incident reports highlight the necessity of a multi-agency incident command system, planning for lack of communication infrastructure, fuel load reduction and management, defensible space, management of social media and early warning systems.

This article contains excerpts from the report 'The Elandskraal Fire, Knysna: A data driven analysis' by the CSIR Meraka Institute and the 'Situational Analysis of the 2017 Knysna Fires: Lessons Learned Report' by Vulcan Wildfire Management.

The 2017 Knysna fires were notable for involving the largest deployment of fire fighters in South Africa to date. A total of 985 fire fighters (excluding volunteer agencies) along with 78 vehicles, 12 helicopters and two fixed-winged bombers were used in combating the fire between 6 June and 10 June 2017.

Operations: WC PDMC

The Western Cape Disaster Management and Fire and Rescue Services cited that the fire started on evening of 6 June 2017 and by 7 June 2018, there were 28 fires burning with four fatalities. "The wildfires were fanned towards residential areas by strong winds from a cyclone to the west. Western Cape Disaster Management



The Knysna Wildfire began the evening of 6 June 2017 and consisted of 26 fires by 7 June 2017



The fires were fanned towards residential areas by strong winds from a cyclone to the west



Eight lives were lost



1 059 formal dwellings and 385 informal dwellings were destroyed



Recommendations included the importance of defensible space in the WUI

► and Fire and Rescue Services received the request for assistance received from Eden District Municipality. Evacuations were ordered in Knysna and surrounds and the George Bus Service activated to evacuate residents. 408 formal houses and 200 informal dwellings were destroyed. The Knysna Hospital had to be evacuated and a medical command post and treatment area was established. Provincial mutual aid was activated and 88 additional fire fighters deployed. Cape Nature activated 153 wildland fire fighters and staff and national resources that were activated included 22 Working on Fire teams (535 staff) from other provinces."

"The wildfire reached the urban interface at around 14h00 and took six hours to pass through Knysna. In total 1 059 formal dwellings and 385 informal dwellings were destroyed with fire fighters having to deal with at least one structure/house on fire every minute."

"On 8 June 2017 the South African Air Force joined fire operations and humanitarian support continued. The body of a three-year old child was found and 20 buildings were destroyed in Plettenberg Bay. A Type 1 incident management team (IMT) was deployed

in Knysna. There was a fire fighter fatality in the hospital as a result of burns. The fire was 85 percent contained."

"On 10 June 2017 a major flare up resulted in another seven buildings being destroyed. One person died in the fire. The fire was contained by 19h00. From 11 June 2017 onwards the fire remained contained with sporadic flare ups. Structures remained vulnerable to ignition in the wildland-urban interface (WUI) over 12 hours after the initial wildland fire front had moved through the community."

CSIR Meraka Institute Report

The CSIR Meraka Institute Report states that the total burned area is 9 440ha. "A Sentinel-2 of 14 June 2017 was used to map the total burned area of the Elandskraal and Kruisfontein fires and the first estimate of burned area is 9 440ha. There is an underestimation of areas that burned under forest canopies due to the remaining green tree tops that are assessed by the automatic algorithm as unburned areas."

The report also cited "Excessive drying of fuels due to days of berg wind conditions before the 7 June 2017 coupled with a drop in relative

humidity to 25 percent and an increase in temperature by five degrees to 25 degrees between 1h09 and 3h00 ensured that the vegetation was fully cured and highly flammable."

Vulcan Wildfire Management report

In the Vulcan Wildfire Management report, the following was conveyed: "On 7 June 2017, the Kruisfontein and Elandskraal wildfires, collectively referred to as the Knysna Fires, had a devastating impact on the Knysna and Plettenberg Bay areas. The scale and destructive nature of these wildfires was almost inconceivable and the Knysna Fires incident will be recorded as one of the most destructive wildfire incidents in South Africa's history."

"An array of natural elements combined to create the 'perfect wildfire storm'. Fuels, drought, Berg winds, low humidity, high temperatures and a cold front with extreme winds contributed to wildfires with an exceptionally high rate of spread and extreme wildfire behaviour."

"As a result of the incomprehensible losses and destruction faced in the aftermath of the Knysna Fires, it was not long before people started

apportioning blame and preparing for litigation. It is essential that this does not become the primary focus as it does little to prevent future disasters of this magnitude. An holistic understanding of the incident is required in order to identify areas where the wildfire industry and public are falling short and how shortcomings can be addressed."

"Wildfire intelligence, planning and risk reduction measures have been well documented in textbooks, international best practice and other wildfire reports in South Africa. Therefore, the tools and strategies, combined with the existing wildfire knowledge and expertise, to avert a disaster of this magnitude already exist. Using the Knysna Fires as a case study, Vulcan Wildfire Management identifies the key challenges in the Eden District that are acting as barriers to the implementation of wildfire management best practice. By understanding the success stories, challenges and the weaknesses in the Eden District, we will be able to adopt and improve approaches, systems and strategies so that future wildfire incidents result in far more positive outcomes."



The report stated that, "Collectively, the private and public sectors were not prepared for an incident of this scale and ferocity. Wildfire preparation and resilience measures, which are fundamental to averting damage and loss, were either not in place or were insufficient."

CSIR Meraka Institute report recommendations

The CSIR Meraka Institute report recommends that "holdover (smouldering) fires have the potential to flare-up under severe weather conditions with potentially devastating

consequences, as was seen in the Knysna fire disaster. In order to reduce the risks of these events in future, the AFIS team recommends the development of a Lightning-Induced Fire Ignition Probability Index for South African conditions. The introduction of such a probability index will allow for the early detection and alerting of positive lightning strikes specifically in areas with very dry vegetation fuels and the subsequent detection of patches of smouldering vegetation."

"Fire risk along the wildland-urban interface (WUI) of the fynbos biome can

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- STHAMER MOUSSOL APS FOR ALCOHOL FIRES IN 1/3, 3/3, 3/6 ECONOMY AS WELL AS SUPER GRADES.
- STHAMER HAS DEVELOPED A NEW ENVIRONMENTALLY FRIENDLIER MOUSSOL PREMIUM RANGE.
- ALL CARRY EN 1568 APPROVALS










Knysna and Bitou was declared disaster areas for fire and the 'Garden Route Rebuild' Programme was established

- ▶ be calculated and mapped using the geospatial assessment procedure (or framework) previously demonstrated by the CSIR for specific study areas (Forsyth and Le Maitre 2015). We recommend that the risk assessment procedure be expanded to the entire fynbos biome (or all fire-prone biomes in the country) and augmented by including data of fuel type, fuel load (biomass), fuel moisture and burn history (time since last burn), all of which can already be derived from satellite imagery on an ongoing basis. The local landowners and government should be very well informed about fire risk along the WUI and share the responsibility for mitigating the risk of wildfires (Forsyth and Le Maitre 2015). To this end, fire risks should be continuously assessed, with risk maps being publicly accessible through web-based geographic information systems. Earth Observation and geospatial technologies are sufficiently mature to provide essential fire risk and other fire related information demonstrated in this report, however, sufficient funding is required to take this technology beyond the 'proof-of-concept' or 'pilot' phases towards an operational service. The mitigation of the risk of inevitable wildfires in the fynbos biome, will therefore require:
 1. More research on the occurrence and behaviour of lightning-induced holdover fires
 2. The development of a system to map the Lightning-Induced Fire Ignition Probability Index based on lightning strike data and satellite data
 3. A system for mapping fire risk in WUI and for publicly disseminating these maps

4. Broader communication of fire danger based on weather conditions
5. Sufficient support and funding to maintain these operational, public-good, fire information systems and
6. Close collaboration between local landowners and government by means of fire protection associations to mitigate fire risk.

Vulcan report recommendations

Vulcan Wildfire Management invited the Western Cape fire chiefs and industry experts to a meeting on 26 October 2017 in order to establish an expert panel. The first meeting allowed for input and guidance on key focal points deemed important for analysis. A second meeting was held on 13 February 2018, which offered insight into key research findings, allowing the panel to comment and share further knowledge and professional insight.

Key findings

Objectives identified for the Eden District:

- Develop a system of shared wildfire understanding and responsibility
- Create synergy among those affected by or involved with wildfires
- Establish and develop wildfire resilient communities

Work required to achieve objectives based on the Eden District analysis:

- Developing people and optimising systems within the wildfire context.
- Successful wildfire resilience lies in preparation and risk reduction, not reactive response.
- No single entity or organisation can solve the wildfire problem in isolation. Collaboration and

working together to create wildfire resilience are the only ways to succeed.

- Wildfire-specific capacity and capabilities need to be established and supported by all role-players affected by wildfire, if real change is to occur.
- Innovation and cooperation are required to overcome financial roadblocks. Financial constraints can be overcome when there is greater understanding of wildfire risk and good synergy amongst all role-players.
- Landowners and homeowners in the Eden District need to share more responsibility for wildfires. However, they require more information and support from the authorities and wildfire experts if they are to do so.

In the light of the reports, its findings and recommendations, it is obvious that neither the local authorities, public and private sector, were not ready for an incident of this magnitude. But having said that, which town, city or metro can claim that they are prepared for such an event? Are you?

The Western Cape Disaster Management and Fire and Rescue Service managed the incident under extreme weather conditions and should be commended for its unified approach to incident management.

The Knysna Fires should become a case study for all sectors and spheres of Government and its challenges faced, a lessons learnt synopsis that does not gather dust on a shelf but rather becomes a practice outlining standard operating procedures (SOPs) and dictating practical information systems on a national level.

Let us never forget:

- Madré Johnston
- Tony Johnston
- Michael Johnston
- Catherine Nyirenda
- Enala Manda
- Dawie van der Ryst
- John Blaauw
- Bradley Richards

Sources: Western Cape Disaster Management and Fire and Rescue Service, CSIR Meraka Institute and Vulcan Wildfire Management reports. ▲