



Situational Analysis of the 2017 Knysna Fires

Lessons Learned Report
by Vulcan Wildfire Management





Introduction

Vulcan Wildfire Management (Pty) Ltd was appointed by the Western Cape Directorate Disaster Management and Fire & Rescue Services (the Client) to launch a task force to analyse and document the June 2017 Knysna (Elandskraal Fire) and Plettenberg Bay (Kruisfontein Fire) wildfire incidents (also known as the Knysna Fires) and, thereafter, produce a comprehensive report with a summary of findings and recommendations.

Vulcan Wildfire Management's role in this Post-Incidents Assessment was: to outline certain matters that came to our attention during engagement with stakeholders, members of communities and public; document interviews, and offer our comments and recommendations for the Western Cape Directorate Disaster Management and Fire & Rescue Services and participating stakeholders' consideration.

Our assessment approach consisted of inquiry, survey, observation, comparison and analysis of participant-provided information. Vulcan Wildfire Management relied on the completeness and accuracy of the information provided.

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The Vulcan Wildfire Management Task Force team that travelled to Knysna on two occasions. Here, pictured standing on the well-known Knysna Red Bridge, from left to right: Patrick Ryan, Ryan Heydenrych and Dean Harrison.

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Glossary

“Command” means the act of directing and/or controlling resources by virtue of explicit legal, agency, or delegated authority.

“Command Staff” means the Command Staff which consists of the Public Information Officer, Safety Officer, and Liaison Officer. They report directly to the Incident Commander. They may have an Assistant or Assistants, as needed.

“Debrief” or **“After Action Review (AAR)”** means a structured review or de-brief process of an event, focused on performance standards, that enables participants to discover for themselves what happened, why it happened, and how to sustain strengths and improve on weaknesses. After action reviews, informal or formal, follow the same general format, involve the exchange of ideas and observations, and focus on improving performance.

“Disaster” means a progressive or sudden, widespread or localised, natural or human-caused occurrence which —

- (a) causes or threatens to cause
 - (i) death, injury or disease;
 - (ii) damage to property, infrastructure or the environment; or
 - (iii) disruption of the life of a community; and
- (b) is of a magnitude that exceeds the ability of those affected by the disaster to cope with its effects using only their own resources.

“Disaster Management” means a continuous and integrated multisectoral, multidisciplinary process of planning and implementation of measures aimed at —

- (a) preventing or reducing the risk of disasters;
- (b) mitigating the severity or consequences of disasters;
- (c) emergency preparedness;
- (d) a rapid and effective response to disasters, and
- (e) post-disaster recovery and rehabilitation.

“Disaster Management Cycle” means the ongoing process by which governments, businesses, and civil society plan for and reduce the impact of disasters, react during and immediately following a disaster, and take steps to recover after a disaster has occurred. Often phases of the cycle overlap and the length of each phase greatly depends on the severity of the disaster. The cycle includes: Prevention/Preparedness, Response, Stabilisation, Recovery.

“District Municipality” means a municipality that has municipal executive and legislative authority in an area that includes more than one municipality and which is described in section 155(1) of the Constitution as a category C municipality.

“Division” means the system used to divide an incident into geographical areas of operation. A Division is located within the ICS organisation between the Branch and the Task Force/Strike Team. Divisions are identified by alphabetic

characters for horizontal applications and, often, by floor numbers when used in buildings.

“Fire Danger Index (FDI)” means the system that is used to provide a measure of the relative seriousness of burning conditions and threat of fire by providing an as accurate measure as possible of the relative seriousness of burning conditions.

“Fire Protection Association (FPA)” As described in the Veld and Forest Fire Act, no. 101 of 1998, a Fire Protection Association may be formed by land owners, within a neighbouring geographical area, who wish to cooperate for the purpose of predicting, preventing, managing and extinguishing wildfires. An FPA must, amongst other duties described in the act, develop and apply a wildfire management strategy for its area, inform its members of equipment and technology available for preventing and fighting wildfires and provide management services, training and support for communities in their efforts to manage and control wildfires.

“Hazard” means something that is potentially dangerous or harmful, often the root cause of an unwanted outcome.

“Incident” means an occurrence or event, natural or human caused that requires an emergency response to protect life or property. Incidents can, for example, include major disasters, emergencies, terrorist attacks, forest and urban fires, floods,



hazardous materials spills, nuclear accidents, aircraft accidents, earthquakes, public unrest, weather-related disasters, public health and medical emergencies, and other occurrences requiring an emergency response.

“Incident Action Plan (IAP)” means an oral or written plan containing general objectives reflecting the overall strategy for managing an incident. It may include the identification of operational resources and assignments. It may also include attachments that provide direction and important information for management of the incident during one or more operational periods.

“Incident Commander (IC)” means the individual responsible for all incident activities, including the development of strategies and tactics and the ordering and the release of resources. The IC has overall authority and responsibility for conducting incident operations and is responsible for the management of all incident operations at the incident site.

“Incident Command Post (ICP)” means the field location at which the primary tactical-level, on-scene incident command functions are performed. The ICP may be collocated with the incident base or other incident facilities and is normally identified by a green rotating or flashing light.

“Incident Command System (ICS)” means a standardised on-scene emergency management construct specifically designed to provide for the adoption of an integrated organisational structure that reflects the complexity and demands of single or multiple incidents, without being hindered by jurisdictional boundaries. ICS is the combination of facilities, equipment, personnel, procedures, and communications operating within a common organisational structure, designed to aid in the management of resources during incidents. It is used for all kinds of emergencies and is applicable to small as well as large and complex incidents. ICS is used by various jurisdictions and functional agencies, both public and private, to organise field-level incident management operations.

“Incident Management Team (IMT)” means the Incident Commander and appropriate Command and General Staff personnel assigned to an incident.

“Incident Objectives” means statements of guidance and direction necessary for the selection of appropriate strategy(ies), and the tactical direction of resources. Incident objectives are based on realistic expectations of what can be accomplished when all allocated resources have been effectively deployed. Incident objectives must be achievable and measurable, yet flexible enough to allow for strategic and tactical alternatives.

“Initial Attack” means the actions taken by the first resources to arrive at a wildfire to protect lives, property and attempt to stabilise the incident through control or suppression of the fire.

“Integrated Fire Management” means a comprehensive and holistic approach to managing wildfire. This includes prescribed burning, stack burning, fuel reduction, fire breaks, property risk assessments and risk reduction, operational planning, resource training and development, intelligence gathering, awareness via education and wildfire suppression.

“Joint Operations Centre (JOC)” means the physical location at which the coordination of information and resources to support domestic incident management activities normally takes place. A JOC may be a temporary facility or may be located in a more central or permanently established facility, perhaps at a higher level of organisation within a jurisdiction. JOCs may be organised by major functional disciplines (e.g., fire, law enforcement, and medical services), by jurisdiction (e.g., National, Provincial, District or local), or some combination thereof.

“Large Landowner Organisations” means government-backed or private organisations that own or are chartered with the upkeep of large areas of uncultivated land. These areas are often Reserves or National Parks, and mostly made up of veld and forests (wildland) and are largely untouched by habitation or structural development.



“Local Municipality” means a municipality that shares municipal executive and legislative authority in its area with a district municipality within whose area it falls and which is described in section 155(1) of the Constitution as a category B municipality.

“Mobilisation” means the process and procedures used by all organisations for activating, assembling, and transporting all resources that have been requested to respond to or support an incident.

“Origin” or “Point of Origin” means the location where a competent ignition source came into contact with the material first ignited and sustained combustion occurred.

“Preparedness” means the range of deliberate, critical tasks and activities necessary to build, sustain, and improve the operational capability to prevent, protect against, respond to, and recover from emergency incidents.

“Public Information Officer (PIO)” means a member of the Command Staff responsible for interfacing with the public and media or with other agencies with incident-related information requirements.

“Rate of Spread (ROS)” means a fire behaviour term used to express relative growth of a wildfire.

“Resources” means personnel and major items of equipment, supplies, and facilities available or potentially available for assignment to incident operations and for which status is maintained.

“Response” means the activities that address the short-term, direct effects of an incident.

- a) Response includes immediate actions to save lives, protect property, and meet basic human needs.
- b) Response also includes the execution of emergency operations plans and of mitigation activities designed to limit the loss of life, personal injury, property damage, and other unfavourable outcomes.
- c) As indicated by the situation, response activities include applying intelligence and other information to lessen the effects or consequences of an incident; increased security operations; continuing investigations into the nature and source of the threat; on-going public health and agricultural surveillance and testing processes; immunisations, isolation, or quarantine.

“Role Player” means a designated district municipality, landowner, FPA or any entity that is involved with firefighting, integrated fire management in some form or manner. It also includes those affected by wildfire such as homeowners as well as those who have a role to play in wildfire risk reduction such as town planners, developers, etc.

“Strategy” means the general direction selected to accomplish incident objectives set by the incident commander.

“Synergy” means the combined power of a group of things when they are working together that is greater than the total power achieved by each working separately:

- Team work at its best results in a synergy that can be very productive. Cambridge University Press, 2018

“Tactics” means deploying and directing resources on an incident to accomplish incident strategy and objectives.

“Task Force” means a combination of single resources each with different capabilities assembled for a particular tactical need with common communications and a Leader.

“Technical Specialists” mean personnel with special skills that can be used anywhere within the ICS organisation.

“Threat” means an indication of possible violence, harm, or danger.



“Unified Command” means an application of ICS used when there is more than one agency with incident jurisdiction or when incidents cross political jurisdictions.

a) Agencies work together through the designated members of the Unified Command, often the senior person from agencies and/or disciplines participating in the Unified Command, to establish a common set of objectives and strategies and a single Incident Action Plan.

“Wildfire” Refers to a veld, forest, bush, thicket, vegetation, grassland, bushveld, Fynbos and mountain fire.

“Wildfire Professional” means those paid for their service in combating wildfires, this includes firefighters in the District Fire Services and Municipal Fire Services, landowner employees, nature conservation organisations and contract crew organisations.

“Wildfire Specialists” means a wildfire professional but with more wildfire specialisation and focus in functions such as:

- Integrated Fire Management
- Wildland Urban Interface ‘(operations, planning and risk reduction)’
- wildfire behaviour strategy and tactics
- Division/Group Supervisors, Strike Team and Task Force Leaders and IMT members
- advanced wildfire operations in Ground, Vehicle and Aerial Crews
- advanced remote area operations,
- prescribed burning and operational burning.

“Wildland Firefighter”

A firefighter responsible for the prevention, containment and suppression of wildfires that can be employed on a permanent or seasonal basis or be a volunteer. The nature of their duties depends on the type of crew they are working in. However all duties are physically demanding and undertaken outdoors, often in extreme conditions and a long distance from roads or areas of habitation. For the majority of fire suppression operations various hand tools are used with water being a scarce resource but very effective when available.

“Wildland Urban Interface (WUI)” means the zone of transition or area between unoccupied land and human development. This zone is not measured by a specific or predetermined geographic distance but rather by the area of land in which human development coexists with unoccupied or rural land. This includes the any vegetation paths that can extend from the unoccupied land into the urban sprawl.

Acronyms

AAR	After Action Review
DAFF	Department of Agriculture, Forestry and Fisheries
FDI	Fire Danger Index
FMU	Fire Management Unit
FPA	Fire Protection Association
FPO	Fire Protection Officer
IAP	Incident Action Plan
ICP	Incident Command Post
ICS	Incident Command System
IC	Incident Commander
IMT	Incident Management Team
IT	Information Technology
IDP	Integrated Development Plan
IPCC	Intergovernmental Panel on Climate Change
JOC	Joint Operations Centre
MTO	Mountains to Oceans Forestry
NSRI	National Sea Rescue Institute
NGO	Non-Governmental Organisation
PPE	Personal Protective Equipment
PDMC	Provincial Disaster Management Centre
PIO	Public Information Officer
ROS	Rate of Spread
SAICS	South African Incident Command System
SANParks	South African National Parks
SCFPA	Southern Cape Fire Protection Association
SOP	Standard Operating Procedure
VWS	Volunteer Wildfire Services
WUI	Wildland Urban Interface
WoF	Working on Fire





Executive Summary

Introduction

A common theme, underpinning the obstacles and solutions to achieving wildfire resilience, emerges out of the Eden District's wildfire challenge.

Synergy

The combined power of a group of things when they are working together that is greater than the total power achieved by each working separately:

Team work at its best results in a synergy that can be very productive.

Cambridge Advanced Learner's Dictionary & Thesaurus (2018)

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.



Above: Smoke hangs over the town of Knysna, seen across the lagoon from the fire-ravaged slopes above Belvidere.

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. Wildfires are part of the natural ecosystem and were burning through the landscape well before human habitation. What makes wildfires different today is that they are influenced by human activities (e.g. man-made ignitions, the introduction of alien vegetation, poor land management practices, etc.) and humans choosing to place themselves in these fire-prone environments. With encroachment into these ecosystems, it is no longer just vegetation that is burning; it is people, animals, homes, livelihoods and infrastructure.

8 documented fatalities (potentially more due to heart attacks).

1059 formal dwellings destroyed or damaged.

385 informal dwellings destroyed or damaged.

Financial loss estimated at billions of Rands.

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

to prevent this disaster from occurring. Individuals, families, communities, firefighters, landowners, farmers, municipalities, homeowners, emergency responders, relief agencies and businesses were all hard hit and felt the impact.

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. A 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.



All above: Large areas of the town of Knysna and its surrounds were devastated by the fire.



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 co-operation 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.

Analysis Methods

Desktop Research

- Analyses of Incident Action Plans, investigation reports, photographs, videos, satellite data, news reports, social-media information, etc.

Formal Interviews

- Structured and prearranged interviews with 42 role-players from both public and private sectors were conducted in order to understand perspectives before, during and after the incident.

Informal Interviews

- In the process of conducting the fieldwork, approximately 35 informal dialogues were had with members of the public and fire services. These discussions further contributed to understanding the incident.

Group Dialogue

Certain instances called for focused group discussion.

These included meetings with:

- Key Incident Management Team members (8 people).
- Community members from Brenton-on-Lake, Brenton-on-Sea and Belvidere (13 people).
- Knysna Fire Stories (3 people).

Field Work

- Conducted site visits at key locations and held meetings with the various role-players in Eden District. This took place during the incident (12-17 June 2017) and during the analysis phase (2-16 November 2017).

Expert Panel

- Vulcan Wildfire Management invited the Western Cape Fire Chiefs and other industry experts to a meeting on 26 October 2017, to establish an expert panel. At the first meeting input and guidance were received on key focal points deemed important for analysis. The second meeting on 13 February 2018, offered it insight into key research findings, allowing the panel to comment and share further knowledge and professional insight. Members of the expert panel are thanked for their strategic insight and willingness to contribute to this process.



EXPERT PANEL



Back Row (left to right): Ryan Heydenrych (Vulcan Wildfire Management), Wayne Josias (Cape Winelands District Fire Services), Dale Nortje (Cape Winelands FPA), William Olivier (Cape Town Fire & Rescue Services), Louise Afonso (CapeNature), Danie Wilds (Cape Winelands District Fire Services), Philip Prins (SANParks), Ian Schnetler (Cape Town Fire & Rescue Services)

Front Row (left to right): Gerhard Otto (Eden District Disaster Management), Bertus Senekal (West Coast District Fire Services), Etienne du Toit (PDMC), Rodney Eksteen (PDMC).

Absent from photo: Tony Marshall (CapeNature), Reinard Geldenhuys (Overberg District Fire Services), Pierre Gallagher (Cape Peninsula FPA), Annelize Lamprecht-Vertue (PDMC), Shane Christian (Working on Fire), Patrick Ryan (Vulcan Wildfire Management), Dean Harrison (Vulcan Wildfire Management).



How the analysis should be viewed and used

The focus of this Knysna Fires analysis is on the Eden District. However, role-players in other districts or provinces may experience similar challenges and problems. The hope is that some of the key principles, approaches, ideas and recommendations suggested in this report can be adopted further afield.

Vulcan Wildfire Management encourages everyone involved in or affected by wildfires to think about their challenges and seek to understand why they exist. Be inspired to seek innovative solutions to overcome them. Create systems that function optimally and allow yourself and your organisation to reach its full potential.

Finally, and most importantly, Vulcan Wildfire Management hopes this analysis inspires those in Western Cape Government leadership positions to help create an environment where wildfire interventions are supported and succeed. These leaders are encouraged to be part of a larger system, that supports synergy and collaboration.

Report Structure

The report is divided into three sections.

Section A: Wildfire Shared Responsibility System — A Desired Future State

This section imagines a desired future state where people and systems are working in synergy and where wildfire resilience is optimised.

Section B: Unpacking Wildfire Shared Responsibility

Each topic in this section starts by explaining the basic principles of a shared responsibility in appropriate context. The reader is then offered insight from various role-players in the wildfire industry. A discussion highlighting salient points and recommendations based on lessons learned, are then presented for each topic.

Section C: Legal Framework — Wildfire Responsibility

This analysis report focuses on people and systems in the Eden District. The legal framework of wildfire responsibility is also an important element to consider. Pertinent legislation is referenced and discussed.

The logo for Vulcan Wildfire Management is a large, stylized graphic centered on the page. It consists of a central red flame-like shape with three distinct lobes, set against a background of several grey diamond shapes arranged in a symmetrical, downward-pointing pattern.

**Be inspired to seek innovative solutions to
overcome existing challenges
— Vulcan Wildfire Management**



Section A: Wildfire Shared Responsibility System

— A Desired Future State

This Knysna Fires analysis develops a strategic vision or A Desired Future State for the Eden District. It is hoped that its principles and ideas will be adopted by other Western Cape Districts and, perhaps, further afield.

The vision derives from an analysis of the three guiding areas of influence that enable a wildfire shared-responsibility system to function optimally:

- Legal framework.
- Systems to achieve the framework.
- People to make the systems work.

While the legal framework needs improvement, it is not a priority area. The areas that need the most focus and attention are the People and the Systems.

People – united behind shared objectives – are at the core of successful change. These people rely on effective Systems, a conducive Environment for Success, collaborative Relationships and a clearly understood Legal Framework to succeed.



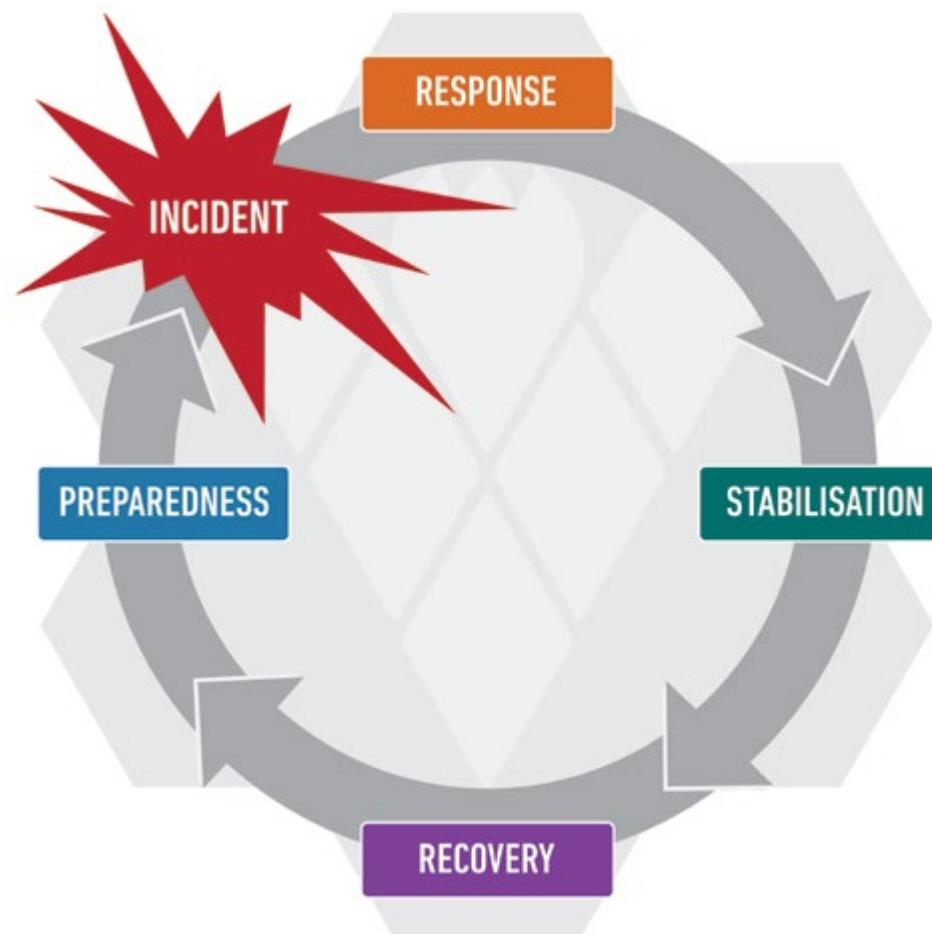
Following the Elandskraal and Kruisfontein wildfires of June 2017, officials and members of the public have debated the concepts of risk management and responsibility. Some believe the authorities need to take more responsibility while others believe citizens and communities at risk need to take greater ownership of and responsibility for risk management. However, the wildfires that affected the Knysna and Plettenberg Bay areas showed us that no single entity can tackle the wildfire challenge in isolation – especially large or complex wildfires. The most effective solution is a sustained, shared risk-management approach starting well before the ignition of a wildfire.

To prevent (or at least mitigate) disasters of this nature recurring, the Eden District needs to transform the People and Systems affected or involved with wildfires. To help conceptualise what a good wildfire risk-sharing system looks like, Vulcan Wildfire Management has drafted a positive statement of intent, encapsulated in A Desired Future State - Wildfire Shared Responsibility System. This system has been structured around the Disaster Management Cycle.

- Preparedness and Prevention
- Response
- Stabilisation
- Recovery

The Wildfire Shared Responsibility System shows the responsible participants at each stage of the Disaster Management Cycle and gives practical examples of measures undertaken by those working towards the desired future state. This Wildfire Shared Responsibility System is a starting point for discussion and all involved are encouraged to:

- envisage where they would like to be in the future
- identify measures to achieve this future state
- develop collaborative relationships and partnerships to enable transformation, and
- set deadlines to achieve the desired state and strategise how challenges will be overcome.



A DESIRED FUTURE STATE — WILDFIRE SHARED RESPONSIBILITY SYSTEM

Structured around the Disaster Management Cycle of Prevention and Preparedness, Response, Stabilisation, Recovery

Responsible Role-player	Prevention and Preparedness
<p>FPA, Local Municipality, Disaster Management, Insurance Industry</p>	<p>These organisations pro-actively carry out sustained wildfire risk-awareness communication campaigns that change the behaviour of rural and WUI homeowners and landowners exposed to wildfire risk. These targeted campaigns help homeowners and landowners comprehend their risk. They are incentivised and rewarded for being prepared for wildfires. Also, mechanisms exist to penalise those who are non-compliant.</p> <p>A popular phone application and guide has been developed to help homeowners determine risk. By inputting data themselves, homeowners become aware of factors putting their home most at risk. This prioritises and guides risk-reduction actions. It also guides homeowners on whether or not they should stay and defend their homes or evacuate them.</p> <p>All homeowners and landowners can have basic principles applied to their circumstances. However, they are also subject to different circumstances and challenges. Adaptive ways of dealing with risk reduction have therefore been adopted</p>
<p>Town Planners</p>	<p>Wildfire awareness, understanding and planning for risk are critical components of town planning. Wildfire risk is considered when making town-planning decisions as well as influencing other role-players with whom town planners come into contact. As such, wildfire risk is well-thought-out when considering the following.</p> <ul style="list-style-type: none"> • Positioning of homes/communities in relation to vegetation, slope and aspect. • Proximity of homes to each other. • Road networks for emergency services' access and egress. • Location and availability of hydrants and water sources. • Placement of hazards (e.g. electricity lines).
<p>Developers, Builders, Architects, Landscapers</p>	<p>All new developments exposed to wildfires are appropriately designed and constructed to limit their risk. There are established wildfire building codes and standards and there is a wildfire-risk compliance certificate that needs to be signed off by the local fire authority (similar to how internal property fire risk is assessed and approved).</p> <p>Wildfire intelligence is reflected in all aspects of design and building.</p>



A DESIRED FUTURE STATE — WILDFIRE SHARED RESPONSIBILITY SYSTEM

Structured around the Disaster Management Cycle of Prevention and Preparedness, Response, Stabilisation, Recovery

Responsible Role-player	Prevention and Preparedness
<p>Wildland Urban Interface (WUI) Homeowner</p>	<p>All WUI homeowners are aware of their exposure to wildfires and complete at least the basic proactive mitigation measures around their buildings, assets and infrastructure.</p> <ul style="list-style-type: none"> ▪ General home maintenance and wildfire ember-resistant strategies are adopted. ▪ Landscaping and access around the home considers firefighting defensive actions. ▪ Where possible the homeowner has more advanced defensive measures around the home – such as water sprinklers, water tanks and firefighting equipment. <p>Predetermined plans are in place to stay and defend the property during a wildfire or to evacuate. Further, the homeowner understands the strength of community in dealing with wildfire.</p> <p>The homeowner supports and participates in community-driven wildfire risk-reduction initiatives and programmes.</p>
<p>Rural Homeowner/ Landowner</p>	<p>Compared to the WUI, the rural environment has a different set of wildfire challenges. Rural homeowners recognise that they need to be more self-sufficient and resilient. They therefore implement more advanced wildfire-mitigation measures in response to increased risk and exposure.</p> <p>Predetermined plans are in place for those able to stay and defend their properties safely (due to sufficient preparation), while vulnerable persons are evacuated before wildfire reaches their area.</p> <p>All large rural landowners are required to have firebreaks and firefighting resources to react to wildfires on their land. Additionally they have firefighting resources, well prepared and trained for rapid response.</p> <p>There is a sense of unity in the rural areas. Landowners are inspired to help one another out. The same sentiment is felt towards Fire Services. Fire Services work well with communities before, during and after wildfires to offer advice, support and guidance.</p>



A DESIRED FUTURE STATE — WILDFIRE SHARED RESPONSIBILITY SYSTEM

Structured around the Disaster Management Cycle of Prevention and Preparedness, Response, Stabilisation, Recovery

Responsible Role-player	Prevention and Preparedness
<p>Farming Landowner, Homeowner and Farm Workers Community</p>	<p>Farmers understand that wildfires can seriously threaten their livelihoods and therefore formulate annual wildfire-prevention and response plans to ensure safety, loss minimisation and business continuity. Elements considered in the plan include:</p> <ul style="list-style-type: none"> ▪ firebreaks ▪ firefighting resources ▪ fuel-load management ▪ defensible spaces ▪ evacuations ▪ safety zones ▪ livestock safety zones ▪ rapid-response actions ▪ communication systems, and ▪ mutual-assistance agreements with neighbouring farmers. <p>Plans are shared with Fire Services and there is a sense that everyone is reducing risk by working together.</p> <p>Farmers ensure they have resources trained in wildfire suppression (with someone trained in Initial Attack Incident Command) who will manage the wildfire until handing over to more-experienced resources – if the wildfire grows beyond their capability.</p>
<p>Large Landowner: Conservation Area, State, Other</p>	<p>Landowners are seen to take responsibility. They implement proactive wildfire-mitigation measures as well as have capable firefighting response resources. They have dedicated staff skilled in both hazard reduction and wildfire reaction. Working with supporting agencies is optimised by fostering positive interpersonal and institutional relationships with other large landowners, as well as District and Municipal Fire Services.</p> <p>Strategic prescribed burning and fuel-reduction buffer zones have been created to limit wildfire spread. This has taken the concept of firebreaks to the next level.</p>



A DESIRED FUTURE STATE — WILDFIRE SHARED RESPONSIBILITY SYSTEM

Structured around the Disaster Management Cycle of Prevention and Preparedness, Response, Stabilisation, Recovery

Responsible Role-player	Prevention and Preparedness
Local Governance: Municipal and District Structures impacting Fire Services	<p>Funding for preventing and combating wildfires is planned for and allocated in local-government Integrated Development Plans (IDPs). There is focus on wildfire prevention as opposed to reactive wildfire suppression. The Minister and relevant government officials are aware of the wildfire threat potential and the consequences of not planning for wildfire. They are therefore able to approve necessary decisions and budgets. Wildfire policies support and encourage Integrated Fire Management activities. For example, they:</p> <ul style="list-style-type: none"><li>• encourage fuel-management strategies such as prescribed burning<li>• support the decision to allow some wildfires to continue burning under the right conditions, and<li>• introduce Wildfire Specialist Services to supplement and support existing Fire Services and develop capacity in this previously underdeveloped field.



A DESIRED FUTURE STATE — WILDFIRE SHARED RESPONSIBILITY SYSTEM

Structured around the Disaster Management Cycle of Prevention and Preparedness, Response, Stabilisation, Recovery

Responsible Role-player	Prevention and Preparedness
District Fire Services	<ul style="list-style-type: none"> • Firefighting crews and incident managers are specifically trained for wildfire and WUI operations. • All responders receive adequate ICS training and implement ICS during operations. • There is excellent leadership and experience in the Division Supervisor role during larger incidents. A successful skills-development programme in this area of expertise is ongoing. • Interagency simulation training occurs annually. It promotes synergy among all participants. • There is a high standard of physical fitness training for all operational personnel. • In the spirit of shared responsibility, Fire Service crews assist with fuel-reduction burns on the properties of landowners meeting certain criteria for assistance; that is, they: <ul style="list-style-type: none"> • have done the correct planning • have their own resources in place, and • have plans to monitor the area after the burn. • A payment plan has been worked out for landowners who need help from Fire Services but struggle financially. They are billed at affordable rates. This promotes a sense of working with the community to reduce risk. • Leadership roles within the District Fire Services, Disaster Management, the Municipal Fire Services and the Wildfire Specialist Services meet regularly to plan for wildfire incidents in the district. There is an understanding that wildfire is its own speciality, that there is always something to learn about wildfires from others, and that collaboration results in consistently better outcomes.



A DESIRED FUTURE STATE — WILDFIRE SHARED RESPONSIBILITY SYSTEM

Structured around the Disaster Management Cycle of Prevention and Preparedness, Response, Stabilisation, Recovery

Responsible Role-player	Prevention and Preparedness
Municipal Fire Service	<ul style="list-style-type: none"> • In addition to urban (structural) firefighting and rescue, crews are trained specifically for wildfire and WUI operations. Their focus is on initial attack, WUI fires and evacuations. They assist the District Fire Services in a supportive function during wildfire operations. • All crew members receive adequate ICS training and implement ICS during all operations. • Interagency simulation training occurs annually. • Municipal by-laws for wildfire risk reduction are standardised across all Municipalities within each district. The National Veld and Forest Fire Act No. 101 of 1998 and other municipal by-laws are enforced by dedicated, trained personnel. This is supported by the Integrated Development Plans and therefore there is adequate funding and capacity for effective enforcement.
Wildfire Specialist Services	<p>The urgent need for focused wildfire skills has resulted in the development and introduction of Wildfire Specialist Services. Wildfire Specialist Services enhance the existing wildfire knowledge and expertise already found in District and Municipal Fire Services. Programmes have been developed to promote a culture of coordination and cooperation with the District and Municipal Fire Services. The Wildfire Specialist Services enhance capability and capacity in:</p> <ul style="list-style-type: none"> • wildfire strategic planning (preparation and response plans) • coordination of interagency training exercises • risk-reduction operations • structure-protection groups • remote-area crews • WUI specialists and • division supervisors and incident management teams. <p>These crews are employed full time. When not actively firefighting, they assist the District Fire Services with strategic wildfire planning and conduct wildfire risk-mitigation work for communities that cannot afford to conduct the work themselves. Wildfire Specialist Services uplift all Fire Services as their skills and experience are shared through interagency cooperation.</p>



A DESIRED FUTURE STATE — WILDFIRE SHARED RESPONSIBILITY SYSTEM

Structured around the Disaster Management Cycle of Prevention and Preparedness, Response, Stabilisation, Recovery

Responsible Role-player	Prevention and Preparedness
All Wildfire Industry Service Providers - Public and Private	<p>Although there are many separate entities and organisations with different philosophies and approaches, the industry is compelled to work together and agree on common objectives. A sense of collaboration builds industry capabilities.</p> <p>There is a Provincial Wildfire Hub and coordination centre where all major role-players are collectively located, and where wildfire planning and reaction coordination takes place.</p>
Fire Protection Associations (FPAs)	<p>The FPAs, after substantial investment from DAFF, have built up sufficient capacity to meet the needs of their landowners as well as build membership numbers. There is great cohesion with District and Municipal Fire Services and Wildfire Specialist Services.</p> <p>The FPAs receive help from their Local Municipality, Disaster Management and insurance industry to promote wildfire awareness to all landowners threatened by wildfire.</p> <p>FPAs have an enhanced ability to facilitate good working relationships between Fire Services and landowners through their collaboration in preventative work.</p> <p>FPAs receive better financial support through innovative solutions.</p>
Weather Forecasting and Active Wildfire Detection Systems	<p>Recognised leaders in wildfire warning systems in South Africa have been identified and partnerships have been formed between these providers and emergency resources.</p> <p>An improved Fire Danger Index (FDI) is in place with a new Catastrophic index level. The FDI gives role-players specific actions to take based on their unique circumstances.</p> <p>Prescribed burning and fire operations dependent on FDI values are based on current and forecast localised FDI values (not generic large-area values).</p> <p>Monitoring systems gather and collate information to provide ongoing intelligence.</p>



A DESIRED FUTURE STATE — WILDFIRE SHARED RESPONSIBILITY SYSTEM

Structured around the Disaster Management Cycle of Prevention and Preparedness, Response, Stabilisation, Recovery

Responsible Role-player	Response — Immediately after ignition
All Fire Services	<p>Rapid detection and accurate reporting is attributable mainly to Fire Services promoting and advising the public how to report wildfires.</p> <p>There is one emergency phone number. It links to a local emergency call centre, which can still manage emergency calls on a local level.</p> <p>Fire Services have a system to ensure a formal response to all wildfire incidents. This is made possible through support received from supporting firefighting agencies/organisations (e.g. landowners, volunteers, FPA resources, private contractors, etc.)</p>
District Fire Service, Farming Landowner, Large Landowner	<p>Rapid detection and monitoring of lightning-strike fires using the latest technology takes place. Standard operating procedures have been developed to standardise responses to this type of fire.</p>
FPA, WUI Homeowner, Rural Home/Landowner, Farming Landowner, Large Landowner, District Fire Service, Municipal Fire Service, Wildfire Specialist Services	<p>All ignitions are treated as serious and initiate a predetermined set of response actions, based on the current FDI rating, warnings and advice.</p> <p>The future state of the fire is also predicted based on weather forecasts and other contributing climatic factors such as drought.</p> <p>If an ignition is deemed to be in a remote area, action is still required. Newly developed standard operating procedures for remote-area and lightning-strike ignitions monitoring and suppression are followed.</p>



A DESIRED FUTURE STATE — WILDFIRE SHARED RESPONSIBILITY SYSTEM

Structured around the Disaster Management Cycle of Prevention and Preparedness, Response, Stabilisation, Recovery

Responsible Role-player	Response — Initial Attack
<p>Farming Landowner, Large Landowner, Rural Home/Landowner, (FPA, FMU provide assistance)</p>	<p>A community wildfire warning-and-reporting application is used to inform neighbours and fire authorities of the ignition, location and other important information. Response is optimised as a result.</p> <p>A rapid initial fire-suppression response takes place to keep wildfires as small as possible. Landowners are well-prepared for this eventuality and rally together with neighbours, sharing resources in the most optimal way (due-readiness planning).</p> <p>Landowners inform their local Fire Management Unit, which provides the required advice or assistance. Based on its initial assessment of the wildfire, it promptly updates the relevant Fire Services on the status of the wildfire.</p>
<p>Municipal Fire Services</p>	<p>Municipal Fire Services usually arrive on the scene before District Fire Services as they are often closer to the incident. They assist the landowner and, if the wildfire is beyond the landowner's expertise, capability and control, then Incident Command is handed over to the Municipal Fire Services. At this stage, the Municipal Fire Services communicate with District Fire Services and Wildfire Specialist Services to determine what additional resources will be required.</p> <p>If the wildfire is forecast to go into extended attack, plans to establish an Incident Command Post and Incident Management Team are initiated as early as possible.</p>
<p>District Fire Services</p>	<p>Incident Command is transferred to District Fire Services when they arrive on scene. The transfer-of-command procedure from Municipal Fire Services to District Fire Services is well-rehearsed in pre-season simulation training. Initial incident actions are well-documented. This makes the transfer of command a smooth process. Incident Command System best practices are followed.</p> <p>District Fire Services communicate with Wildfire Specialist Services and other support resources based on their anticipated resource needs.</p> <p>Note: If the landowner is a large landowner with strong capabilities, a Unified Command structure is established. In fires affecting the WUI, Municipal Fire Services will also form part of the Unified Command structure.</p>



A DESIRED FUTURE STATE — WILDFIRE SHARED RESPONSIBILITY SYSTEM

Structured around the Disaster Management Cycle of Prevention and Preparedness, Response, Stabilisation, Recovery

Responsible Role-player	Stabilisation — Extended Attack
<p>Farming Landowner, Large Landowner, Rural Home/Landowner, (FPA, FMU provide assistance)</p>	<p>The landowner, who would have transferred command after the early stage of the wildfire, continues to provide resources and support to the incident (based on ability). Local knowledge is recognised and used by Fire Services, and the landowner therefore has agency representation in the Incident Management Team.</p> <p>FPA/FMU continues to advise and provide the landowner with guidance and assistance.</p> <p>Other surrounding landowners continue to remain vigilant and provide their neighbouring landowner/s with support as required.</p>
<p>Municipal Fire Services</p>	<p>ICS is implemented and the appropriate roles are activated and staffed. All resources fall under the ICS organisational structure. They focus on structure protection and the WUI as required.</p> <p>Municipal Fire Services continue to provide support to the incident or stand down if they are no longer required.</p> <p>Municipal Fire Services continue to work together in Unified Command as required.</p>
<p>District Fire Services</p>	<p>ICS is implemented and the appropriate roles are activated and staffed. All resources fall into the ICS organisational structure, including all supporting resources.</p> <p>District Fire Services remain in command or part of Unified Command.</p> <p>Predetermined incident information and updates are timeously communicated to homeowners and the public. Messages are structured, regular and insightful. Media briefings are scheduled and there is a good understanding that the flow of information to the public and through the media during extended operations ensures that the correct information goes out.</p>



A DESIRED FUTURE STATE — WILDFIRE SHARED RESPONSIBILITY SYSTEM

Structured around the Disaster Management Cycle of Prevention and Preparedness, Response, Stabilisation, Recovery

Responsible Role-player	Stabilisation — Extended Attack
Wildfire Specialist Services	<p>ICS is implemented and the appropriate roles are activated and staffed. All resources fall into the ICS organisational structure, including all supporting resources.</p> <p>District Fire Services remain in command or part of Unified Command.</p> <p>Predetermined incident information and updates are timeously communicated to homeowners and the public. Messages are structured, regular and insightful. Media briefings are scheduled and there is a good understanding that the flow of information to the public and through the media during extended operations ensures that the correct information goes out.</p>
WUI Homeowner, Rural Homeowner	<p>Homeowners initiate their predetermined wildfire plans and activate all their defensive measures. Those who have planned to stay and defend their properties are capable and adequately prepared while those who have planned to evacuate, have evacuated early.</p>



A DESIRED FUTURE STATE — WILDFIRE SHARED RESPONSIBILITY SYSTEM

Structured around the Disaster Management Cycle of Prevention and Preparedness, Response, Stabilisation, Recovery

Responsible Role-player	Stabilisation — Demobilisation
District Fire Services	<p>Mopping up is recognised as an essential and specialised skill set and is done according to standard operating procedures. The fireline is adequately monitored for flare ups and potential problem areas are identified and dealt with.</p> <p>There are sufficient, suitably skilled resources applied to the given situation.</p>
Landowner	<p>The landowner provides resources and assistance during this critical stage. The District Fire Service will ultimately transfer command back over to the landowner at some stage and they remain vigilant until the wildfire is declared dead-out.</p>
Responsible Role-player	Recovery — After a wildfire
All who were involved	<p>Conduct after-action reviews with crews to ensure lessons are learned. Submit incident information to District Fire Services which, in turn, adds the information to a central database managed by Provincial Disaster Management, including:</p> <ul style="list-style-type: none"> • near misses • lessons learned • resource costs • ratings of crew performance, and • wildfire-specific information (e.g. size, origin location, probable cause, estimated damage, etc.). <p>Preparation for the response to the next wildfire begins.</p>
Provincial Disaster Management	<p>Manages the central wildfire intelligence database.</p> <p>Ensures dissemination of intelligence to all participants in an appropriate and relevant format for each.</p> <p>Encourages all role-players to continue developing, growing, innovating and, most important, to continue working with synergy..</p> <p>Develops and maintains wildfire-related initiatives, training and programmes to prepare for future wildfire incidents.</p>





Section B: Unpacking Wildfire Shared Responsibility

The previous section looked at A Desired Future State. To understand the work needed to achieve this desired state, we will now unpack the Knysna Fires in sections and consider factors that may have contributed to or exacerbated them. Following each section, recommendations designed to meet the needs of a Wildfire Shared Responsibility System are presented for your consideration..



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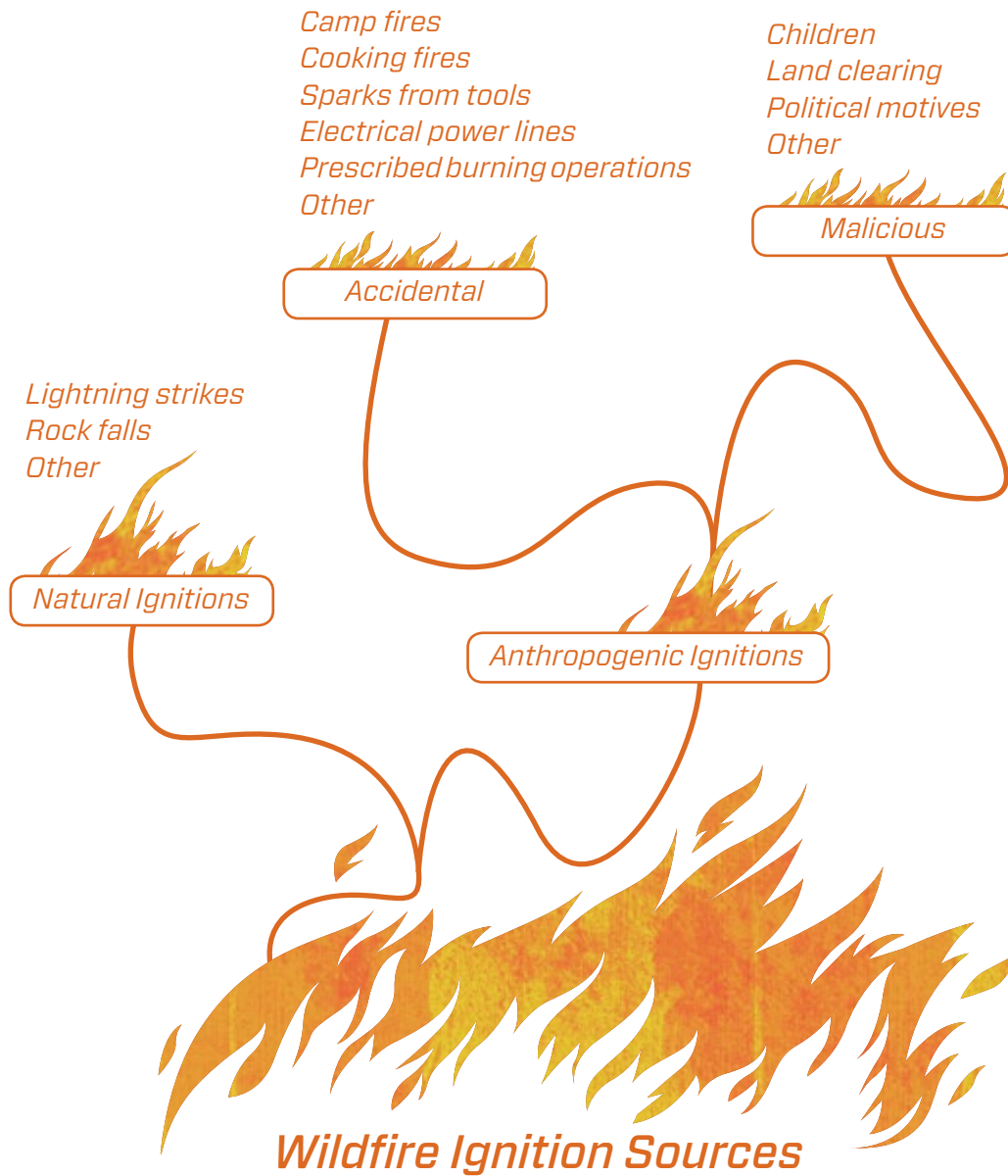
Ignitions (start of wildfires) and initial response

Introduction

It is important to understand wildfire ignitions from a broader perspective before considering the intricacies of the Elandskraal and Kruisfontein wildfire ignitions. For an ignition and, subsequently, a fire to exist, it needs three key ingredients: heat, oxygen and fuel. These are commonly referred to as the fire triangle.

The illustration to the left explains how these three key ingredients are affected by the environment in which a wildfire occurs.

When there is conducive fuel and oxygen available, heat is the limiting factor. When sufficient heat is added to the system, ignition occurs. Ignition sources of wildfires are broadly categorised as either natural ignitions or anthropogenic (man-made) ignitions. Anthropogenic ignitions can be further subdivided into accidental ignitions or ignitions with malicious intent.



Natural ignitions

The overwhelming majority of wildfires caused by natural ignitions are started by lightning strikes. Lightning-strike fires occur frequently in areas such as the Eden District. Other less frequent natural ignition sources include rockfalls (e.g. Tulbagh earthquake of 1969), and even light focused or refracted through water or ice. Rare natural ignition sources include meteor strikes.

Accidental anthropogenic ignitions

It is believed that most anthropogenic ignitions are accidental. There are many kinds of accidental human-ignition sources. A non-exhaustive list includes:

- informal mountain dwellers: cooking or warming fires escape control
- religious ceremonies in the mountains (candles)
- vehicle accidents or roadside vehicle fires igniting vegetation
- sparks generated by power tools
- electrical power lines: downed lines, lines in contact with vegetation or apparatus failures
- out-of-control prescribed-burning operations
- braai or camping fires escaping control, and
- structural or informal settlement fires spreading to vegetation

Anthropogenic ignitions with malicious intent

It is difficult to quantify the exact number of wildfires ignited with malicious intent as formal investigations are not common practice. A challenge experienced in prosecuting perpetrators is in finding evidence that directly links the accused to the crime. Possible motives for igniting wildfires with malicious intent include:

- psychological reasons
- children are known to light fires as a form of entertainment in the Western Cape (they enjoy seeing helicopters and fire engines)
- political motives, and
- land-clearing for informal-settlement expansion.

Increased human activity and encroachment into natural areas has seen a corresponding increase in the number and frequency of wildfire ignitions. This presents a major ecological problem. In fire-prone and fire-dependent ecosystems such as the Fynbos Biome, fires occurring in an area too frequently do not allow indigenous plant species to mature and reproduce (plants are destroyed before they can produce seeds). This leads to species loss and sometimes even extinction (when there is a small endemic range). Fires occurring out of the natural fire season can also disrupt natural reproductive and succession cycles. Other ecological problems include the proliferation of alien vegetation, soil erosion, the destruction of seed banks, and the death and/or migration of important pollinators and predators.

The increasing number and frequency of wildfires also create severe socio-economic problems. There is a huge cost associated with wildfire-suppression activities and restoration. People lose their homes, assets, livelihoods and sometimes even their lives. The already over-burdened and under-resourced Fire Services are even further stretched.

Once a wildfire ignition has occurred, a rapid initial response is vital to limit the spread of the wildfire. With a delayed response and as the wildfire grows:

- the amount of resources required to suppress the fire increases
- the fire behaviour and complexity increases
- the cost and time of the suppression operation increases, and
- the probability of damage to property and infrastructure increases.

For a rapid initial response to take place, the following needs to occur or be in place:

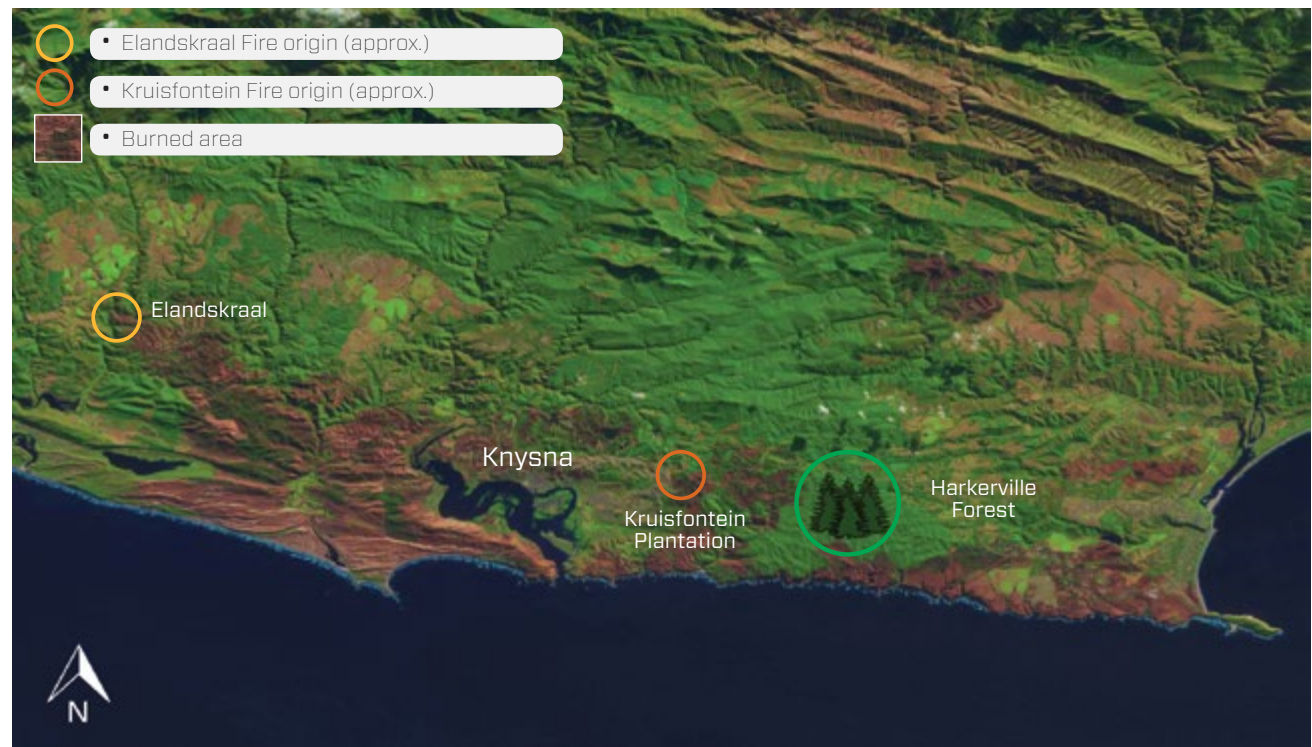
Early detection of wildfire ignitions.

1. A capacity to respond (knowledge, personnel, equipment, training).
2. Access to the ignition site.
3. Predetermined strategic plans and standard operating procedures for responding to different types of ignitions in different locations.



With the brief background to wildfire ignitions and initial response provided above, this section of the report explores the ignitions of the Kruisfontein and Elandskraal wildfires. It is important to note that this report is not a wildfire “origin and cause” or “cause determination” investigation. This is usually undertaken from a legal and liability perspective to determine and hold accountable an entity at fault. This report unpacks the variables that contributed to the disaster so that lessons may be learned.

Many wildfires occurred in the Eden District in June 2017. For the purposes of this section, only the ignitions and initial response of the Kruisfontein Fire and Elandskraal Fire (two separate and distinct ignitions) are discussed. These two wildfires are collectively referred to as the Knysna Fires. To create context for discussion of the ignitions and the initial response to the Knysna 2017 wildfires, various industry views are presented on the following pages.



Approximate point of origin for the Elandskraal and Kruisfontein Wildfires, collectively known as the Knysna Fires.

INDUSTRY VIEWS

Summary of main points covered in a meeting on 9 November 2017 with Sedgefield Station Commander Wayne Sternsdorf of the Knysna Municipal Fire and Rescue Services.

Before the conflagrations of the Knysna and Plettenberg Bay Fires, Sternsdorf had been called to view the smouldering fire in Elandskraal (30 April 2017). He was pointed towards visible smoke across the valley from his location, to the N/NE direction of Noah's Ark (this is a structure built by Wallace Vosloo). Because of the dense vegetation he climbed up Noah's Ark to try and get a better view. However, Sternsdorf was still not able to see a clear source of the fire and couldn't pinpoint where the smoke was coming from - Sternsdorf could not see a plume or a puff of smoke but he rather saw a haze of smoke in the valley. Sternsdorf was informed by a resident that the smoke came and went. Sternsdorf advised the resident (Anton du Plessis) who he met up with on Vosloo's property that they needed to "sort out their firebreaks" and contact Dirk Smit of the Fire Protection Association (FPA) as a fire in this area is the responsibility of the landowner and they should seek assistance from their Fire Management Unit (FMU) and/or Fire Protection Association (FPA).

Sternsdorf pointed out that the Knysna Fire Service gets called to everything (they were actually called out to deal with moles that morning) and he believes this is a legacy of the previous fire chief, who was very much part of the community and assisted beyond their mandate in any way possible. Due to the

lack of staffing, and the large area they are required to respond to, this is actually a problem and very draining on their time. There are a number of factors, which would make it difficult for the Municipal Fire Services to monitor smouldering fires in an area like this:

- The number of calls and other fires that they are required to attend.*
- Limited resources and personnel on duty each shift.*
- Access into the Elandskraal community area was also made difficult when it came to checking up on the smouldering spot because of the fences and two locked gates without any intercom.*
- In terms of mandates, wildfires are more the responsibility of the landowner and District Fire Services as the Municipal Fire Services mandate is aimed at urban fire and rescue - not remote area firefighting.*

Summary of main points covered in a meeting on 11 November 2017 with residents Ritchie Morris and Mary Jane Morris of the Elandskraal community.

With regards to the history of the smouldering fire, the Morris's had been smelling and noticing smoke since May 2017. This was confirmed on the 8th May by their neighbours at Teniqua Treetops. They have also had a good relationship with the Southern Cape Fire Protection Association (SCFPA) since they did a prescribed burn with them a few years back. On the

8th May the Morris's sent an email, about the smoke they had noticed, to Danie Grabe (who they thought was still with SCFPA - he was still listed on the SCFPA website up until July 2017 but he had apparently left). This email was also sent to Teniqua Treetops, Hennie Smit - Head of Town Planning Knysna, Warren Bright - Bright Farms, Elska le Roux - Secretary SCFPA, Charmaine at Nyati Bodies (owner of the land opposite the smouldering spot site) and Lalla Odendaal (a neighbour two houses up who was also their house sitter).

In the email, Ritchie Morris said perhaps the SCFPA could forward the mail regarding the smoke to the relevant landowners with an enquiry - he was bringing it to their attention from a fire risk perspective. They received no response from anyone except Bright. His suggestion was that the municipality and or the SCFPA send an enquiry to various landowners in the area and they should respond or investigate - better to be proactive than have to deal with fire spreading. Morris then asked in email on 10th of May (including a picture): "SCFPA have you sent an enquiry to these landowners" but he again had no response to this.

Ritchie Morris could not see the point source of the smoke or where it was originating but smoke was visible at times and they could smell it in the mornings and evenings throughout May. The smoke however disappeared during the warmth of the daytime. On the 27th May he sent the municipality a photo, which showed the smoke in the valley. Ritchie Morris at that time was not aware of the other activity by Dr Wallace



Vosloo and others regarding the drone flights and the lightning strikes until after the fire had occurred.

On the morning of the fire they were informed by their house sitter that she had been woken around 04:00/04:30 by the Morris's border collie, which had been restless for a while. She got up and looked in a southerly direction towards the land with Noah's Ark on it and saw that the whole slope of that hill facing her had burned to a point just below the Noah's Ark. Ritchie Morris noted that this totally contradicts the estimated timing offered in the Knysna Municipal report. She panicked, then calmed down and called Robin Patz (Teniqua Treetops) who tried to get hold of the municipality at 05:00 but could not get hold of anyone. A guest at Teniqua took photos at around 05:00 and the fire was being monitored from Tree house Number 5. The Morris' flew back the next day after being told their farm had burned down. On arrival they found it still standing but the dogs and horses had been moved and stuff was removed from the house. Ritchie Morris then joined Rob Dormell and all the local farmers to fight the fires and attempt to stop the further spread of the fires in their area.

Summary of main points covered in a meeting on 8 November 2017 with Manager Gerhard Otto of Eden District Disaster Management and Richard Meyer of the Knysna Municipality.

According to Gerhard Otto there is no record in their occurrence book of Eden being called out to the "lightning strike fire" in the Elandskraal area. He says

"perhaps this is an oversight and they (Eden District) should have been called there, but they were never at the lightning strike fire from Eden side".

The questions arising for Otto are:

1. "If Eden were called what would they have done?"
2. "If there was a lightning strike fire which occurred today in indigenous forest, what would the response be?"

Otto is of the opinion that if you asked around the Fire Services today there will be uncertainty as to how this will be dealt with, based on historic tactics these fires would be monitored. The Fire Services will go out to the area. If it is in difficult terrain they will say it's inaccessible and they will then monitor the wildfire. If it spreads then perhaps they will then be able to do something. Lightning strikes in indigenous forest are traditionally monitored until they become a threat or are naturally extinguished.

Before the outbreak of the large wildfires on the 7th June 2017 there were already a number of wildfires already burning/smouldering in the Eden District. "Two weeks after the Knysna Fire we had 36 areas in indigenous forest smouldering... and what did we do about them... nothing". This is due to resource limitations as well as geographically inaccessible locations of some of these wildfires.

A smouldering fire in the Wilderness area was water bombed by a helicopter for one whole day. It was then smoking again the next day. Water bombing alone was not that effective.

The question remains. "Lightning strike in indigenous forest, how should we deal with it going forward?" Traditionally indigenous forests were even used to stop the spread of wildfires as they would not carry fire compared to the fynbos and alien vegetation types. Wildfires were anchored and even steered into indigenous forest as it was seen as a safe area for wildfires. For the past 12 years we have had periods of drought. The climatic conditions have changed how indigenous forest burn when wildfires occur. The forest canopy is depleting allowing grasses on the forest floor.

It has also become a climate where more lightning storms seem to be occurring. The lightning is normally in the evening so rapid response to lightning strikes can't take place until the next day, as the choppers can't fly at night. "In the last week, 17 new wildfires occurred from lightning strikes".

These are the questions and answers taken from an email, which Chief Fire Officer Freddy Thavar of the Eden District Fire and Rescue Services responded to on 30 November 2017.

Question: What are the challenges in dealing with lightning strike fires?

- Answer "These types of fires are normally high in the mountains"



Question: How does the District deal with fires on private property? (i.e. Do they assist landowners, advise them, leave it to them to deal with etc.?)

- Answer “When called to a fire we perform active firefighting strategies and tactics”

Question: What are the challenges with dealing with multiple remote area fires and how is this overcome?

- Answer “Handle the most serious fire first”

Question: With regards to the Elandskraal Fires prior to 7th June 2017. When was the District made aware of these smouldering fires and what was your process in dealing with these fires?

- Answer “I was not present during the Knysna fires and cannot comment on them”

Question: Is there any Standard Operating Procedure for dealing with lightning fires? (If not, would this be a good idea?)

- Answer “No.”

Question: How are wildfires evolving (are you seeing changes in the number of fires, fire behaviour, intensity, the number of large fires etc.) in the District with regards to the drought, changing weather patterns, extreme weather which we are currently experiencing?

- Answer “It’s the same as other years”

Question: Do you think we need to approach preparedness and response to wildfires differently in these times of more extreme environmental factors?

- Answer “No”

Question: What would assist the District Fire Services in dealing with wildfires?

- Answer “More resources”

Question: How does the District approach Wildland Urban Interface (WUI) fires where fires transition between different jurisdictions (mandates)?

- Answer “We manage fires wherever we are requested to attend”

Question: What could the District Fire Services do to be better prepared for incidents which affect the WUI? (Based on lessons learned from Knysna and Plettenberg Bay).

- Answer “Be better resourced”

Question: What District Fire Services vehicles and crews were deployed to work on the Knysna and Plettenberg Bay fires?

- Answer “4 skid units, 3 tankers, 4 shifts of 24, 2 shifts of 3, 3 Officers”

Question: What role did the District Fire Services play during the Knysna and Plettenberg Bay Fires in terms of Incident Management?

- Answer “One officer was designated as the safety officer in the command structure”

Question: Looking back on the Knysna and Plettenberg Bay fires. What are the major learning points which have come out of this major incident? Please could you list both the positive and negative areas of learning? (What worked and what didn't). Please be as descriptive as possible.

- Answer “I was not present during the Knysna fires and cannot comment on them”

Question: Is there any further information or topics you would like to cover that have not been specifically asked in the questions. Please feel free to add any other relevant input.

- Answer “None”

Summary of main points covered in a meeting on 9 November 2017 with Chief Fire Officer Clinton Manuel of the Knysna Municipality Fire and Rescue Services.

With regards to the fire on the 7th June, Knysna Municipality sent a vehicle and an officer out to investigate the smouldering fire on the “29th April 2017”. Knysna then handed over and informed Eden District Fire Services that the fire was far out, and the responsibility of Eden District. Knysna Fire Brigade also informed the Southern Cape Fire Protection Association (SCFPA). The only reason Knysna Municipality went out to have a look was because people kept phoning the Municipal Fire Services to report the fire. According to Manuel no one from the SCFPA or Eden went to go and have a look at the smouldering area.



The officer reported that he was pointed to a smoulder way across on the opposite side of the ridge. It was deemed an inaccessible area and the officer asked the landowner if he was a member of an FPA. They confirmed they were members. He informed the landowner that they needed to cut a firebreak and inform the SCFPA. Manuel confirmed that the landowner who showed the officer the smouldering smoke did contact the SCFPA via email and the telephone. The landowner, according to Manuel, kept calling the Sedgfield officer regarding the smouldering fire, but the officer repeatedly informed them he had handed it over to the SCFPA and the District and they need to deal with it.

Manuel affirms that the Sedgfield Fire Department, when they visited the site of Noah's Ark, were pointed to a spot on the opposite ridge and never to a smouldering fire that has since been reported as the alleged origin of the fire.

Manuel explained that for two days prior to the 7th June 2017 everyone was preparing for the storm that was going to hit the Western Cape and they knew that they were going to be hit by strong winds. All the staff were well aware that if any fires were reported they had to be responded to. On the 7th June 2017, Manuel says there were 27 fires burning in the District, which as a result had resources stretched all over.

07 June 2017

02:30/02:45 (Approx.)

First call came in from a MTO forester in Kruisfontein asking for assistance with that fire. Knysna Fire Service's Knysna and Concordia resources (and Manuel) went to assist. They had to evacuate a couple of villages.

04:00 (Approx.)

Received a call regarding a wildfire in Lancewood to which the Sedgfield crew was dispatched.

06:15

The first call to the third fire, the Elandskraal Fire, was recorded. If anyone phoned about this fire prior to this "there is no record of it". This might be due to the Sedgfield fire station being a "lock up and go fire station" and the Sedgfield crew having left the station to attend the Lancewood Fire around 04:00. The vehicle from Karatara was sent to the Elandskraal Fire to investigate and the second Municipal employee was also asked to go and have a look to see what was going on. When the report came back that there was a fire that was spreading quite fast, Manuel withdrew the Sedgfield crew from the Lancewood Fire and sent them to Elandskraal. When they arrived the fire was already well developed and spreading through an area around Serenity.

11:00 (Approx.) onwards

Communication was difficult on the morning. The radio communication was not working that day and it was only when an officer managed to get a

cell phone call through to Manuel that he was then made aware about the extent of the Elandskraal Fire. Much of the focus up until that point had been on the Kruisfontein Fire. The Elandskraal Fire was reported from the officer to be "well developed and it had gone right past him. The police had also told the officer that three people had died in the fire". Manuel then made plans to head to the Elandskraal Fire as this was a fire that was going to now come in to the town. As Manuel went over the White Bridge he could see the fire coming over the hill. The conditions were reported as strong winds and heavy smoke. In some areas crews didn't even realise that the fire had gone past them. When the fire had started to spread along the Brenton Road, Manuel realised he was going to require additional assistance (given the fire conditions and rate of spread, as well as the limited and already stretched out resources). Manuel then contacted Gerhard Otto from Eden District for assistance. Unfortunately at that stage the entire District was busy with firefighting operations and all the District had available was one bakkie skid unit. Manuel then phoned Etienne Du Toit and Colin Diener from Western Cape Provincial Disaster Management Centre to request a Provincial response to the wildfire. Manuel says that this request was well respected and received. Following that, Manuel had some conversations with other Chief Fire Officers who offered assistance. (Local, surrounding, Fire Services such as Bitou, Mossel Bay etc. were also very busy with fires and Manuel explained that this Provincial assistance was very much needed).

Summary of main points covered in a meeting on 13 November 2017 with Fire Protection Manager Gideon van Lill, Silviculture Area Manager Jeff Taylor and Kruisfontein Plantation Manager Christiaan Smit of MTO.

MTO very early on first contacted Southern Cape Fire Protection Association (SCFPA) and then Knysna Municipality Chief Fire Officer notifying them about the Kruisfontein Fire. MTO have access to aerial resources through the SCFPA so it's essential to contact them early. Especially in conditions that were experienced on that fire, it was essential to inform everyone concerned as soon as possible.

Summary of main points covered in a meeting on 3 November 2017 with Chief Fire Officer Hedley Venter of the Bitou Municipality Fire and Rescue Services.

Interestingly when asked about the Standard Operating Procedure (SOP) for smouldering fires, Venter said that after seeing the fire behaviour in 2010, when banana and indigenous trees burned, Bitou Fire Service now has a policy of not leaving any smouldering fires. The threat is too great not to respond. If a smouldering fire is on private land, Bitou Fire Service will advise the landowner of where the fire is and who to contact for assistance.

Summary of main points covered in a meeting on 7 November 2017 with Environmental Planning Manager Pam Booth, Planning and Development Director Marlene Boyce and Town Planning and Building Control Manager Hennie Smit of the Knysna Municipality.

It was identified that there was a massive gap in the strategic planning leading up to the fires considering the forecasts and extreme weather warnings. Considering the smouldering fire in the Elandskraal area, which is an identified hotspot, why were firefighting resources not more alert to what could potentially happen and directed to the potential hotspots?

Summary of main points covered in a meeting on 4 December 2017 with National General Manager Shane Christian and National Spokesperson Linton Rensburg of Working on Fire.

We need to take global warming seriously. Lightning fires specifically are becoming a problem in the Western Cape, especially over the past 3 years. We need to become pro-active in dealing with lightning fires in terms of forecasting and responding to lightning fires.

WoF were on standby for storms that were forecast to hit the Western Cape. On 6th June they had already responded to "smoke in Sedgfield area which then seemed to disappear". On 7th June at about midday

they offered the Knysna Municipality WoF resources and told them "don't worry about payment, let's just activate people". WoF received no response. Then around 18:00 Linton Rensburg (WoF) contacted the Municipal Manager and said "we have resources in the area that can assist you" at which stage the resources were approved to move in. Christian says it all started off on a very bad foot that the Chief Fire Officer did not want to accept WoF resources.

Summary of main points covered in a meeting on 13 November 2017 with Managing Director Paul Gerber and Eastern Region Manager Dirk Smit of the Southern Cape Fire Protection Association.

According to Gerber, there was a power line that came down in the Featherbed Area (closer to Lake Brenton side) which started a separate ignition on West Heads which then ran up and over to Brenton-on-Sea. There is reportedly a witness (municipal employee) to this occurring.

Based on where the wildfire was in Pezula on the night of the 07th June, wind direction at that time, combined with accounts from locals that the fire did jump from the West Heads to the East Heads. It is highly likely Pezula was impacted by both the Elandskraal and Kruisfontein Fires. It's not exactly clear where the fires met up. "Fire Season" as a term is becoming invalid. Wildfires are occurring all year round and Wildfire Management should occur all year round.



Summary of main points covered in a meeting on 13 November 2017 with Chairperson Chris Gould of the Knysna Heads Association.

Gould feels that the report released by the Knysna Municipal Manager was a mistake and challenges the scientific aspect of it, suggesting that an independent investigator should have been called in. He did mention this to Kam Chetty (Knysna's recently appointed Municipal Manager) and was informed that the report would be peer reviewed by four peers. To his knowledge this has never been carried out. While he feels Dr David Klatzow's report is closer to the truth he feels that Klatzow's report still lacked depth and detail.

Right: It should be noted that the Eden District in the Southern Cape is prone to wildfires and during the Knysna Fires incident there were other fires in the area that required resources, such as the Kransbos Fire.



DISCUSSION

Kruisfontein Fire

This wildfire was the first major fire observed by authorities and the landowner in the early hours of 7 June 2017. The origin (near Dam se Bos) was just east of Knysna town and north of the N2 shown to the right.

Ignition

- Dr David Klatzow (Forensic Investigator) conducted an origin and cause investigation of the Kruisfontein Fire. Klatzow considered an electrical fault ignition, a smouldering fire, the Elandskraal Fire and arson as possible causes of the Kruisfontein Fire. Klatzow concluded that "...the most likely cause of this fire is either lightning strike or careless children. Deliberate human agency (arson) is ruled out." (Taken from D J Klatzow, Fire Report, Afriforum – Knysna Fires, 2017, p17)
- It is reported that multiple ignitions have historically occurred in this area. It is therefore essential to determine the primary cause of these ignitions to implement measures to prevent or limit future ignitions.

Initial response

- Early Detection - This fire ignited in an area easily visible from the N2 and surrounding communities. This may have assisted with the rapid response of resources.



Approximate area of the Kruisfontein Fire ignition

- Capacity and Access - By all accounts multiple, coordinated interagency resources reacted and responded as soon as they could. However, the extreme weather conditions and associated fire behaviour meant that containment efforts were largely ineffective. Resources were required to prioritise the defence of a threatened community early on in the operation, which hampered containment efforts.

Elandskraal Fire

This fire was the second major wildfire to begin in the early hours of 7 June 2017. The general area of origin was approximately 20km to the north-west of Knysna in the Elandskraal area (the Myforest property). Numerous origin and cause investigations have been conducted for the Elandskraal Fire and there are two major contradictory theories. One is that the Elandskraal Fire was caused by a lightning strike as early as March/April 2017. It continued to smoulder until it developed into an active wildfire on 7 June 2017.



A second theory is that the Elandskraal Fire was caused by human activity (either accidental or deliberate) on the morning of 7 June 2017. The two alleged ignition points are shown in the map to the right. This dispute is highlighted to give context to the discussion.

This discussion will focus on lightning/smouldering fires as they are currently a major challenge in the Eden District. Smouldering fires are discussed from a generic perspective below and this by no means constitutes an endorsement of either origin and cause theory. This report is a lessons learned analysis and not a cause determination investigation.

Ignition

- The Eden District is a lightning-prone area and lightning is known to be a common cause of wildfire ignitions.
- A smouldering fire is governed by 1) oxygen availability, 2) heat retention capacity, and 3) fuel moisture content. An active smouldering fire has conducive fuel and heat retention but lacks sufficient oxygen to support flaming combustion. Smouldering combustion can be sustained at low oxygen levels. A smouldering fire can burn for extremely long periods and can develop into an active wildfire (flaming combustion) if some mechanism or dynamic increases the supply of oxygen to the smouldering fire (e.g. exposure to strong wind).



Above: Approximate area of the Elandskraal Fire ignition

- Under average climatic conditions, the indigenous forests of the Eden District have a peaty layer with a relatively high moisture content. When Vulcan Wildfire Management visited an unburned area in the general origin of the Elandskraal Fire, it was observed that the ground fuels were extremely dry (which was attributed to the current drought conditions). Discussions with local residents confirmed that the ground fuels were a lot drier than normal. The lower fuel moisture content provides a more conducive environment for a smouldering fire to burn and spread.
- Berg wind conditions that existed in the days prior to 7 June 2017 would have resulted in further drying of the ground fuels which, in turn, would have created conditions more favourable to the spread of fire.

Initial response

- The initial response to smouldering fires caused by lightning strikes presents a number of challenges in the Eden District:
 - » There are currently no generally accepted guidelines or standard operating procedures for responding to smouldering fires.
 - » The smouldering fire location can be in remote areas, in rough terrain with limited or difficult access.
 - » Adverse weather conditions, or limited daylight hours, can make the initial response complex and/or unsafe or delayed.
 - » Aerial water bombing of the area is usually ineffective in isolation. The tree canopy disperses the dropped water, reducing its ground penetration.
 - » The average ground crew is usually not sufficiently skilled, trained and equipped to reliably conduct this type of operation.
 - » There is insufficient capacity in Eden District and B Municipalities Fire Services to respond to all smouldering fires, as there are limited resources in the District.
 - » The financial cost of suppression operations can be high.
- Eden District lacks suitably skilled, trained and equipped ground crews to consistently and reliably suppress remote-area fires, especially where access is challenging. The development of a specialist crew would overcome existing challenges:
 - » Access: Crews can be inserted by hiking into remote areas or by rappelling from helicopters.
 - » Containment and mop up: Specialist training, tactics and equipment, combined with creative problem-solving abilities, would ensure effective suppression by a highly-motivated team. The team could be trusted to work independently.
 - » Monitor: The crew would remain on site until the fire is declared dead-out or the risk of reignition is negligible.



Above: The dead and peaty layer of vegetation beneath the tree canopy in the area of Elandskraal close to the area where the ignition took place.



Above: The layer of leaf and vegetation litter beneath the canopy was found to be dry and crisp to the touch, even after scratching below the top layer down into it.



Fires in the Eden District

The Industry Views section highlights major issues and misunderstandings around the assumption of responsibility and strategic planning for wildfires in the Eden District. The various role-players in the Eden District need to resolve these differences by collaborating and partnering with one another. Questions have been posed below, based on the Industry Views, to provoke thought around current misunderstandings.

Landowner/FPAs in the Eden District

- If a landowner has a fire on their property and requests help from Fire Services and/or their FPA what type of help could/should they expect?
 - » No response, as it is their responsibility.
 - » Instructions to suppress the fire themselves.
 - » Advice and guidance as to how to go about dealing with the fire.
 - » Contact lists of possible resources for their own management and cost.
 - » Reduced cost resources and help with managing difficult ignitions.
 - » Other.
- If a landowner complies with all the required actions, as set out by the National Veld and Forest Fire Act No. 101 of 1998, and still feels they do not have the skills, ability or resources

to deal with a fire on their property, what course of action can they follow? And linked to this: What is the financial liability of the landowner if any outside assistance is offered by the Fire Services?

- If a landowner does not have the necessary resources and finances but still has a major concern about a fire, what course of action can they follow?
- Are there systems and procedures through which the FPA can assist landowners in sharing resources and expertise in dealing with situations such as this, when landowners require additional assistance?

Fire Services - Eden District and B Municipality

- Can Fire Services assist landowners with fires on their property? Do they have the mandate, budget, resources, time and skills to do so? If they can only assist in certain instances, under what conditions will they offer assistance and are landowners aware of this process?
- What are the protocols for determining where a fire originates from if only smoke is seen? If Fire Services observe smoke, to what lengths do they need to go to determine the origin of that smoke?
- When Fire Services have resource limitations – as well as other fires on the go, is it realistic to expect their assistance on a landowner's property?
- If life and property are threatened, are Fire

Services expected to provide a preventative response or only a reactionary response?

- Do Fire Services plan and respond to wildfires differently, based on historical weather conditions as well as forecast weather conditions?
- Do Fire Services have a system for monitoring all the reported and known active fires in their area regardless of whose land the fire is on and, based on forecast conditions, will they prioritise which fires require Fire Services attendance?
- How do Fire Services overcome resource challenges and multiple fire challenges if they cannot always deal with them – and what partnerships and relationships do they have to organise additional local assistance?
- If a fire has been reported to them, what responsibility do the Fire Services and FPA have to make sure the relevant landowner is made aware of the fire on their property?

While some of the answers to these questions can be found in existing legal frameworks, a lot of the answers (or rather, solutions) come down to how the system works in Eden District Fire Services, B Municipality Fire Services or the Southern Cape Fire Protection Association. This analysis has shown that wildfire management in the Eden District is extremely complex, especially once a wildfire occurs. A simplified, standardised and realistic system needs to be implemented, which supports the legal framework, and then becomes common practice throughout the District.



RECOMMENDATIONS

Ignitions

- It is recommended that the Western Cape Directorate Disaster Management and Fire & Rescue Services establishes and has oversight of a centralised database of wildfire ignitions. Eden District Fire Services would then have the responsibility to ensure that the details of wildfires are captured for all wildfires within the district. Landowners would need to be encouraged to report this information to Eden District Fire Services for smaller wildfires that do not require a formal response. It is essential that the wildfire industry becomes better at recording specific details of wildfire ignitions for analysis and intelligence purposes. Some organisations do this well but the information is not shared or centralised. This information will assist in determining ignition-reduction strategies as well as strategic planning for the initial response to ignitions that do occur.
- Eden District Fire Services, together with B Municipalities and the Western Cape Directorate Disaster Management and Fire & Rescue Services, should initiate a targeted awareness-and-education campaign focused on reducing ignitions. Intervention is required to reduce anthropogenic ignitions whether accidental or malicious. By capturing wildfire information in a centralised database (as suggested above), it is possible to determine hotspot areas, high-risk activities and specific audiences at which these campaigns need to be targeted. As an example, it is known that

children sometimes ignite fires around Eden (and the Western Cape) for entertainment purposes (frequency increases during school holidays). A communication campaign could be established to provide exciting nature-appreciation activities and encourage children to become ambassadors and protectors of their natural environment. This addresses the root cause of the problem – the children are bored – and evokes/rewards positive behaviour.

- Where ignitions cannot be prevented, Eden District Fire Services, together with B Municipalities, must develop new intervention strategies to reduce the number of ignitions as well as to limit the spread of wildfire from possible ignition hotspots. High-danger areas should be prioritised. A holistic fuel-management strategy for limiting fire spread in these areas must be considered and could comprise activities such as:

- » enlarging fuel-reduction zones alongside traditional community firebreaks with reduced continuity of horizontal and vertical fuels

- » reducing pine needles and pine slash under pine trees in plantations adjacent to hotspot areas, and

- » conducting regular prescribed burns in areas adjacent to communities, which would prevent fire spread both into and out of the community.

Initial response

- Predetermined strategic plans: All role-players within the Eden District (homeowners, landowners, municipality, Fire Services, Fire Protection Association, etc.) need to develop a coordinated, strategic wildfire plan for responding to wildfires under different sets of circumstances (e.g. type of fire, type of vegetation, weather conditions, accessibility). Eden District Fire Services should take charge of this process as they have the professional mandate for the suppression of veld fires in the District. The strategic plan needs to be shared (in a relevant and appropriate format) and accepted by all role-players so that they understand their responsibility and designated required actions. Examples of elements to be included in the strategic plan are:

- » standard operating and response procedures for different wildfire circumstances

- » wildfire-readiness planning and wildfire-ignition/spread interventions

- » evacuation plans, and

- » wildfire monitoring.

- It is recommended that the Western Cape Directorate Disaster Management and Fire & Rescue Services, in conjunction with Eden District Fire Services, lead a strategic initiative to improve and optimise reaction, monitoring and suppression for remote-



area ignitions (especially for difficult-access areas). Having Provincial involvement could assist with similar strategies being adopted or adapted by other districts in the province. Fire Protection Associations and Specialist Wildfire Consultants should be engaged to offer insight and possible solutions in the development of these strategies. The lack of standard operating procedures and capacity required for the appropriate response to smouldering fires is concerning and needs to be addressed with the utmost urgency. The strategic plan for smouldering fires needs to include:

1. **A detection and monitoring system.** Near real-time lightning-strike and satellite remote-sensing data are tools that should be used to detect smouldering fires. Active smouldering fires are normally visually confirmed by observing smoke issuing from an area. These systems should be adopted by Fire Services and further developed in order to enhance successful detection and remote monitoring of all smouldering fires.

2. **A risk rating system.** Due to financial, resource and logistical constraints in the Eden District, it would be unrealistic to expect the suppression of all smouldering fires to occur. Therefore, smouldering fires that present the highest risk should be prioritised. Low-risk smouldering fires may not even require a response. Factors

that need to be considered in the risk rating system include: potential for fire spread (weather, fuel, topography), and threat to life, property and infrastructure. The risk rating of a smouldering fire will change with time due to external factors (e.g. forecast weather changes). Therefore the risk rating needs to be constantly evaluated. It is highly recommended that the detection, monitoring and risk-rating systems be automated.

3. **Actions required based on risk rating.** The appropriate response and action required for a smouldering fire should be guided by its associated risk rating (trigger points for action need to be developed). Actions would include: remote monitoring, on-site monitoring, and immediate suppression response. The action required for a particular smouldering fire needs to be continually reassessed as the risk rating of that smouldering fire changes.

4. **Appropriate allocation of resources when a response is required.** If a suppression response is triggered, appropriate resources need to be allocated to the suppression operation. There is a common misconception that aerial resources are the best or only resources that can have an effect on remote-area wildfires. This misconception needs to be addressed as aerial resources are

incredibly expensive to operate and are often very ineffective when working in isolation. Currently most other types of resources in the Eden District lack the skill, training and equipment to provide an effective remote-area response. Vulcan Wildfire Management therefore advocates the development of specialist Remote Area Firefighting Teams.

- The Western Cape Directorate Disaster Management and Fire & Rescue Services, should take the lead in the development strategy for specialist Remote Area Firefighting Teams in conjunction with the Eden District Fire Services as well as the other District Fire Services in the Western Cape. Consultation with proven specialists in ground crew operations will also assist in the process in order to develop the appropriate standard operating procedures, tactics, specialist skills, training and equipment required. Innovative funding models will be required. However, this resource needs to be considered at the same level as other specialist resources, such as helicopters.



Above: The view from close to the possible point of origin showing the burned landscape and terrain looking in an easterly direction.





Fire Spread

Introduction

Wildfire (veld, bush, forest, mountain fire) should never be underestimated. Fire is a force of nature over which we have limited control. When weather, topography and fuel conditions become extreme, wildfire behaviour can be deadly, destructive and unstoppable. Having respect for this power is essential. The African Continent is known as the 'fire continent' and we should accept the inevitability of fire in our landscapes.

Once you have an ignition, the weather conditions, fuel characteristics and topography will determine how a fire behaves and spreads. These three elements form the Wildfire Behaviour Triangle and examples of some of the determining factors that can lead to an increase in fire intensity and increased fire spread are shown in the diagram to the left.

On 7 June 2017, all three of these elements contributed to a wildfire with an exceptionally high rate of spread and extreme wildfire behaviour – a 'perfect wildfire storm'.

WEATHER (OXYGEN/HEAT)

Heat

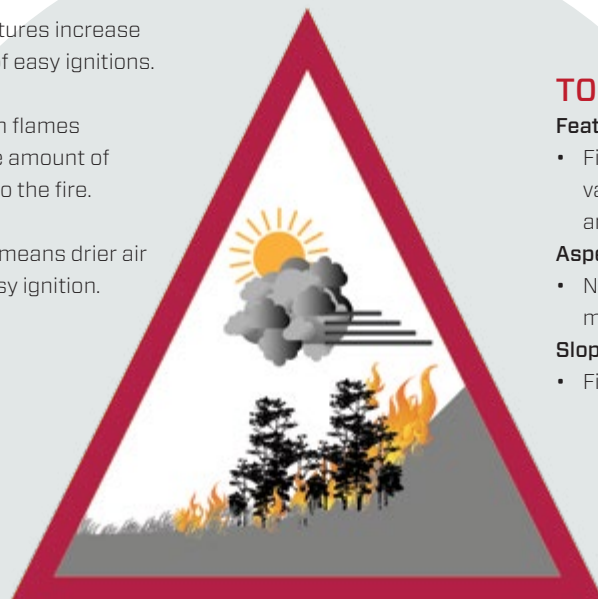
- High temperatures increase the chances of easy ignitions.

Wind

- High winds fan flames increasing the amount of oxygen fed into the fire.

Humidity

- Low humidity means drier air which aids easy ignition.



TOPOGRAPHY

Feature (Kloofs/Ridges)

- Fires speed up in kloofs or valleys (the venturi effect) and along ridge lines

Aspect (North/South)

- North-facing slopes receive more sunshine and are drier.

Slopes

- Fires move quicker uphill.

VEGETATION (FUEL)

Moisture

- When vegetation is drier, such as in the afternoon or during a drought period.

Continuity

- Where vegetation is dense or compact.

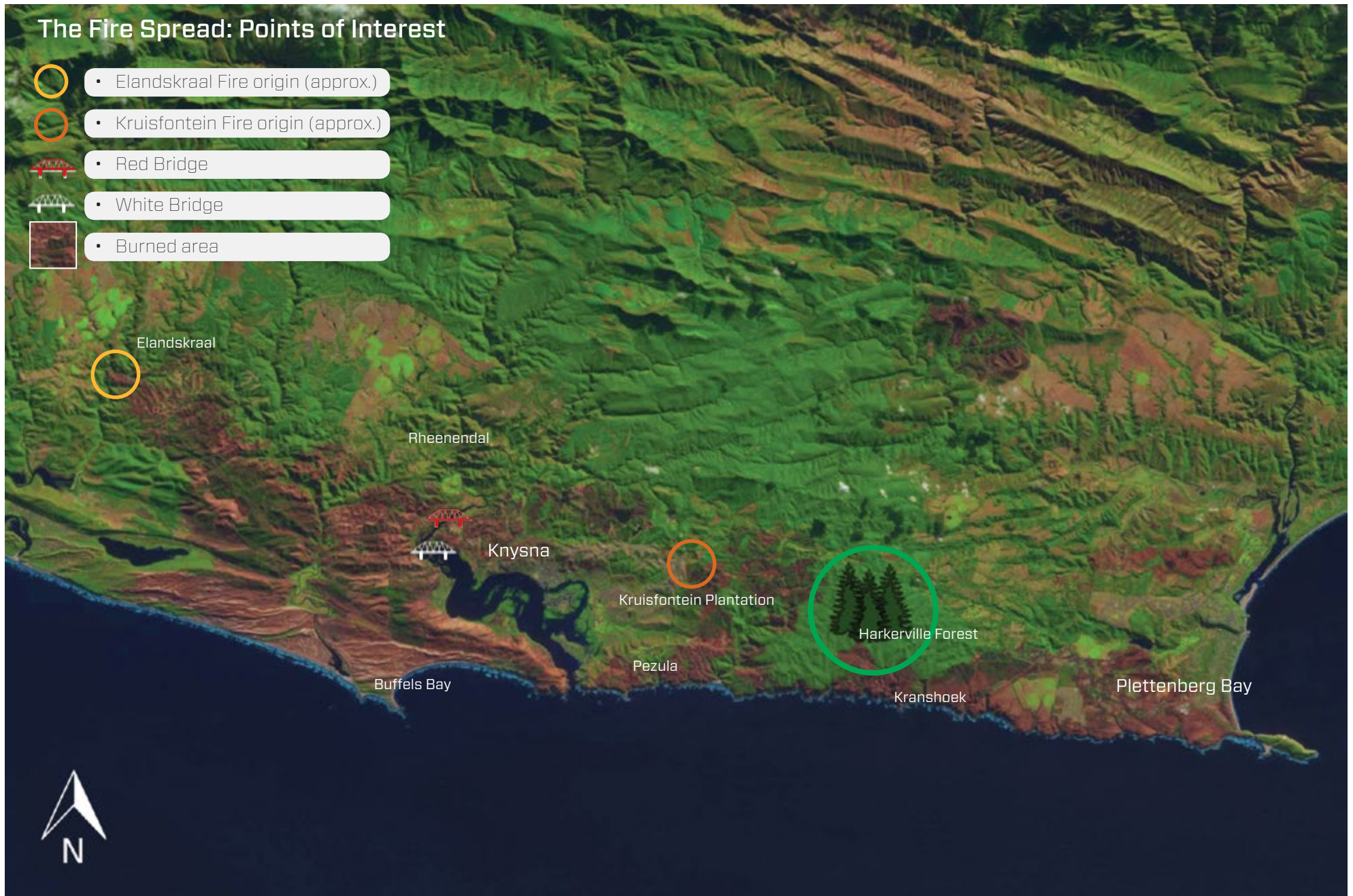
Fine or Heavy

- Grasses and Fynbos carry fire easily; whereas trees may take longer to ignite but will burn hotter and for longer.



The Fire Spread: Points of Interest

-  Elandskraal Fire origin (approx.)
-  Kruisfontein Fire origin (approx.)
-  Red Bridge
-  White Bridge
-  Burned area





Above: This image shows a spot fire that has started ahead of the main fire. An ember was most likely lifted up by the convective heat of the main fire, carried by the strong wind and landed in dry grass and light fuels. This ember created a new ignition and found abundant fuels which helped the spot fire grow. The wind also fuelled the new fire and contributed to its swift gain in size and momentum. If you imagine this occurring all along the fire front it indicates the extreme speed with which the fire was moving. Photo Source: Southern Cape FPA (2017)

Left: Fire crews for the most part could not safely and effectively battle the wildfire in the natural environment. They had to position themselves to protect structures hoping to steer the fire around homes and limit the damage. Photo Source: David Morris (2017) ©.

These weather, fuel and topography factors included:

- drought conditions
- Berg winds
- cold front winds
- high wind speeds
- shifting wind directions
- low relative humidity
- high temperatures
- atmospheric instability
- valleys, gullies, ridgelines, slope
- heavy fuel loading
- alien fuels
- light and heavy fuels
- horizontal and vertical continuity of fuels
- low fuel moisture content
- high fuel temperature
- high continuity of fuels, and
- volatile fuels (high natural chemical content).

For further information on how weather, topography and fuels affect fire behaviour, see Teie (2009), pg105-156.

In order to limit wildfire spread and damage, we need a system that promotes planning and preparing for wildfires. Planning and preparation are influenced by understanding the wildfire behaviour factors

we can control and the factors we cannot control. We have the most control over the fuel in our landscapes. Where we cannot control or influence factors, we need to adequately prepare for and mitigate against them.

Fire plays an essential role in our fire-driven ecosystems. The fauna and flora have adapted to – and even become dependent on – wildfire for their survival and proliferation. However, with the expansion and encroachment of human settlements into these fire-prone landscapes, a perception has been created that there is “a fire problem”. The problem is not wildfire itself but rather the introduction of humans into these systems (putting people in the paths of wildfire). If we want to live and work in this fire-prone and fire-dependent natural environment, we need to understand the risks and adapt to fires (prepare), not just fight them (react).

The following extracts provide background and insight into the nature of wildfires in South Africa. The extracts are taken from Forsyth, Kruger & LeMaitre (2010).

3.1.2

Extreme wildfire episodes

There are some cases of extreme wildfire episodes, where wildfires exceed the boundaries of any municipality, and when many major fires break out almost simultaneously, across wide stretches of the country. The wildfires of late August and early September 2008 are such an example. ...

This period was marked by extreme dryness and strong gusty northerly to westerly winds, ahead of a major regional weather front, following a long rainless period in the interior and east of the subcontinent. By 29 August, a fire in the Sparse Arid Woodland of the Central Kalahari Game Reserve of Botswana had grown to over a million ha in extent, and eventually burnt for over a week. Numerous fires broke out across the Sour Grasslands of South Africa. ...

In South Africa, scores of people lost their lives in the fires, and economic losses amounted to billions of Rands. ...

...such “megafire” episodes have been poorly reported to date and little researched; events of this kind need further study and proper factoring into future risk assessments

3.2.2

Trends in fire risk factors in South Africa

Risk factors are the underlying natural or human causes of a given level of veldfire risk. Risk factors in plantation forests appear to have deteriorated markedly, with the results as reported above. Safire argues that, in plantation forestry, the risk levels have increased because of the strong trend toward the practice of leaving slash unburnt after clear-felling, “for conservation reasons”, though forest managers are now reviewing this policy. They mention other contributing factors as including neglect of silvicultural tending practices in the forests, as well as a lack of trained staff and management on Corporate estates and “managed farms”, and instead, a reliance on forestry contractors, who are either not resident



or not familiar with the territory, or both, and thus ineffective in responding to wildfire. This is despite improvements in fire detection, according to Safire. Safire also reports an apparent current increase in the severity of fire weather as reflected in the calculated fire danger indices and wind speed. This is possible, but as likely owing to cyclical changes in weather over the regular cycle, rather than climate change (see below).

The spread of alien invasive plants continues in certain areas. The consequences are diverse, since the effect on fuel varies with the species that invades, and the density reached. In some parts, where species of pine have become dense, fire intensity may increase significantly.

3.3.2

Climate change and veldfire

The Intergovernmental Panel on Climate Change (the IPCC) reported in their Fourth Assessment Report as follows: “Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level.” And further: “Observational evidence from all continents and most oceans shows that many natural systems are being affected by regional climate changes, particularly temperature increases.” Such warming may increase fire danger, unless there were to be compensatory reductions in available fuel through reduced primary production. In most countries with fire-prone ecosystems, there is concern about the

inferred effects of climate change on wildland fire risk.

3.3.3

Climate change, veldfire and adaptive risk management

The climate-change outlook for South Africa is uncertain, as it is elsewhere.

Nevertheless, the risks attached to the more extreme scenarios are sufficiently high, that a prudent policy of insurance against these risks is appropriate, if at reasonable present costs. The IPCC concludes its chapter on adaptation: “Responding to climate change involves an iterative risk management process that includes both mitigation and adaptation, taking into account actual and avoided climate change damages, co-benefits, sustainability, equity and attitudes to risk.”

Such an adaptive risk management process is appropriate in South Africa. Here, implementation of the statutory provision for a fire danger index will provide a system for institutionalising such adaptation, since the FDI will track real weather and climate variation.

5.1.3

Ecologically acceptable fire regimes in South African vegetation

Indigenous forests are not extensive in South Africa, and covering less than 1% of the landscape even before they were over harvested during the period 1700 to 1900. They occur in a matrix of fire-prone surrounding vegetation (either grassland or fynbos), and are normally confined to “fire

refugia” – places in the landscape protected by the topography from frequent fire. Indigenous forests can and do burn: the great fire of 1865 is said to have reduced the former extent of the Knysna Forest by half, and initiated formal forest conservation in South Africa. Most ‘undisturbed’ forest patches in South Africa have evidence of charcoal in their soils, indicating that they do burn, but infrequently. Even with diligent protection (especially of the forest margin, which when intact is a natural firebreak), rare fires in exceptionally dry years will be sufficient to satisfy any ecological fire requirement, and no deliberate burning policy is recommended.

5.1.4

Conclusions on fire ecology and management

...Veldfire management and risk reduction strategies must take account of fire ecology. Fire is a natural and inescapable ecological factor in South Africa. Those ecosystems and species that were exposed to fire during their evolution are adapted to fire, and often require it to complete key stages in their life cycle. Land cover and land use changes in the South African rural environment have meant that ecosystems often no longer support natural fire regimes.

Therefore some form of fire management, involving prescribed burning, is needed to simulate nature, or to achieve other management goals. Thus, the hazard of wildfires may be increased or decreased, depending on the quality of veldfire management in any one area. Equally, the bad environmental consequences of wildfire may be aggravated where veldfire management is poor...



INDUSTRY VIEWS

Once the Knysna Fires had established their powerful momentum and ferocious intensity, they became unstoppable. The availability of additional firefighting resources may have reduced the amount of overall damage to structures and infrastructure, but they would not have been able to contain the fire spread under such extreme fire behaviour conditions. Due to our limited ability and capacity to suppress wildfires in extreme conditions, the importance of preplanning and preparatory work is highlighted. The Industry Views here are some of the accounts regarding the spread of the Kruisfontein and Elandskraal wildfires.



Above: Huge plumes of smoke herald part of the Elandskraal Fire reaching the edge of Belvidere, situated across the lagoon from Knysna. Photo Source: Belvidere Resident (2017)

Summary of main points covered in a telephone conversation on 24 January 2018 with owner Robin Patz of Teniqua Treetops.

(Editor's Note: An account on the Elandskraal Fire)

Patz had been woken around 05:00 by one of her guests at Teniqua Treetops (which looks onto the property where the Elandskraal fire is presumed to have originated), who had seen a red glow in the sky. Robin Patz said she could not clearly see the fire due to the sky being filled with smoke but could see that it had reached close to the area where Noah's Ark is situated. At this stage, she could see that only the upper area of the slope was burning and not the lower level towards the Karatara River. She said the rest of the slope burned out over the next few weeks. Patz immediately began phoning Sedgfield Fire Department to report the fire but could not get an answer. She says that this lack of response from the Sedgfield Fire Department continued throughout that day.

Summary of main points covered in a telephone conversation on 24 January 2018 with landowner Callie van Wyk of Elandskraal community.

With regards to the Elandskraal Fire, Van Wyk first noticed it when he went outside to see what the weather was for that day. At about 05:10 he saw a smoke plume that he thought, "must be coming from a small fire". Because of the Berg winds they had been

experiencing for the past few days, and this being a risk with a wildfire in the area, he went back outside to have another look 15 minutes later. In a very short space of time the smoke was much larger and he could see this was going to be a very dangerous fire.

Summary of main points covered in a meeting on 3 November 2017 with Senior Firefighter Adriaan Swanepoel of the Bitou Municipality Fire and Rescue Services.

(Editor's Note: An account on the Kruisfontein Fire, which spread toward Plettenberg Bay area)

The wind speed of the first two days on the wildfire made the fire impossible to deal with. The fire intensity and severity was such that although Bitou Fire Services tried to hold the fire to the south of the Airport Road there was little chance to control the amount of spotting occurring over the road. The airport has a firebreak 50-100m and then the tarred runway. The embers jumped this area, landing in a gum bush plantation on the other side. Fire services were right at a spot fire that had just started in the airport area but even then, could not suppress it. The wind was so strong that it was literally blowing the jet of water away from the fire as firefighters attempted to spray it on the flames. The decision was made to rather move ahead of the fire and warn and evacuate residents who were threatened.

The fire burned from Kranshoek viewpoint along the coast towards Plettenberg Bay. It would follow



a pattern of running toward the coast, then move slowly back inland and then at a certain point run towards the coast again. It kept repeating this process. On Wednesday 7th June the fire ran through the Robberg area very rapidly and a number of structures were lost. There was also a wind direction shift on Saturday 10th June, which resulted in further homes being lost.

Some of the homes were lost to fire moving through vegetation and then burning the structures. Many were also lost due to the ember attack that continued after the fire front had passed.

Summary of main points covered in a meeting on 13 November 2017 with Knysna Station Commander Jerome Simonis of the National Sea Rescue Institute.

On a personal level, Simonis was only aware of the scale of fire when he saw it burning at the White Bridge, near the Cycads for Africa area. At about 12:04 he drove down the N2 from the Leeuwenbosch Farm stall on the corner of the Rheenendal Road and saw that the fire was crossing the National Road driven by the gale-force wind. He could feel the extreme heat while in his vehicle and knew that with the forecasted conditions, Belvidere was in danger. Brenton-on-Sea and the Western Heads would possibly also be threatened. He never thought there was any chance of the fire crossing the river and threatening Paradise or Knysna Heights. He also considered that now having the N2 closed on both sides of Knysna and in

both directions, there was going to be a problem for an evacuation as well as emergency services trying to get into the area. He also cannot remember any fire warning that day, although he did recall a severe weather warning of possible flooding.

Simonis said that while he did not see a spot fire start above Featherbed, he does have a theory that the fire there may have started sometime around 13:00-14:00 just above Dick Auburn's property, due to an electrical transformer box falling in the wind. He has seen this happen three times before in strong winds.

Summary of main points covered in a meeting on 11 November 2017 with residents Ritchie Morris and Mary Jane Morris of the Elandskraal community.

Ritchie Morris felt the SCFPA maps that were created and used for co-ordinating fire resources in the area were atrocious so he created a grid map of the area which proved very useful for being able to send people to the right location. This was used during this incident in order to send local landowners to flare ups. There were flare ups in the valley for 6 weeks after the fire and they constantly fed this information to the municipality; all they received from the municipality in return were threats. The only person who came out to them was Deon van Wyk, Eden District Fire Services Assistant Chief Fire Officer. He climbed on the roof of Ritchie Morris's house to get a better view of the burned site. During this time Ritchie Morris spent nights on the roof monitoring

and did patrols in the forest. For weeks, afterwards they repeatedly tried to get assistance with flare ups and would phone the Southern Cape Fire Protection Association (SCFPA) who would tell them to phone the municipality. When they phoned the municipality, they were told to phone the SCFPA.

Summary of main points covered in a meeting on 2 November 2017 with Crew Leader Thamsamqa Baleni of Working on Fire.

Spot fires caused lots of damage to the properties. Hand crews could at times successfully extinguish spot fires before they got too big however they could do nothing with the active fire fronts. Even then, it was hard for the firefighters to contain and suppress the spot fires, which were all over the place. Just as one was suppressed another would start up. There were also other ways in which they assisted residents such as helping with catching dogs that were lost and that had escaped. Safety was a priority for the Working on Fire teams, especially during the intense fire conditions.

Summary of main points covered in a meeting on 9 November 2017 with Chief Fire Officer Clinton Manuel of the Knysna Municipality Fire and Rescue Services.

Manuel describes the fire burning as three or four different fronts with the fire running through the gullies and hills, especially on top of the hills moving very rapidly. When Manuel called the crews back to



Knysna to protect the town, they had not realised that some fire fronts had past them as all they could see was the front they were working on. The wind of 70-90km/h and fuels such as pine trees throwing embers into the air saw spot fires occurring 100-300m ahead of the fire also making containment and suppression extremely challenging. Spotting was a major factor in the accelerated rate of spread of the fire.

Manuel also attributes some of the extreme fire behaviour to the fuel loads that existed at the time. Suppression efforts were also affected but cut-off access and egress routes (e.g. when Brenton Road was overrun by fire).

Manuel suspects that someone possibly did a back burn from the Featherbeds area. He admits it could have been a spot fire. However, based on a photograph that exists showing a long straight line of fire, it appeared to look as though someone walked with a drip torch.

In the afternoon of 07 June, the fire jumped the Knysna River close to Red Bridge. Manuel believes the fire jumped the Knysna River around 16:00-17:00 when he was still in the field near “the triangle” area just past the White Bridge. (Editor Note: This distance from possible spotting vegetation such as pines and gums to where the embers landed on the other side of the river is approximately 500-600m). When these spot fires occurred, this is when the fire then spread towards the Welbedacht area. A Fire Services

vehicle from Oudtshoorn (already in the area), tried to work on the spot fires in an attempt to contain them before they ran up slope towards Welbedacht but they couldn't due to high winds, multiple spot fires and heavy fuel loads.

Manuel remembers the fire affecting the town as three different fronts, which made evacuations and planning for where the fire would be next very difficult. The first came through the Belvidere area, the second front came through the town, Knysna Heights direction, and then the third came through the upper town section affecting Simola.

Manuel then brought Len du Plessis from SANParks into the Incident Command Post to help give accurate weather forecasts and updates. They realised that the wind would be changing to a south-easterly on the Saturday. The change in direction would have an impact on Pezula as well as spreading the wildfire from Brenton-on-Sea to Buffalo Bay and further towards Sedgfield. This was once again when homes were lost even with all the resources that had now arrived in Town.

Summary of main points covered in a meeting on 7 November 2017 with Environmental Planning Manager Pam Booth, Planning and Development Director Marlene Boyce and Town Planning and Building Control Manager Hennie Smit of the Knysna Municipality.

Booth felt that the AFIS dashboard should be made available to more than just the professionals, as it is really important information for the community-based firefighters. One can watch the AFIS app all day but there is no wind direction or updated information like there is on the dashboard.

Summary of main points covered in a meeting on 13 November 2017 with Fire Protection Manager Gideon van Lill, Silviculture Area Manager Jeff Taylor and Kruisfontein Plantation Manager Christiaan Smit of MTO.

In the past, more block burns were conducted around the plantations as defendable spaces. The shift to ecological burns (longer frequencies between burning areas creating a situation where you have old vegetation next to a plantation) means you no longer have that defendable block. On MTO property, they do burn but they don't have control of the burning on neighbouring properties. In the last three years the amount of suitable burning windows periods has also decreased. There has been less precipitation and many more windy days. Burns are often planned but are not always possible.



The build-up of vegetation fuels needs to be looked at on a more strategic level, especially in and around times of drought. There should be a multi-agency approach to dealing with the bigger picture of fuels. So, on a macro scale you start creating fuel buffer zones, which can assist with fire spread on a larger scale. In terms of awareness, people in the greater community also need to be made aware of the benefits and the ecological importance of burning so there is less resistance. The message essentially is “burn or get burned”.

The preventative work in plantations is working “under normal fire conditions” but “this fire (Kruisfontein Fire) jumped more than 3.5km over an indigenous forest”. The fire of the 7th June cannot be categorised as normal fire behaviour. Even parts of indigenous forest which don’t normally burn looked like a war zone, ‘as if there were explosions,’ with total destruction.

At some point, they were ahead of the fire and measured 72km/h winds. They witnessed the fire jump a 1.5km gorge. At a distance of approximately 1.2 km in front of the head of the fire they reported feeling the radiation heat from the fire. It was burning with such intensity that the smoke plume pushed through the inversion layers “like an atom bomb”. This is fire behaviour unlike anything they have experienced before. Even the driftwood on the beach was allegedly burned, where the fire was constantly being driven into the ocean.

From the point on the Kruisfontein Fire, MTO realised they would be chasing the fire. They secured the base and tried to work on the flanks. On the left flank, they were hoping to pinch the fire into an indigenous forest so there was a lot of focus on that aspect. They also wanted to keep the fire north of the N2. The fire managed to slip through a piece between the indigenous forest and a village and at that stage they had to prioritise protecting the village as opposed to preventing fire spread. Despite their best efforts the conditions were so extreme it kept taking the fire away from them. At times, it was 30-40m flame heights so it is not something that you can easily stop. Even when the wind dropped days later, the fireline was incredibly long and the fuels were incredibly dry. It remained extremely challenging.

Summary of main points covered in a meeting on 9 November 2017 with Senior Firefighter Sydney de Doncker of the Knysna Municipality Fire and Rescue Services.

De Doncker was one of the first firefighters on the scene at the Elandskraal Fire. When he arrived, the fire was already raging, driven by a gale-force wind and engulfing everything in its path. This was something beyond anything he had ever seen before. De Doncker’s crew arrived on scene in Echo 9, a water tanker, via a gravel road from the Karatara side as they had been deployed at the Lancewood Fire earlier that morning. On seeing the fire behaviour and realising their initial efforts to suppress it were ineffective, De Doncker quickly made the decision

not to fight the fire but to try and save structures. They used water as a protective barrier around a home but lost the garage due to a tree and electrical pole falling onto it. With the home secure, they moved to Serenity Care Centre to save structures there. Around this time Echo 8 arrived to assist and the Karatara Pumper broke down due to a clutch issue. The defence of the homes was aided by members of SAPS and was again successful. However, they lost a greenhouse due to intense radiant heat.

The following night De Doncker was deployed to the Phantom Pass area in Knysna where they saved properties, including some that were already burning. While working on the Brenton side they became trapped at one point while searching for a working hydrant. They sheltered with a SAPS vehicle and a white Mercedes and helped to advise them on how to stay safe. When De Doncker deemed it safe to drive out of the entrapment zone, they took their chance and made it to safety.

Lack of water during the incident was a problem as only certain hydrants were working. The Municipality had closed some valves and not all firefighters were informed which hydrants were working. Homeowners putting on their hoses and sprinklers put further pressure on the water system.

Summary of main points covered in a meeting on 9 November 2017 with Sedgfield Station Commander Wayne Sternsdorf of the Knysna Municipality Fire and Rescue Services.

On the morning of 7th June, Sternsdorf had originally been called to the Kruisfontein Fire around 04:00. While at Kruisfontein he was informed of a flare up at the Lancewood Fire near Hoekwil (Wilderness area). This had been burning for two weeks and Eden District had been dealing with it. The people phoning in to report the flare up to Sternsdorf could not get hold of Eden Fire Services, and upon trying, neither could Sternsdorf. Sternsdorf dispatched Sydney de Doncker, Senior Firefighter from the Sedgfield Station.

At 06:15 Sternsdorf received the first call reporting the Elandskraal Fire and Sternsdorf sent Ben (Karataru firefighter) to investigate. Ben reported back that the fire was big.

Once the Kruisfontein Fire was considered safe around the homes at Springveld, Sternsdorf left and drove towards the Elandskraal Fire. However, when he arrived at the Karataru turn off on the N2, he was informed that the fire was already at Rheenendal so he turned around, met Dirk Smit (from the FPA), and they drove towards Bibby's Hoek near the Totties Farm Stall around 07:30. There Sternsdorf and Smit found the FMU who had already got the fire in that area contained so Sternsdorf turned around and returned to the N2 back along Rheenendal Road.

When arriving at the N2 he saw the fire spotting and progressing at such a speed that it actually passed him while he was travelling on the N2 at 110km. Understanding that the fire would move into the Westford Bridge area, Smit who was still with Sternsdorf, said he would proceed to that area.

While travelling back along the N2 to Knysna Sternsdorf received a call from Clinton Manuel saying the fire was coming down towards the Phantom River Lodge and the White Bridge. Sternsdorf saw the fire had already crossed the N2 to the south at this stage. He and a tanker prepared to fight the fire at Phantom River Lodge but on seeing a 30-40 metre wall of flame coming down at them, he ordered the tanker to abandon firefighting attempts and rather to evacuate residents ahead of the fire. They kicked down doors to check for people inside as well as let out any animals trapped in the homes. Sternsdorf reported in to Manuel to say they had lost the area. At that stage Manuel informed Sternsdorf that the fire was moving towards Belvidere and Sternsdorf proceeded to move there. He arrived in Belvidere where they managed to hold the fire from spreading further into the Belvidere Heights Area. Two law enforcement officials and two residents assisted them using the community installed hose boxes.

Sternsdorf observed that the fire was getting around the firebreaks that were in place in Belvidere and the fire was then heading to Villa Castolleni. He then went on to the Old Age Care Home to check on them and saw they had good defendable space. The Old

Age Care Home had their own generators and water supply so he advised against evacuation. He informed Manual of this decision and gave instructions to the nursing staff to keep everyone indoors in the lounge area. The nursing staff were to keep the residents occupied and keep the air conditioning on. He then moved on to Brenton, where he was informed of about a heart attack victim on the Featherbed Road. Sternsdorf proceeded there and met with the man, who had the heart attack victim's body in his car. He checked on the victim and confirmed a fatality. He then advised that they move back up the road to Margaret's Viewpoint due to the thick smoke. He informed the police and requested them to respond when possible.

Sternsdorf is convinced that someone lit a backing fire as defensive measure off the Featherbed Road and refers to a photograph that shows the fire as a definitive line. (Editor's Note: The SCFPA have another theory that the power line and power box along that road collapsed due to the wind and caused the ignition, as this has occurred in the past and there is reportedly an eye witness to this. Either way there seems to be a separate ignition in this area which could possibly be a back burn, power line ignition or other possible source). Sternsdorf and some SANParks members were preparing to hold the road to Brenton-on-Sea when the fire that had started off the Featherbed Road came rushing up behind them, forcing them to abandon this strategy (there was intense fire on both sides of them). Sternsdorf says at that stage "even if he had the whole of



Cape Town fleet there is no ways that I could have stopped it". This new ignition then raced up the hill and was burning in the direction of Brenton-on-Sea. Sternsdorf mentioned that it was around this time that Manuel had become trapped in the Simola area and had to get back into Knysna town via the forestry roads. Sternsdorf stayed in the Brenton area until he could drive safely back to Knysna.

Summary of main points covered in a meeting on 4 December 2017 with National General Manager Shane Christian and National Spokesperson Linton Rensburg of Working on Fire.

Like in any large fire, there were some areas where there was just nothing a ground crew could do. Constant wind changes made fighting the fire extremely difficult. There were some cases where WoF ground crews were withdrawn (by WoF itself) due to safety issues, which made Division Supervisors upset. Sometimes we simply just had to make decisions because we could not wait to discuss matters with the IC. Christian says that WoF partner organisations supported them in these decisions. Christian claims that there are often disputes between role-players during operations where WoF needs to make decision whether to withdraw with their partner.

Christian highlights that there is a problem with urban Fire and Rescue Service firefighters not having wildland fire specific training. Furthermore,

resources brought in from other areas did not go with "indigenous" knowledge (local landowners experience and understanding of fighting fires in this area). It's very important and none of that was tapped into.

In some cases there were conflicting firefighting strategies. Incident Management Teams focused on specific areas but landowners had their own interests (referring to MTO, CapeNature etc.) and the FPA is obligated to assist member landowners.

Tsitsikamma Fire

On the same day, at the same time and under the same conditions MTO, SCFPA and WoF were working together on the Tsitsikamma Fire very successfully. Christian believes this is because only two/three agencies were involved. They were focusing on the knowledge of 'indigenous' people (the old foresters) and also had to evacuate local communities. National Disaster management got involved and sent buses to assist with the evacuations.

Summary of main points covered in a meeting on 13 November 2017 with Chairperson Chris Gould of the Knysna Heads Association. Part I

On the morning of the fire (07 June 2017), Gould dropped his kids at school at around 07:30, which being a private school was open. (Public schools in the Western Cape had been closed on account of the large storm approaching the Western Cape). At this time he saw a large smoke cloud originating out of the

Karatara area. As Gould has a small holding out there, he was concerned and drove out to investigate. He arrived near Karatara around 08:00/08:15 and met up with his neighbour, Callie van Wyk, who was leaving with his family to investigate where the fire was. Gould joined them. Gould immediately realised by looking at the smoke plume and the wind conditions that this fire was going to be a serious problem. It was heading east/south-east and would not be stopped by the Barrington Road.

He then travelled along the Barrington Road until he could go no further. He witnessed around three or four Fire Services personnel and other vehicles (large and small) fighting to suppress the fire at Serenity. As the fire had crossed the Barrington Road, he turned around and drove back towards the N2, then turned right along the Karatara Road to the Seven Passes Road, which took him around behind the fire to the other side of the Barrington Road near Nico's Café. Here he spoke to some people who confirmed that the fire had indeed jumped the Barrington Road and was moving quickly – it was unlikely to be stopped. He left here and returned to the N2 via the Seven Passes and Karatara Roads. Once at the N2 he headed towards Knysna.

While on the way to Knysna Gould read a message on the Patrol Warrior WhatsApp group asking a fireman who was part of the group, whether there was anyone on the Rheenendal Road and what was happening there. Gould turned onto the Rheenendal Road and drove until he reached the Highway West turn off to



see if he could help in any way. From here he could see a wall of smoke approaching from the West and felt that the Rheenendal Road would not stop the spread of this fire either, so he headed back to the N2 taking note of the distance from Highway West until he had the smoke plume overhead, as he felt this would be where the fire would hit the Rheenendal Road and may be useful info.

This turned out to be very close to the N2 in close proximity to the Leeuwenbosch Farm Stall. He then sent a message saying “They are never going to stop this at the Rheenendal Road, the only way they will stop it is at the Knysna River, let’s hope that works. Otherwise it is going to cross close to where the Rheenendal Road meets the N2. Belvidere and Brenton are open before it, this is just going to go right through these communities”.

After this Gould drove back to his home on the East Head to hunker down and keep a watch on the fire. He watched the fire burn very quickly through the Featherbed area but did not witness the actual ignition.

The image above right indicates the roads and landmarks Gould makes mention of. The red arrow line on the map is based on Gould’s account and indicates the direction the wildfire was spreading in. This fire spread account matches up with the areas affected by the wildfire and other similar accounts of the wildfire on that day.



Above: The red line indicates the direction the wildfire was moving in as based on Gould’s account.

In a meeting held on 15 November 2017 with Dirk Vanderbank and Wayne Alexander of the Alexander Guest House, the following is a summary of the main points of this discussion.

Vanderbank and Alexander noticed a spot fire close to the Alexander Guest House (on Knysna’s East Head) at around 13:50 on the 07th June. This spot fire had just started in the vacant lot next door to them. They grabbed hoses and, with their other neighbours, they attempted to defend the home downwind of the fire. They were able to successfully protect the home and contain the fire in the vacant lot. Unfortunately another section of the same fire was pushed by the wind away from the houses in the direction of the old radar station and Pezula, following the cliffs and coastline.

Summary of main points covered in a meeting on 13 November 2017 with Chairperson Chris Gould of the Knysna Heads Association. Part II

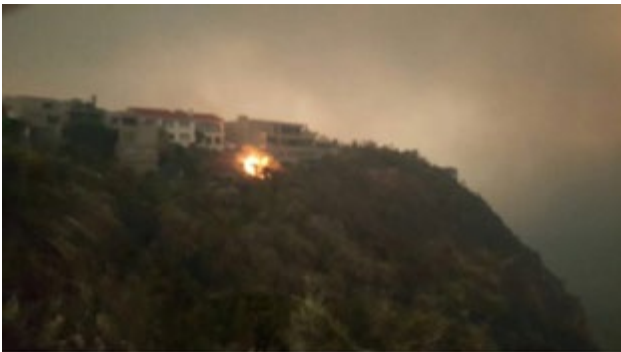
During the ongoing wildfire affecting Knysna and surrounds Gould sent out messages to the community to keep a watch out for spot fires (in the Heads area) as there were no firefighting vehicles around. (He points out that there were none seen in the Heads area at any time during the next 5 days). Soon after this, Gould received a report of a spot fire, (which was near the Alexander Guest House), and Gould called on the WhatsApp group for all able-bodied people to respond to the end of Glenview. They arrived to find Dirk Vanderbank and Wayne Alexander (the owners of the Alexander Guest House) and two other people suppressing the fire with their garden hoses. They were managing to keep the wall of the one house wet down and prevented the fire from causing any significant damage to it. However, the wind blew the fire away from them and the houses, along the cliff line and towards the John Duffy farm. It then continued on to Pezula Estate.





Above: Ignition from spot fire beginning on the East Head around 13:50 near Alexander House. Photo Source: Wayne Alexander (2017)

A little later Gould heard about another spot fire below the Top View site near Keith Hollis's property. Gould again asked the community to assist. Hollis had been alerted by his daughter (on holiday in Namibia) who had received a photo of the spot fire from a friend. People responded and suppressed it using buckets and water from the pool.



Above: Photo showing the spot fire near Keith Hollis's property on the East Head. Photo Source: Chris Gould (2017)

Gould also mentioned that he had noticed how bad palm and pine trees were for spreading embers.

Summary of main points covered in a meeting on 10 November 2017 with 13 residents of the Brenton and Belvidere communities.

Natural indigenous vegetation burnt because of lots of dry materials underneath. A Keurboom tree was described as exploding with flames. Pine trees burned with great ferocity and also threw lots of embers into the air. Indigenous Milkwood seemed to be the only forest that didn't burn. Gardens and any other vegetation below them burned and smouldered.

A resident remarked how everything before the fire was very overgrown. People in the community wanted privacy around their homes so they all had these bushes around which contributed to helping the fire spread. The drought period (dry vegetation) and a lot of trees (which were already dead before the fire) contributed to the fire spreading so quickly.

There was a discussion around the management of fuel loads and prescribed burning. A major problem is that burning and clearing had not taken place for such a long time. The fuel load had become so high that people were scared to burn. Once you get to that point, the ability to burn safely diminishes and the risk increases - as well as the costs and time to prepare the burn area. More regular burning needs to take place.

Summary of main points covered in a meeting on 9 November 2017 with Chief Fire Officer Clinton Manuel of the Knysna Municipality Fire and Rescue Services.

Buffer zones need to be created as plantations are too close to the town. With natural parks surrounding Knysna, there is a greater chance of stopping the spread of fire. Suburbs and areas that have one road in and one road out need to be looked into for future incidents. Overall the town needs to evaluate a number of things to make the town safer. Knysna is also looking at initiatives, which use alien vegetation for house construction, helping reduce the alien biomass. Knysna also needs to engage with the forestry companies to help create natural buffer zones around the town of Knysna as well as keep the forest floors clean in their plantations. There needs to be medium to long-term plans in place to ensure that mitigation work takes place and is ongoing to help reduce the risks. Hopefully other towns will be able to learn from this incident as well as from the actions that have taken place to reduce the risk going forward.

Summary of main points covered in a meeting on 14 November 2017 with Deon van Zyl of the Rheenendal Fire Management Unit.

The 7th June 2017 Knysna Fire that originated from the Elandskraal area and burned through the Rheenendal Fire Management Unit and across the Rheenendal Road, is the second largest one for the

Rheenendal area in recorded recent history. Both fires followed a similar pattern of spread, although the previous fire was not driven by extreme wind conditions and was therefore easier to contain and suppress. The previous fire occurred in 2010 and burned for 4 days, requiring Fire Services and 4 helicopters to finally suppress it - costing in the region of R25 Million. During this time, the fire jumped the Rheenendal Road twice in two different directions.

The terrain off the Rheenendal Road is a mixture of veld and farms and has many deep kloofs with thick vegetation. Van Zyl is of the opinion that the Rheenendal Road itself could make a very good strategic firebreak if the clearing work required to widen it was carried out. This would be due to its accessible location as well as proximity as a line of defence to prevent fire spread towards Knysna. Van Zyl has been battling with the Knysna Municipality and Eden District Municipality for the last 7 years to try and get Rheenendal Road cleared. Van Zyl says the Municipality has a responsibility to maintain their roads and verges. If they were to do the clearing, the landowners represented by Van Zyl and the FMU are prepared to maintain it. In 2011/12 the community in the Rheenendal area collectively spent R50 000 on herbicide to try and reduce the vegetation load. There is also an Eskom servitude that at times runs parallel to the Rheenendal Road. If this was also cleared to a fuel break standard (and not waist height as it currently is), it could form a supporting line for a break along the Rheenendal Road.

The fire of the 7th June was driven through the southern section of the Rheenendal FMU's area of responsibility with the first home being lost around 12:00. Later in the day and into the evening, the flank of the fire began to move north-west towards the Rheenendal Village. The area of greatest concern to the Rheenendal FMU was the Rheenendal Village - approximately 6000 people with no community hall and surrounded by plantations. Luckily the fire did not get this far, but the risk still existed.

The plantations in this area are not well maintained. The previous plantation owner, PJ van Rheenen, kept the plantations in a good condition and maintained a good relationship and shared resources with the landowners. Van Zyl claims that since PG Bison has acquired the plantations, the relationship with the landowners has deteriorated. The plantations of Rheenendal and Harkerville were knee deep in slash before the fires.

Van Zyl heard that the Elandskraal Fire impacted on Serenity at around 08:00 on the morning of the 7th June. There are no breaks or areas that they could use to halt the spread of a large plantation fire between his property and Serenity. The flanking fire had sufficient momentum that it jumped other existing fire breaks in the area, and the wind peaked in intensity around midnight.

The overgrown vegetation with difficult access contributed to the difficulty in suppressing the fire. There is limited parallel access between farms and small holdings and often one has to travel up onto Rheenendal Road, along it and then back down again in order to get to a neighbour.



Above: This image (not from Knysna) shows the high number of embers that a palm tree produces when burning. These embers can stay alight and travel for many kilometres causing spot fire ignitions and adding to the fire spread. Photo Source: Justin Sullivan (2017) ©



“They are never going to stop this at the Rheenendal Road, the only way they will stop it is at the Knysna River, where the Rheenendal Road meets the N2 and Belvidere and Brenton are open before it, this is just gonna go right through these communities”

— Chris Gould, Knysna Resident



Above: The high density and continuity of alien invasive vegetation, as well as the terrain with rolling hills and valleys combined with drought and extreme weather conditions to create a wildfire with intense fire behaviour and rapid rate of spread.
Photo Source: David Morris (2017) ©

DISCUSSION

- Community members unsuccessfully attempted to contact the Sedgefield Fire Department very early on 7 June 2017 as well as throughout the day. They were unaware that this is a “lock up and go” fire station as explained to Vulcan Wildfire Management during an interview with Clinton Manuel on 9 November 2017. This is an urgent issue that needs to be addressed.
- The Knysna Fires had extremely high rates of spread, exacerbated by strong winds that caused spot fires to start well ahead of the main fire. The continuity and type of fuels, as well as the landscape with hills and valleys provided the perfect environment for aggressive wildfire spread. Fire-suppression attempts were often futile and therefore the focus had to shift towards evacuations and structure protection.
- Based on accounts from landowners and homeowners, it was evident early on that this wildfire was going to spread into the town of Knysna and its suburbs. The advantage the landowners and homeowners had in order to make these assessments was that they were not focused on direct-suppression operations – they had perspective. Fire Services only appeared to realise the full extent of the fire much later because they were so actively involved in direct-suppression operations and evacuations – they lacked situational awareness. In an ideal situation, Knysna Fire Services would want to get a leadership position to withdraw from direct operations to

obtain a broader perspective of the incident and to develop strategic plans and objectives. Incident stress, as well as fatigue possibly also affected decision-making and situational awareness. The other challenge smaller towns like Knysna and Plettenberg Bay face is that they have a very limited number of personnel in their Fire Services. Therefore, in many incidents, the leadership positions – out of necessity – become actively involved in operations.

- Initial responders need to be cognisant of the importance of information sharing in the early stages of a fire before a more formal Incident Command System structure is established. Knowing what a wildfire is doing at all times is essential for effective and safe fire-suppression operations. In the early stages of the Elandskraal Fire, crews were unaware that the fire had passed their location and that the fire had run much further on different fronts.
- Access and egress along some road networks became extremely challenging during the Knysna Fires incident. In terms of orienting where the fire was, as well as navigation around areas, there were also challenges. It was even harder for firefighting resources unfamiliar with the area to navigate or find their assigned work locations, which hampered effectiveness.
- Many community members who were affected by the wildfire were caught by surprise. In the days leading up to 7 June 2017 there had been lots of communication about expected storms and flooding, but no wildfire warnings were

issued. These communities suddenly received evacuation orders on 7 June (for which they had not prepared). This added to the panic and chaos.

- The heavy fuel loads in both the Elandskraal and Kruisfontein wildfires were one of the main contributing factors leading to the ferocious intensity and rapid spread of the Knysna Fires. Homeowners and landowners remarked that there had been significant vegetation build-up in the Knysna and Plettenberg Bay areas in preceding years. This fuel build-up was observed on private, municipal, conservation and forestry land. Fuel-load management is an essential wildfire management process that all landowners need to address. On the positive side, there are some landowner accounts describing areas where recent prescribed burning had taken place, which resulted in a reduced rate of fire spread. Post fire, many areas are now in a situation with reduced or no fuels remaining but their fuel-management process will need to begin very soon, especially in areas affected by alien invader species.
- Deon van Zyl of the Rheenendal Fire Management Unit (FMU) brought up an interesting and valid point about strategic firebreaks. Van Zyl supports the concept of having a strategic system of firebreaks that can protect large areas (fire spreading into or out of a large area). Landowners should still have their own internal firebreaks to limit fire spread across their land but there should also

be a ‘bigger picture’ strategy for areas and FMUs. For example, Van Wyk suggests using Rheenendal Road in his FMU, which sits on a ridge line. It could be used as a defensive line for a fire spreading from the west to the east or vice versa. With the long-range spotting that occurred in the 7 June 2017 wildfire it may not have been a successful holding line but it may have offered a point from which a back-burning operation could have been conducted. More strategic thought should be applied to geographic areas such as this. Van Zyl had been trying to get cooperation for many years to create a strategic firebreak along this road but his attempts had “been ignored or disregarded”.

- A challenge experienced during the incident was a lack of water for fire-suppression operations. There were also reportedly power failures that affected pump stations supplying hydrants. Water shortages in the WUI were also possibly a result of excessive demand on the system reducing water pressure. Shortages in the rural areas were also experienced due to the drought conditions currently being experienced in the Western Cape. A very real concern for all metro/urban areas experiencing drought conditions is – what if hydrants run dry? What other water sources are going to be available and how long are the turnaround times (for filling firefighting vehicles) going to be to get what is available?





Above: Heavy fuel loads exist in large areas of the Eden District. The image above clearly shows, not only the heavy fuel loading that exists, but also the topography of rolling hills and the almost 'gun barrel' way they point towards Knysna, Belvidere, Brenton and Buffels Bay. This added to the aggressive and rapid fire spread when driven by the extreme wind conditions which funnelled the wildfire. The fire front originating out of the Elandskraal area burned across the landscape in the smoky hills that can be partly seen just to the left in the image. In the distance to the right of the image is an area which burned in subsequent days when the wind shifted direction.



Above left and right: The images show the large amount of pine slash (tree limbs and branches) as well as a thick bed of pine needles and undergrowth that exists in many plantations in the Eden District. These examples were captured close to the area that the Elandskraal fire followed.



Above: The images are from the Elandskraal (left) and Knysna Heads (right) areas. They are good examples illustrating how homes and lives in the Eden District are surrounded by vegetation (fuels). Homes are built in high wildfire risk areas, positioned on slopes and surrounded by dense vegetation.

- The Knysna Fires first affected a remote wilderness area, then a rural area and then a Wildland Urban Interface (WUI) area. All of these areas create a unique set of challenges requiring different types of resources, strategies and tactics. Throughout the wildfires, many firefighting resources were allocated assignments for which they were not adequately trained, skilled and equipped. A wildland firefighter with training and personal protective equipment is very different from an urban firefighter who has training and personal protective equipment for structural fires. Despite these limitations, the assigned resources did the best they could under the immensely challenging conditions. Vulcan Wildfire Management commends all the resources involved for the roles they played during this incident.





Above: The intensity of the Kruisfontein Fire and the extreme winds resulted in embers being thrown for kilometres resulting in spot fires. These spot fires were not only occurring in the plantations and Fynbos areas but also in areas of natural indigenous forest, which is commonly expected not to burn. It is for this reason it's important to note that indigenous forest did burn. This can most likely be linked to the ongoing drought combined with fire prone weather conditions which are currently being experienced in the Western Cape. The indigenous forests did not carry fire in the same way as the plantations for example. They sometimes burned intensely but mostly when combined with alien fuels or were in close proximity to alien fuels. Their rate of spread was generally slower compared to other vegetation types. They often burned for longer periods but at lower intensities. Once the wind calmed and temperatures dropped they often became smouldering fires.

RECOMMENDATIONS

- Knysna Municipality and Knysna Fire Services need to immediately address the Sedgefield Fire Station communication link with the public. If a staffed control room is not always going to be available, phone calls need to be rerouted to the Knysna Fire Department or another suitable switchboard that can deal with calls.
- Knysna and Bitou Fire Services (or other firefighting resources) in small towns or remote areas need to establish a trigger (as part of the standard operating procedures) for leadership to withdraw for direct operations, based on the size and/or complexity of the wildfire. Strategic oversight is essential for effective and efficient operations and there needs to be a more structured approach to ensure this happens, despite the limitations of low crew numbers.
- Eden District Fire Services and B Municipalities need to focus on training and development to enhance the 'size-up' and the situational awareness process as well as the tactical decision-making skills of their crews. This can be implemented through mentorship programmes, annual simulation training exercises, table-top discussions and studying industry trends. It can be very easy to fall into a routine over years, especially when conditions are stable. As conditions evolve (such as in times of drought) the 'usual way of doing things' is no longer effective and that is why ongoing training for different conditions is vital.

- The Western Cape Directorate Disaster Management and Fire & Rescue Services need to urgently determine ways in which they can assist with the training and development of leadership roles in the Eden District, particularly within the Operations Sections of wildland incidents (i.e. Operations Section Chief, Branch Director, Division Supervisor, Task Force Leaders, Strike Team Leaders, Crew Leaders, etc.).
- As a suggestion, the development and training of these roles and capabilities needs to take place throughout the province and should be prioritised on a Provincial level, particularly the Division Supervisor role. With great leadership running incidents, it is equally important to have great operational leaders in place to convert objectives and strategic plans into tactical actions. The middle-to-lower ranks of leadership in Eden District require development. They must have the ability to adapt tactics based on current fire behaviour and communicate changes to superiors. Furthermore, these leadership roles (initial responders) need to have the experience and ability to quickly identify a rapidly escalating wildfire that they are unable to contain so that additional resources and further leadership can be requested.
- The Eden District Fire Services and the B Municipal Fire Services, with oversight from The Western Cape Directorate Disaster Management and Fire & Rescue Services, need

to collectively predetermine plans for structure protection and evacuation for WUI areas. Both these resources will be working alongside each other as the wildfire transitions from the rural area into the WUI. Fire moves through the WUI extremely fast, so there is no time to develop effective initial attack plans during an incident. The predetermined initial attack plans could be standardised with slight adaptations to meet the unique aspects of different areas. Furthermore, fighting wildfires in the WUI requires specialist skills, training, equipment and leadership, and this needs to be further developed.

- The Western Cape Directorate Disaster Management and Fire & Rescue Services need to prioritise the development of an early wildfire warning system and a permanent, targeted approach to communicating these warnings to all public demographics affected by wildfires. The early wildfire warning system should be linked to an improved Fire Danger Index with a new catastrophic index (discussed in more detail in other sections of this report).
- The Eden FMUs need to create detailed and functional maps of their areas containing essential information for firefighting operations (e.g. road networks, access points, water points, firebreaks, landowner contact details, etc.). All Eden FMUs should have printed versions of these maps, which can be handed out to resources arriving in the area. All the maps from the different FMUs should be sent to the



Southern Cape FPA which can then distribute the maps to the various Fire Services or provide them to an Incident Command Post. These maps could also be considered from a broader emergency response context and could be provided to other emergency services (e.g. ambulances, police, etc.). Firefighting resources should make full use of technological navigation aids such as GPS systems and cell phones but shouldn't become overly reliant on them. Basic map work and navigation skills should be included in all emergency responder training courses. These skills require ongoing training to maintain proficiency.

- Eden District Fire Services, Southern Cape FPA and well as Eden District Disaster Management need to prioritise the development of a comprehensive policy to promote a holistic fuel-management strategy (e.g. creation of firebreaks, prescribed burning and other fuel-reduction strategies) in the District. Landowners are currently facing a number of challenges with regard to prescribed burning:

- » Landowners are being road-blocked by red tape when attempting to conduct prescribed-burning operations (as discussed in detail in the Landowners' Responsibilities section of this report) in Knysna. The system of obtaining burn permits and permission needs to be straightforward and the person or institution making the decision must have the appropriate wildfire experience, understanding and knowledge.

- » The number of suitable burning days is decreasing with climate variability and this is becoming very problematic. Solutions need to be explored.

- » The threat of liability often dissuades landowners from conducting prescribed burning. This leads to an even more dangerous state. The insurance industry needs to be engaged with to provide an affordable short-term insurance option for landowners, provided they meet the required operational and safety conditions. Perhaps the premium could be partially subsidised to promote a culture of risk reduction.

- A well-managed strategic burning policy at a District level will greatly reduce the fuel-load risk and also aid with biodiversity in these fire-driven ecosystems. When prescribed burning is done at a strategic level you can start creating fuel buffer zones between plantations and communities and between nature reserves and WUI environments. Large areas acting as buffers to fire spread are a far more effective strategy than having a 20m-wide firebreak.

- Southern Cape FPA, Eden District FMUs, Eden District Fire Services and B Municipalities need to source alternative water sources as part of strategic planning for operations, especially in WUI areas. Examples of preparing alternative water sources include:

- » Strategically engaging with homeowners for their assistance. Homeowners could

fit the correct hose attachments so Fire Services can quickly access and use the water from their water storage tanks. Or perhaps the homeowner has a pump and hose that they could use to resupply a firefighting vehicle from their swimming pool.

- » Setting up rainwater storage tanks at key infrastructure points (e.g. cellular masts and communication towers).

- » Eden District B Municipalities should investigate power supply back-up options for water pump stations serving critical areas and hydrants.

- The Kruisfontein and Elandskraal wildfires presented safety risks and operational challenges for all firefighting personnel. There is a plethora of information that can be sourced from resources. However, such resources need to be interviewed very shortly after their assignments. The important details are often forgotten very quickly. It is recommended that the Western Cape Directorate Disaster Management and Fire & Rescue Services set up a process whereby a more detailed and focused study is initiated, looking into operational success stories as well as challenges experienced on large and challenging wildfire incidents. This future analysis should begin during and immediately after an incident – so this needs to be pre-planned. The study would aim to provide intelligence for a resource-development strategy that can be used within Eden District or possibly across the Province.





Above: The image shows a severely scorched section of the Harkerville Forest Plantation, that the Kruisfontein Fire originating to the East of Knysna burned through. This section is close to the area where volunteer firefighters Bradley Richards and Ian Barnard were over run by fire and subsequently Shaun De La Almieda and Riel Voss loaded them into their vehicle to escape the flaming front.





Incident Management

Introduction

If there was ever a case to be made for why the Incident Command System (ICS) is required to manage an incident, it would be the Knysna Fires incident.

ICS is an internationally recognised (and nationally adopted) standardised on-scene incident management system designed to enable effective and efficient incident management by integrating a combination of facilities, equipment, personnel, organisations, procedures, and communications operating within a common organisational structure.

ICS has three primary purposes.

- To provide for the overall safety of responding personnel and members of the public at an incident or planned event.
- To provide for a clear management structure and hierarchy that is scalable.
- To ensure that the achievement of objectives is carried out efficiently and effectively.



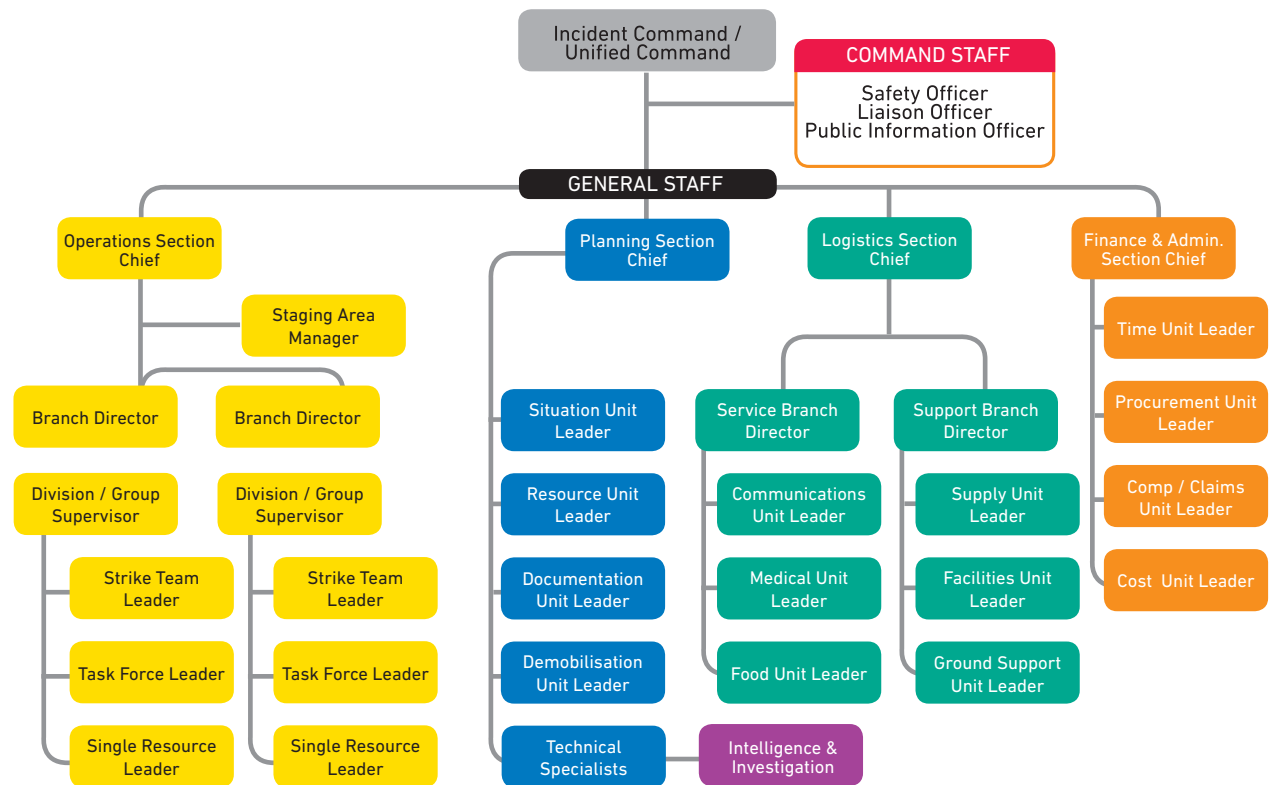
The system has considerable flexibility. ICS has now been successfully tested over more than 30 years of application, in emergency and non-emergency situations ranging from small to large incidents, by all levels of government internationally as well as the private sector.

Benefits of the Incident Command System:

- Standardised management tool for use on any type of incident or event, be it big or small.
- Allows for a coordinated response by various agencies across different jurisdictions.
- Establishes common processes for planning and managing resources.
- Enables the achievement of objectives through efficient management and integration of resources.
- Resources are integrated into a common management structure.

The need for a single management system that could be applied to any incident, regardless of type, has seen ICS (which was initially created for managing the response to wildfires in the United States of America) evolve into an all-hazard solution for managing any type of incident or event (e.g. car crash, large-scale flood, wedding, World Cup tournament, etc.).

ICS was implemented during the Knysna Fires incident and, once implemented, it brought stability to one of the largest and most destructive wildfires in South Africa's recent times. The application of ICS during this incident can be assessed to determine how well ICS is being adopted and to determine where there is room for improvement.



Above: The Incident Command System organisational structure.



INDUSTRY VIEWS

Summary of main points covered in a meeting on 18 October 2017 with members of the Knysna Fires Incident Management Team including:

Reinard Geldenhuys

Overberg District Fire Services

Bertus Senekal

West Coast District Fire Services

Dale Nortje

Cape Winelands Fire Protection Association

Ian Ross

Cape Winelands District Fire Services

Wendy Tawse

CapeNature

Deon Rossouw

CapeNature

Patrick Shone

CapeNature

Louise Afonso

CapeNature

Feedback

- In the early stages of the unfolding incident, the Incident Command System (ICS) was not implemented properly. It took a while before organisational structure was brought to the incident.*
- Mutual Aid Agreements are already established between some Districts, but this should become the standard across all Districts. Where there are no existing mutual aid agreements, it can be attributed to past friction stemming from relationships or different operational approaches.*

- Using people outside of the Fire Services that have the skills to fill positions in the Incident Management Teams (IMTs) is part of the evolution of ICS that needs to take place. It is noted that ICS is starting to reach a level of maturity in the Western Cape. However we need to start developing further available human resources that can fill required ICS positions.*

- Certain Districts have databases containing details of trained and qualified Incident Management Team members. However, these are not centralised in a Provincial database.*

- The transition from initial response into extended response and understanding when this is going to happen is something we are getting better at but can still be improved upon. This often comes down to experience and leadership in decision-making.*

- Multi-agency co-ordination and co-operation is still a challenge.*

- Management of logistics during the incident was a challenge.*

- WhatsApp groups for communications worked well and allowed for a written record of events during the incident to be created.*

- There was a massive flow of information (including false information) from the public, which created undue panic and was at times challenging to manage. In response to these, resources were often deployed on low priority*

- and/or unnecessary assignments, which resulted in limiting the use of resources in other areas of higher priority.*

- The question as to whether the local Chief Fire Officer should have been the Incident Commander (IC) of the incident was raised. The members of the IMT felt that in terms of the responsibility for the area and the mandate it was considered correct that the Chief Fire Officer of Knysna should have been the Incident Commander.*

- It was noted that the act of food being given to community members evacuated from informal settlement areas resulted in subsequent reports of unaffected community members igniting fires so they could also gain access to the food and resources being collected and distributed.*

- Looting during the incident resulted in some residents refusing to leave their homes during evacuations in order to safe guard their property and possessions.*

Lessons Learned

- Knysna Municipality waited too long before asking for assistance and ordering mutual aid assistance and resources. It's important to identify triggers points for when a call for further assistance is required. It is also important to convey exactly what types of resources are required, rather than a generalised call for help.*



- *There is a tendency to under-staff the positions that can be filled within ICS. This was highlighted during the Knysna Fires incident when even during the peak of the incident, there were positions that could have been staffed allowing for more Span of Control with those units playing a supporting role to their Sections.*
- *Provincial funding and support is needed for the development of Incident Management Teams.*
- *ICS worked well because the team that arrived to assist with the incident management worked well. This Incident Management Team has experience, know each other well and work together regularly, which is a very important factor.*
- *It was initially difficult to establish ICS when this IMT took over command from the local initial response team. There was no documentation or ICS structure in place and when this IMT team arrived, the first team withdrew completely. Essentially this happened too quickly without a proper hand-over or transition between management teams. A proper hand over is crucial during an incident, especially one of this nature. A record of the actions of the initial response is required to be well documented but was not done for the Knysna Fires. This record is vital for accountability, the establishment of ICS, and the transfer of command to a new IMT and has to be carried out.*
- *Just attending ICS training courses is not sufficient and there has to be regular or annual*

interagency simulation training as well as experience gained through the shadowing of experienced people in the roles.

- *The appointment of deputies is important to improve hand-overs and sharing of the responsibilities. This doesn't just apply to the position of IC but also to the other ICS roles. People need to be identified and approached who can fill these roles and assistance offered in them gaining more experience within these roles.*
- *Staffing the role of Division Supervisor is currently proving a major challenge during wildfire incidents (including the Knysna Fires) as it requires a person with strong leadership, a good understanding of ICS, operational experience and the ability to lead teams from multiple agencies. The current system of operations and placement of the correct people into these 'middle management' roles is not adequate.*
- *Divisions on the Knysna incident (which are defined geographical areas of an incident) were sometimes too large for one Division Supervisor to cover. This is possibly the result of not having enough Division Supervisors available to fill the adequate number of Divisions.*
- *We need to go back to basics and build up. It all comes back to training and systems. The required skills are often missing. Going forward we need to combine Tactical Training with ICS training.*

- *Increased training in how to apply ICS during initial response is required.*
- *Interagency communications were problematic and require addressing for future incidents. Perhaps regional and central caches of communication equipment could be created.*
- *Access control of the Incident Command Post (ICP) must be improved as it was often found that there were strangers and non-official personnel in the ICP.*
- *Internet (wifi) and Information Technology (IT) support were essential.*
- *There needs to be better control over donations in order to match donations to incident requirements as well as have official control over donations to ensure they are used for their intended purpose.*
- *Incident Management Teams need to be assigned to an incident for sufficient time, over a number of operational periods, to ensure consistency.*
- *A full Incident Management Team is not required during night-time operations once the incident has been stabilised. Only key roles/positions in the Operations Section as well as deputies/support staff are required, especially once the incident has stabilised.*
- *More attention and the correct processes that exist within ICS need to be applied to the transfer of command and hand-overs.*



Summary of main points covered in a meeting on 9 November 2017 with Chief Fire Officer Clinton Manuel of the Knysna Municipality Fire and Rescue Services.

Once resources started arriving and the Incident Management Team was formed, the operations started becoming more organised. Manuel established command as the Incident Commander. With the Kruisfontein Fire still ongoing, spreading into Plettenberg Bay in the early hours of the 08th June, it was discussed amongst the Incident Management Team that both fires would fall under a single unified command structure. The Bitou area would then be a Branch and would fall under the Chief Fire Officer of Bitou Fire Services.

On the 08th June, and despite very strong winds still coming from the north, Nico Heyns agreed to do a reconnaissance flight between 10:00 and 11:00 with a Huey helicopter. Acquiring that aerial perspective on the fire assisted with putting the incident action plan together. However, using aerial resources to conduct water bombing at this stage was still not viable due to the extreme wind conditions.

Manuel said that the objective for the first two weeks was to “stop this fire”, “stop the spread of this fire”. Due to the size of the fire, even with all the supporting resources that arrived to assist, it was still a massive undertaking.

With hindsight, Manuel felt as though he was placed in a “very unfair situation”. The incident occurred at an unprecedented scale and he was required to command the resources across two Municipalities. This level of decision-making is something you have never been trained for and would struggle to prepare for.

Summary of main points covered in a meeting on 13 November 2017 with Managing Director Paul Gerber and Eastern Region Manager Dirk Smit of the Southern Cape Fire Protection Association.

Gerber recommends that it is important as well as beneficial to have more local people in the roles of Operations Section Chief in the Incident Management Team (IMT) as advice from local experts was offered to the IMT that took over operations during the Knysna Fire, which was not taken or followed. Gerber felt that a local expert would be in a better position to understand the complex dynamics that could occur. Including locals in the Planning team and the Division Supervisor roles would also be beneficial. Gerber provided an example where local knowledge determined that a back burn operation would be the best way to deal with an area of the fire, which was not approved by the IMT. He feels that approving this tactic would have resulted in a more effective operation.

Summary of main points covered in a meeting on 3 November 2017 with Chief Fire Officer Hedley Venter of the Bitou Municipality Fire and Rescue Services.

During the Knysna Fires, Bitou Fire Services felt that they weren't allocated sufficient resources from those available, especially once the N2 had re-opened and extra resources (including aerial) were arriving from other areas of the country. During the June 2017 wildfires, the Plettenberg Bay area was divided into two Divisions with Bitou Fire Services having to make do with one tanker, two skid units and one Buffel to cover these Divisions until two days after the initial ignitions, 9th June, when one tanker and one bakkie were sent to assist them from Eden District Fire Service. However during this time there were also three more fires occurring in the Wittedrift, The Craggs and Kransbos areas requiring the Eden resources to be reallocated to assist with those fires.

Summary of main points covered in a meeting on 25 October 2017 with Operation and Planning Manager Peter Wynne of the Volunteer Wildfire Services.

Upon arriving at the Incident Command Post (ICP), a new Incident Management Team was just starting to take over and it didn't seem particularly clear where the Divisions of the incident were allocated. The VWS team was going to be sent to Division Juliet, which was in the Simola area. They received their assignment from a partner agency representative

(who works closely with the VWS in Stellenbosch) who was in the role of the Planning Section Chief for the incident. The briefing of an assignment during an incident should have come from the Operations Section Chief. The briefing the Leader of the VWS team received was not particularly clear and they were told that they would receive more tactical details and instructions from the Division Supervisor. There was no communication plan (which is required during an incident) and their only means of communication were phone numbers for ICP. On arrival to their Division, Wynne tried calling their assigned Division Supervisor but the person was not there - there had been an apparent mix up with Divisions. The Division Supervisor they had been assigned to was actually working in a separate Division in the Brenton Area.

The VWS worked active lines in this area with fire in thick bush, which was difficult to deal with. Wynne was later asked to fulfill the role of Division Supervisor. During this time, a District fire crew arrived to work in this division but they were never assigned as a resource to Wynne. At one stage Wynne wanted to conduct a back burn operation. He was forced to break the chain of communication that follows the chain of command on an incident and contacted the Planning Section Chief as he was unclear who the Operations Section Chief was. That night, the Working on Fire crews assigned to the division never arrived. Wynne also requested additional resources but was informed there were no additional resources available.

While there was a plan to hand over command of the division that night for Wynne to rest so that he could take command again in the morning (for the whole of the next day) no formal handover process took place. Wynne therefore handed over command to the Eden Fire Service resource that was there and stood himself down (after informing the Planning Section Chief) based on the previously formulated plan. Wynne then received a frantic phone call from the ICP at approximately 01:00 asking for updates.

Wynne is of the impression that there were not enough Division Supervisors allocated to the incident. The naming of divisions did not follow ICS conventional practice and as a field-operative, he felt as though there was a disconnect or broken link with the Operations Section at the ICP.

The following day Wynne went for a morning briefing at ICP. He was scheduled to take on the Division Supervisor role again and informed there had been a few changes in the resources assigned to the Division from the previous day. The morning briefing was given by the Operations Section Chief. Wynne commented that the briefing is “not time for a catch up”. It is a time to focus on what’s happening for the day. The briefing area was informal. There were a lot of people in this space and there was too much discussion rather than a defined “these are the objectives, strategies etc for today”.

It was clear that the Operational Period would be 24 hours with 2 x 12 hour shifts for the crews within that. However it wasn’t clear when the Division Supervisors would stand down. The IMT told Wynne that they “would try find a replacement”. Wynne was issued with a radio so could speak to the Operations Section Chief and received contact details for the MTO crews working in his area (although he struggled to reach Marshall Borchards from MTO Forestry).

Wynne also had the “Skynet” team of volunteers under his command with Derrick Stopforth as his contact. The “Skynet” team arrived in various types of Personal Protective Equipment (PPE) and didn’t have any hand tools. It appeared as though the “Skynet” team were there for fun and weren’t actually prepared to work. They quickly tired and they had no food and water to sustain themselves. They were deemed as more of a liability than anything else and Wynne would rather not have had them in his division.

Just before 15:00, Wynne received a call from the Planning Section Chief regarding a reported accident in Division Delta, which was his Division. Wynne was asked investigate whereupon he found crews gathered at a point and tragically discovered that there had been a firefighter fatality. (Editor Note: 63 year old John Blaauw was overrun by fire in a Concordia Plantation near Knysna. He was the driver for the M&H Alien Plant Control Crew contracted by MTO).



Wynne then called for an operational pause in the Division. Wynne went back to the ICP within an hour of the incident happening and recalls being taken aback that the atmosphere in ICP was “almost jovial”. Someone made the joke, “I guess we have only met 3 out of 4 objectives today”, which he felt was completely inappropriate. Wynne then debriefed the Incident Management Team on what had reportedly happened, based on his discussions with the crews that were there.

After that there were evacuation orders for White Castle, Flenters and Rhobololo. Wynne was then asked to evacuate the Xolweni area which had been under evacuation orders previously but needed to be evacuated again.

At the end of Wynne’s shift, the IMT had not yet found a replacement for him, therefore he was asked to continue as Division Supervisor until 09:00 the next morning. Reinard Geldenhuys subsequently took over Incident Command from the previous IC that evening, however Wynne was not informed of this change.

Wynne went back to ICP at 07:00 to update the IMT on the night’s operations. The Operational Period Briefing was still not being conducted effectively as crews were not taking it seriously. Wynne suggests that the briefing venue wasn’t appropriate and there should have been better access control into this area.

Wynne made the following recommendations:

- The Incident Management Team could have done with more people. It was understaffed.
- Simple signs showing various Section “offices” would have great.
- It wasn’t clear who was in charge of what.
- There could have been a more effective Public Information Officer (PIO) who provides more accurate information more regularly. However, there was an improvement as the incident progressed.
- “Disaster tourists” were an issue. “This is a fireline and is not a place for the public”. Better access and crowd control is required.
- After the fatality incident Wynne was shaken up. He would have liked the opportunity to step down (be replaced) but there was no one else available to replace him.
- A fatality is a tragedy and must be taken more seriously.
- It is required within ICS that a formal debrief takes place after every incident, especially one of this nature and scale. Wynne is not aware of whether a formal debrief took place.

Summary of main points covered in a meeting on 2 November 2017 with Crew Leader Thamsamqa Baleni of Working on Fire.

Baleni feels that often they were not given enough food as they were a local crew (from George) whereas the crews from out of town and who were staying in town (including other emergency services) were given food parcels per person. They were also transported back and forth to George instead of staying at the Base Camp, which would have made things better for them in terms of time to rest, recover and have food.

Summary of main points covered in a meeting on 7 November 2017 with Environmental Planning Manager Pam Booth, Planning and Development Director Marlene Boyce and Town Planning and Building Control Manager Hennie Smit of the Knysna Municipality.

There is a concern that any future Disaster Management Plan that is created at the District level will be a highly technical instrument that is speaking way above the heads of those who would need to implement it. There should be simple and practical Standard Operating Procedures in place for the management of disasters. The municipal work force should be able to assist in different roles during a disaster as they would not be able to perform their normal functions anyway.



In a meeting held on 08 November 2017 with Gerhard Otto, Eden District. Manager: Disaster Management, Community Services and Richard Meyer, Knysna Municipality, the following is a summary of the main points of this discussion.

The various municipalities need to provide more ICS training to their staff (IT, Finance, Admin, etc.) so that the internal understanding and implementation of ICS by staff can be strengthened.

Summary of main points covered in a meeting on 26 October 2017 with Deputy Director (responsible for Fire and Rescue oversight) Etienne du Toit of the Western Cape Government.

The pure size and magnitude of the incident was very overwhelming and challenging - especially at the rate the incident grew. The incident became difficult to manage as priorities and objectives were not established early on. The other important point to remember is that this incident was coupled with another major incident - the storm that hit the Western Cape on the same day. Disaster Management Centre in Cape Town was activated due to the storm forecast so the already manned centre was able to assist with the Knysna Fires incident as it unfolded. Gerhard Otto also activated the Disaster Management Centre in George for the storm, which also helped with the Knysna Fire.

Considering the major storm, the fact that there were other active fires burning, the drought conditions, the weather leading up to the fire with Berg winds... and coming back to why things were so overwhelming, it easy to understand why as it was the 'perfect storm' that struck.

Knysna Fire and Rescue Service were completely overwhelmed by the fire and called for assistance late morning/early afternoon on the 7th June 2017. The regional Disaster Management Centre in George was formally activated. The Provincial response plan was formally activated later in the afternoon at the request of Gerhard Otto and the Knysna Chief Fire Officer. As the afternoon went on, fire conditions continued to grow out of hand.

It was very difficult to anticipate that events would unfold the way they did. This made incident planning and management complicated. Given the size and resource capabilities of the Knysna Fire Service, it was simply unrealistic to expect them to control a fire of that magnitude, under those conditions. The lesson learned is that Command of even a small Fire Service, with a staff complement of approximately 30 can expand to over 1000 firefighters with specialised resources like aircraft using the Incident Command System (ICS). This shows the power and strength of ICS, which gives structure and importantly sets incident objectives from which to work from.

The ICS structure started relatively small but eventually expanded to become huge with 2 branches, including 1 air branch and 11 Divisions. When it came to ICS training in the past there was sometimes the argument that "my service is too small to support ICS", "we will never be able to implement an organisation of that extent" and this incident is proof that it can happen. Du Toit says it was great to see the support from other Chief Fire Officers as well as organisations such as CapeNature who had just come out of the Western Cape fire season and had great team cohesion.

It was important that the outside assistance brought a lot of supporting equipment and materials with them to support their roles as the infrastructure of the Knysna area was problematic. The electricity was sporadic with continuous electrical failures; landline and cell phone communication was compromised as a result of radio repeaters stations lost. Communication was a nightmare. It was fortunate that the Municipal building was reasonably self-sufficient with office support equipment so that was chosen as the Incident Command Post and it was well situated with other key role-players and stakeholders located nearby.

It took a number of hours from when Incident Command was established until the first Incident Action plan was developed. At this stage, Du Toit recalled that there was visibly quite a high level of incident-related trauma and stress. Many of the command staff and first responders had just come



from an operational, rescue and firefighting role, so it was very positive to have some outside command staff and general staff members become involved in the Incident Management Team at this stage.

This was not a text book operation; criticism of certain aspects is certainly valid but on the whole, given the circumstances, ICS catered for the needs of the incident and it was a good example of how it can be used effectively.

Although there was a perception of Incident Command from the start of the fire, there was never a formal incident command post established at this stage. If a unified incident command post was established during the early stage, incorporating the Municipal & District Fire Services and SCFPA, it would have immediately given structure to the incident. The early incident command was more of a “roaming incident command” which was not advisable due to the continued escalation and magnitude of the incident. Had the IMT been established earlier, the realisation that further assistance was required would have happened sooner, resulting in the speedier mobilisation of extra resources from around the Province. A complicating factor in delaying the mobilising of other assistance from other Districts was the storm impacting the Western Cape, which itself required resources to be available and on standby within these Districts.

Du Toit says he has not been involved in any structured or formal debrief of the incident and as far as he is aware this never occurred. He says it needs to happen at both a strategic and an operational level. The question of why a formal debrief has never taken place is an important question? Perhaps the scale of the incident and the post incident fatigue played a role in the debrief not happening. Ultimately Du Toit would have liked to see the Eden District as leading the formal debrief but then including all the role-players involved.

ICS is progressing well but further development of the system and capabilities is required. There is an identified gap in the Division/Group Supervisor level and this is definitely an area requiring development. This is crucial for the implantation of the strategy and tactics.

Summary of main points covered in a meeting on 3 November 2017 with Acting Communications Manager Fran Kirsten of the Knysna Municipality.

Kirsten sat in the Joint Operations Centre (JOC), which also incorporated the Police and Emergency Services, while Fire Operations existed at the “Command Centre”. Kirsten reports that there was a good link of communication between the two with communication representatives in both centres feeding messages to her team of 3-4 people working constantly on communications on social media.

It was reported that all organisations had a representative at the JOC and minutes of meetings were kept and distributed to all after the meeting. The communication team would then put out a press release after that, sending it via their channels as well as releasing this to media. The Communication Team tried to have two media briefings a day but wasn't always possible because the media representatives were often in the field and as a result it was very seldom that they had all the media there.

Kirsten had no previous knowledge of the Incident Command System. Kirsten attributes her success of being able to manage the communication challenge as a result of her experience as a journalist, her media connections as well as having a very capable team.

One great positive that needs to be stressed is that “the fires burnt down all the organisational silos”. Suddenly there were no silos departments and services started working together.

Kirsten had a Skype call with a PR crises manager dealing with Wildfires in New Zealand. He confirmed they were pretty much doing everything that they could be. His only comment was that Kirsten should become stricter with the media as she was giving them too much of her time and not getting enough rest. She was giving her first briefings at 4am and working extremely long hours. The communication team worked a 72-hour shift from the start (early hours of morning 7th June 2017).

Kirsten reports that the Chief Fire Officer was fantastic. Kirsten and him were in good Whatsapp contact all the time as there was not always time to meet and talk. It helped that the Chief Fire Officer gave two sound bites to Kirsten each day, which she could then pass out to the media.

The communication team worked very long shifts, with no relief to hand over duties to. To learn from this there needs to be shifts. The team after a period of time 'collapsed' and all got ill after the incident. Because they have a very small communications department, they would need to bring in external people in order to set up team, which could go on rotation.

When it comes to crisis management it is very important to have the right people in the Command Centres. This was a problem during incident with more and more people arriving and wanting information and access. Eventually they had to put security downstairs, which could vet people coming in.

Summary of main points covered in a meeting on 3 November 2017 with Information Technology Manager Graeme Huddy of the Knysna Municipality.

Huddy's early role in the incident meant that he was included in the Joint Operations Centre (JOC) with a slot to discuss IT issues (e.g. planned power or communication outages etc.). This was very useful

and should definitely be replicated in other incidents. He was also able to assist the communications team.

Summary of main points covered in a meeting on 4 December 2017 with National General Manager Shane Christian and National Spokesperson Linton Rensburg of Working on Fire.

The only major operational and ICS challenge Christian experienced was with the Division Supervisors receiving the teams. They were never at the waiting points and they would disappear at night. We started wasting resources because of the communication breakdown with Division Supervisors. Christian personally believes that divisions should have been further broken down into smaller chunks for better span of control over fewer resources. The problem wasn't Division Supervisors from one particular agency; it seemed to be a problem with Division Supervisors across the board. He highlighted the long Division from Simola to the Plantation as too big an area.

Summary of main points covered in a meeting on 18 October 2017 with Regional Fire Commander Ian Ross of the Cape Winelands District Fire Services.

Ross was called out on Friday 09th June to relieve Johan Botha, also of Cape Winelands and his crew who went up on Thursday. Ross had a crew of five and was later released from the Incident on Sunday 11th June by another Wineland's crew.

On arrival Ross went straight to Incident Command and was assigned to a Division with Ross as the Division Supervisor. He was assigned resources, which included Working on Fire and other resources. He would be working in the Pezula Estate area. Immediately there was a problem with communication, with the result that Ross was not able to locate or speak to the other resources. Ross reported back to Incident Command that he couldn't find the teams he had been assigned and he has no communication with them but this matter did not get resolved. Ross was given a radio, which allowed him to communicate with the Operations Section Chief (and communication also took place via cell phones) but he did not have a line of communication with crews. Ross says he could have been more efficient had he had more teams working alongside them for the shift. They however worked the active lines and were dealing with containing fire spread operations. Fortunately, not having any structures to deal with at that stage.

The shift he and his crew worked was 25 hours shift. This shift commenced immediately after they arrived (after of travelling from Cape Winelands to Knysna). This shift time is very long with no relief.



Lessons learned from Ross:

- *In hindsight Ross says the call for assistance should have been “Wednesday not Thursday”, “even if they arrived and saved two houses that would have made major difference”. Based on how the incident was predicted to unfold, resources should be called in as early as possible.*
- *On stand down, the team went to rest. On Sunday morning, they were on standby to be called again. The team was never debriefed and Ross was not part of any other formal debrief. Ross stresses that demobilisation is such an important part of an incident. Debriefs as well as resting crews before they go home is so important.*
- *Communications need to be addressed.*

Summary of main points covered in a meeting on 6 November 2017 with resident John Noble of Knysna.

Noble was concerned about the number of cars allowed to build up on the White Bridge during the incident. He had arrived there sometime between 11:00-12:00 and had tried to get through to travel on the N2 but was stopped by police. Noble left the bridge and went to the Knysna Fire Station to ask them to rather block the road at the edge of town instead of allowing cars to keep building up on the bridge. He found Niels, an old semi-retired man as the only person left at Knysna Fire Station who was manning the phones. The number of calls was already overwhelming Niels.

At this point ‘volunteers’ started arriving in droves to offer assistance, so Noble decided to stay and help Niels. He found many of the rooms in the station locked when they started searching for items such as white boards etc. as a way of recording the volunteers arriving and creating a system to manage them all. He said he was shocked at the lack of procedures and protocols within the fire station.

Noble felt the Knysna Municipality was not capable of handling this crisis and they should have had incident management training or a plan in place to call on members of the public who have experience in incident management, as Knysna is made up of many people with a range of high-level skill sets and experience.

Noble felt that it was problematic when the Incident Command Post or Joint Operations Centre ‘JOC’ was moved to the Municipal building from the Fire Station. This move took place due to the loss of communications at the Fire Station. At around 17:00 on the 7th June, Noble went across to the Municipal Building and met the Municipal Manager and Clinton Manuel, who had just arrived there from the field. Noble suggested taking personal control of the Fire Station himself, as no one else was. Manuel agreed and gave John his permission to do so. Noble placed a volunteer with Niels in order to help with the receiving of phone calls, taking notes and to properly track (check in) the volunteers. Volunteers arriving were sent out in bakkies to see what was occurring and report this info directly back to Noble, rather

than being sent to firelines. Eventually around 100 volunteers were assisting in various roles from the Fire Station. On the second day of the incident the volunteers had set up a computer system and tried to train the firefighters in how to use this system to log phone calls, track volunteers and resources, but the firefighters were not keen to try it. By continuing with their analogue method of logging calls, information was slow to reach, and in some cases, did not get to the Incident Command.

There was a lot of tension created when officials of Knysna Municipality arrived and started taking the food that was being donated by the public for the firefighters and the volunteers. At this point Noble closed the Fire Station to all but the firefighters and volunteers, who remained in control of the station for 5 days. This situation has resulted in a large feeling of discontent and mistrust of the Municipality.

Summary of main points covered in a meeting on 9 November 2017 with Sedgefield Station Commander Wayne Sternsdorf of the Knysna Municipality Fire and Rescue Services.

On Saturday 10th June, Sternsdorf was brought into Knysna to act as Division Supervisor in Knysna town area and a SANParks member was made Division Supervisor in his previous division. Reportedly the SANParks member did not stay in Division Juliet where he was supposed to be and moved to the Goukamma area. During this time, more homes were lost in the Brenton area. Sternsdorf feels that having

a Division Supervisor who doesn't understand interface or structural fire was an issue here. He cites an example where resources ran away from a house garage which was starting to catch alight thinking the car inside would explode which delayed and hindered the spread of the fire in this urban area and compromised other homes. Had there been a more experienced supervisor who was present and understood this type of fire, the outcome may have been different.

Once the main incident had quietened down Sternsdorf acted as Operation Section Chief for 3 days and then took over as Incident Commander for 7 days when Manuel was called away to various engagements to meet with politicians. During this period, he was supported by Jo Schoemann (Overstrand), Anne (Mossel Bay) and Deon van Wyk (Eden District) who took on the role of Operations Section Chief at different times. Sternsdorf felt that with regards to ICS, the Incident Management Teams' could have worked better together. Information being relayed to the Operation Section Chief was not being listened to and there were real problems with communication between resources due to all being on different frequencies and radio types. At times the only means of communication was cell phones and there was a problem of fire brigade resources not answering their phones. (The reason for this is unknown.).

The volunteers and Working on Fire were great at following Chain of Command, the Incident Objectives

and the tasks as directed by the Division Supervisors, whereas the various Brigade members weren't as good and tended to go off doing their own thing despite Chain of Command.

There was full co-operation between MTO, PG Bison and Incident Command and resources were shared and moved as needed. It was felt that Operations Briefings were not carried out correctly - often the Division Supervisors were not present and very few proper hand-overs took place. He feels this is because of the lack of ICS training in the Southern Cape. During the initial stages of the incident it was also felt that there was too much focus on the fire front and no one was watching behind them over the town for the spot fires that caused so much damage.

A final thought was that a cache of equipment that can support Wildland Urban Interface operations would be very useful. An example would be portable (lightweight) and/or floating pumps that can be used to draw water from pools to deal with spot fires and flare ups as well as refill tankers and skids. These could then easily be redeployed quickly when needed. Thinking out of the box as far as supplying water to vehicles is important moving forward, especially with regards turnaround times when vehicles go to refill.

Summary of main points covered in a meeting on 4 December 2017 with National General Manager Shane Christian and National Spokesperson Linton Rensburg of Working on Fire.

All the resources coming in to base camp became a Working on Fire challenge. WoF normally sets up their own camps but WoF became responsible for supporting all resources coming in and it just got too big. There were no administrative functions and support. Head counts, people checking in and out, enforcement of camp rules such as lights-out times etc. was not done. WoF just wants to set up their own base camp for their own resources because it is just easier.

Christian says there is a need to develop and write up Base Camp SOPs at a Provincial level. Do's and Don'ts etc. The whole logistics team should sit at base camp and you should have one representative that sits at the ICP.

Similarly, we need processes and SOPs to manage food donations. Donations work fine with dry rations but problem comes in with wet rations. You need someone to cook these as they perish. Perhaps donations could go to a PnP fund and then the Logistics Section can order what they need as the fund allows. People also wanted to make financial donations to the firefighting effort but no role-players wanted to take responsibility for receiving the funds.

It's about teamwork and understanding each other. Every agency adds value.

Better forward planning around major incidents is required. Considering indigenous knowledge is important and more discussion is needed before diving into execution of tactics. It will even improve working relationships.



Summary of main points covered in a meeting on 29 November 2017 with Managing Director Michelle Kleinhans of Dynamic Incident Management (Pty) Ltd.

The following is open constructive advice and analysis of what Kleinhans experienced during the Knysna incident. It's not meant as criticism of people who were placed in very stressful and difficult situations but rather, it is an honest account of areas to improve and learn. The hope is that it will be taken in the constructive manner as it is intended.

Kleinhans's Feedback

- The Incident Management Teams were not using the provincially produced ICS Toolkit and were still using personalised and organisation-specific Excel versions of forms. In the interest of evolving ICS within South Africa it would have been great to see the latest documentation being used.
- There was no use of T-Cards until Kleinhans arrived.
- All Incident Action Plan information needs to be on the same forms as opposed to different types or styles of forms, which were being used. Some forms were also not being completed correctly.
- There needs to be more detailed Incident Management Team transitions and hand-overs. Transfer of command was less than optimal.
- Within Incident Management Teams there was sometimes a blend of ICS roles so it was not

always clear as to who was in charge or who was working on what. It would be better to have clearer delegation and correct use of ICS roles.

- Base Camps could have been better used for all crews. Resources sourced in George for example would drive back to George after being stood down rather than going to the Base Camp where they could have immediately gone into rest and not travelled after shifts.
- Communications were an issue especially with regards to radios available or organised for communications between the Incident Management Teams and vital operational elements such as Division Supervisors (as well as Division Supervisors being able to speak to one another). WhatsApp groups were created and used instead, which Kleinhans feels is fine, but it not be the only way of communicating. Problems of signal connectivity on cell phones meant that requests sent via the WhatsApp groups could sometimes be severely delayed in getting responses.
- Staging Areas were only used by WoF, where other resources should have been placed into proper staging areas as well. Staging Areas and the Base Camp were also the same place, which is not a great idea.
- The setup of ICP was not conducive to good and effective processes. The various Sections (e.g. Operations, Planning, Logistics, etc.) were all in the same room meaning that when operational

plans were being discussed, everyone became involved.

- The rotation of Incident Commander was problematic and resulted in confusion at times, as each new Incident Commander would change the previous plans that had been determined.
- The Planning "P" process wasn't being followed correctly. An example is during the Operational Briefings, Division Supervisors would provide feedback upon which plans were then formed during the briefing. It would have been optimal for these feedback discussions and tactics to be incorporated into the Incident Action Plan prior to the briefing. The briefing is not the time where tactical plans are still being made.
- There was no Incident Action Plan or printed map given out to resources when briefing them.
- In one IAP the whole page for a Division assignment was empty. It's important that processes are followed and that there is someone checking the documentation and keeping ICS processes in check.
- The initial Incident Management Team created by Manuel did not draw on qualified or experienced ICS people which meant that transition into a complex and extended campaign incident was made a lot harder.
- Unit Leader positions are being ignored and are desperately needed to support Section Chiefs.



- *Trained Incident Management Teams need to be formed and become accustomed to working together nationally. As an example, from the Knysna incident, people tended to use people they knew in ICS positions as opposed to appointing people who are more qualified or better suited to certain roles. If teams were pre-determined this would eliminate this bias.*
- *Roles and positions need to be thoroughly understood and simulation training for Incident Management Teams is essential. The creation of complete Incident Action Plans as well as completion of the whole planning process, planning “P” should be part of this. The correct terminology and typing needs to be used as well.*
- *Trained, qualified, signed-off nationally recognised IMTs are needed. You should not have a Section Chief who does not know what their role is and it highlights the need for different levels of training. You cannot just do a single training course and then implement the system the way you feel like doing it. It must be done correctly so that all organisations are on the same page.*
- *While ICS is growing and developing in South Africa, ICS mentors or professionals who can assist with keeping the system in check are required.*
- *The system of Task Books needs to be developed for a South African context, so they are practical. It importantly needs to be decided who signs them off on an incident.*

- *There should be an annual ‘international standard’ for showing qualifications and ensuring proficiency. This needs to be an interagency standard as opposed to a single organisation card system.*
- *There is a lack of understanding about the accountability within ICS. There is sometimes a blurred chain of command between different operational resources when instructions for crew tactics are changed without following ICS delegated positions (i.e. a Division Supervisor not being aware a crew under their command has changed their tactics due to a ranking official from the crews own organisation arriving on scene and changing tactics without running this past the Division Supervisor. Further to this the crew also then does not informing the Division Supervisor that they are changing tactics). Situations like this should not be happening in terms of the ICS Chain of Command and delegation of responsibility.*
- *There was not a lot of public information going out. There was no Public Information Officer on the Incident Management Team in place. All forms of communication available these days should be used to feed the correct information to the public.*
- *During the incident, a senior official decided to organise 4 Oryx helicopters, which formed part of the flyover for the Minister. This was ridiculous considering the incident was still ongoing, and*

this then created an incident within an incident.

- *The Incident Command Post was not secured in the way that anyone could come into this area resulting in a number of people being in there with no official role.*
- *It’s important that ICS leadership, especially Incident Commanders, are trained and understand how ICS works. Reflecting on the Knysna incident, some positions were filled by designated officials but were they all experienced and trained in ICS to understand and manage the system effectively?*
- *There needs to be oversight and control over who is training ICS. Course facilitators must be qualified in ICS roles to be able to train.*
- *It would be beneficial to introduce a ‘membership’ system for South African Incident Command System (SAICS) trained members so that one can keep track of those qualified and have a database of qualified people that can be called on, or possibly register the SAICS as a NGO to access funding and keep all ICS work in one stream.*
- *Was there a full debrief for all members of the IMT involved in the Knysna fires? Why not? It would be valuable to capture ‘Lessons Learned’ in a report and sent out to all those who were involved as well as other incident managers who wish to learn from this incident.*



DISCUSSION

- The Eden wildfire role-players must anticipate increased WUI incidents in the future and recognise that these incidents can quickly escalate to overwhelm local resources. The Knysna Fires was a rapidly-evolving incident and the response in the early stages was chaotic. With the benefit of hindsight, the initial response phase of operations would have benefited from an Incident Management Team being in place a lot sooner. Once a formal ICS structure and Incident Command Post were established for this incident, it brought relative order to the response through clear management by objectives.

- To implement ICS, the personnel performing the specific roles in the incident management team (IMT) need to be adequately trained and experienced. In the early stages of the Knysna Fires, the limited staffing of the Knysna Fire Services meant that the majority of staff was directly involved in operations, a possible reason for the delayed implementation of ICS. (The delay refers to expanding the ICS organisation beyond that of Incident Commander). Capacity to establish large ICS organisations needs to be developed. In the more resource-strapped B Municipalities, Incident Management staffing solutions need to be sought outside of emergency services. There are roles in the ICS structure that don't require emergency personnel. All involved in ICS must, however, have an understanding of ICS and the relevant skills to fill a specific position.



Above: Planning meeting of the Knysna Fires Incident Management Team.



Above: ICS requires accountability and tracking of all resources involved in the incident, here Wendy Tawse oversees the Check In process.



Above: The Knysna Fires incident brought members of many different organisations together. This further supports the need for development in, and the adoption of, ICS which is designed to allow for multiple organisations to work under a unified command with common objectives.

- Since the adoption of ICS in the Western Cape, the focus in training and development has been applied to the highest-level roles in the Incident Management Teams (e.g. Incident Commander and the various Section Chiefs). This has possibly been to the detriment of the development of roles such as Division/Group supervisors, Unit Leaders and Technical Specialists. The problem with this approach is that even if upper-management devises the perfect incident objectives and strategies, without the leadership in the middle-management tier beneath them understanding them and carrying out the strategies effectively, the system breaks down.

- There was good interagency support and cooperation during the response and management of the Knysna Fires. However, outside of the Knysna Fires incident there are accounts, from various operational personnel in Eden, of incidents where two different organisations establish their own IMTs and run their own operations. This needs to be rectified.

- The importance of communication during an incident cannot be stressed enough and there were major communication issues experienced during the Knysna Fires. One such line of communication breakdown was as follows. The Division Supervisors had the means to communicate up the chain of command to the Operations Section Chief, but they often couldn't communicate down the line to the Resource Leaders under their command. This can largely be attributed to the problem of different

organisations using different communication equipment, protocols and frequencies. This has been a highlighted concern for many years around the Western Cape and it requires an urgent solution. The financial burden of converting every agency to a standardised system where it can communicate with others is prohibitive and requires a long-term strategy. There are, however, other short-term solutions that need to be investigated and implemented.

- The WhatsApp mobile application proved to be an extremely useful supplementary communication tool. It provided a means to share information, pictures and updates with select groups (e.g. Divisions, Incident Management, etc.). It did have limitations due to the availability of signal and data and battery capacity on phones, but it definitely was a great supporting communication tool for incident communication.

- Social media also presented numerous challenges due to a proliferation of false information and misinformation (e.g. multiple calls for help from the same location or the sharing of expired evacuation orders well after the threat had passed). Incident Management Teams need to take control of communication very early on and establish designated channels of communication that are constantly updated and reliable. The communication challenges are discussed further in the Communications section of this report.

- There were Branches and Divisions (e.g. those in Plettenberg Bay), who felt disconnected from

the ICP and felt that they were not receiving the required support and resources. It can be difficult to manage such a large incident and it is important that there is a balanced approach to all areas based on the incident objectives and identified priority areas.

- While it is essential that an Incident Management Team continue their work to support the ongoing needs of the incident, it is extremely important that there is due respect for fatalities and injuries. It can have a major effect on team morale as crews coming off the active fireline are confronted with the news. Counselling and support should be available to those who require it.

- The 'spur of the moment' volunteers and unknown resources became a significant management challenge during the incident. If an IMT is going to formally accept an offer of help and assign the help as a resource, the IMT must take responsibility for it under the incident. It proved a major logistical problem to determine the capabilities of the informal firefighting volunteers and to source equipment, transport and leadership for them. This issue is discussed further in the Volunteer section of the report. That being said, there was an overwhelming sense of community during the incident and all those who offered assistance should be commended.

- A very important lesson for any IMT that has to deal with a wildfire spreading into the WUI, where homes and entire communities have been affected, is the trauma and impact the

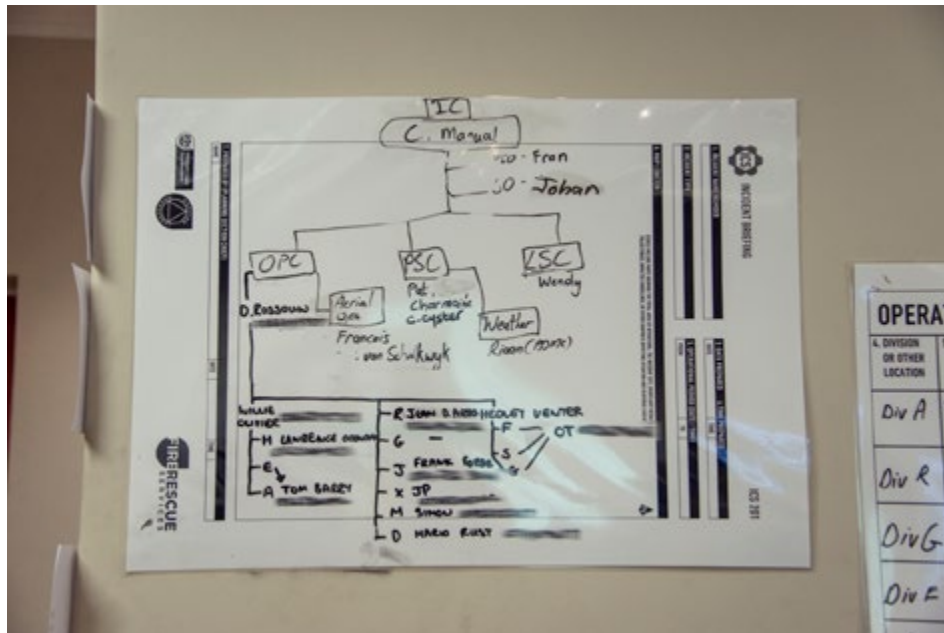


wildfire has on the people living in these areas. There was a consistent theme of helplessness, a sense of abandonment and disconnect between people/communities and those running the incident. Part of stabilising an incident is the human element, and this must not be forgotten.

- After the chaos of the initial response to the incident, ICS worked well to bring stability. ICS is a system, but a system requires people. In this incredibly trying incident, members of Emergency Services and wildfire organisations came from all over to assist as best they could in a time of need. For this service, these people must be recognised and thanked.

When it came to ICS training in the past there was sometimes the argument that “my service is too small to support ICS” or that “we will never be able to implement an organisation of that extent”. This incident is proof that it can happen.

— Etienne du Toit, Western Cape Government



Above: The Incident Command System organisation structure is displayed and easily referenced for all those working at the Incident Command Post.



Above: Seated in the picture; Clinton Manuel, as Incident Commander, in conversation with Patrick Shone of CapeNature in the Planning function of ICS.

RECOMMENDATIONS

- Eden District Fire Service, B Municipalities and Eden Disaster Management must build greater capacity through ICS training outside of the emergency services. This is especially the case in B Municipalities and areas that demand all or most operational personnel to be in the field. Areas where additional capacity could be found include Municipal office staff, NGO volunteers and civil society volunteers. This would allow the firefighters to focus on operations while non-fireline staff could fill the other positions requiring management skills and not firefighting skills. These staff can therefore make up the initial Incident Management Team that will support and guide the Operations function from early on in the incident. The first Incident Management Team as well as an Incident Command Post must be established as soon as possible. As an incident evolves in complexity, a more experienced Incident Management Team can take over command from the first team by way of an effective transition.
- In the Eden District, it is recommended that each B municipality establishes a Type 3 Incident Management Team, Eden District establishes a Type 2 or Type 3 Incident Management Team (and Provincial Disaster Management establishes a Type 2 Incident Management Team that can help or rotate with District IMTs on larger and more complex incidents). The other Districts and Municipalities within the Western Cape, if they haven't already done so, could adopt a similar strategy. Ideally the Eden

District IMT members should be permanently assigned personnel dedicated to specific roles. These assigned team members should also be developing and mentoring aspiring individuals and local IMTs at smaller incidents. If establishing permanently assigned teams is not viable, a standby roster system of those willing, skilled and trained to perform various ICS roles should be established. Advanced ICS training and some form of remuneration would still be needed.

- Annual scenario planning and preparedness training must be conducted at Eden B Municipality and District levels. The initial response and incident management of rapidly escalating, large-scale incidents can be extremely complex and challenging, as demonstrated by the Knysna Fires. Scenario training will help maintain readiness and fine-tune processes.
- In the Eden District (and across the Western Cape) there is a need to prioritise the ICS training and development of Division/Group Supervisors, Unit Leaders and Technical Specialists (provide expertise in specialist areas such as meteorology, WUI operations, evacuations, etc.). It is recommended that all wildfire role-players invest in developing capacity in these positions. The Western Cape Directorate Disaster Management and Fire & Rescue Services should oversee and assist (where possible) with this process.

- It is recommended that Eden District and B Municipalities conduct an audit of ICS personnel capacity and capabilities. It is simply not enough to do one ICS position-specific course. There are many practical areas where the implementation of ICS theory is failing (e.g. briefings and transfer of command) and these can only be developed through practice and experience. Based on the outcomes of the audit, all members of Incident Management Teams must then have a clear, focused and ongoing development programme aimed at developing skills and maintaining readiness.
- Interagency cooperation and coordination across the Western Cape in general needs to be enhanced and developed. The Western Cape Directorate Disaster Management and Fire & Rescue Services are urged to provide oversight in ensuring that annual interagency training scenarios occur and are even made mandatory. These occasions will provide a helpful environment for relationship building and they will enhance how organisations work together. It is here where challenges and possible conflict can be identified and resolved so that the process is made smoother during actual incidents. The interagency training should involve all levels of crew and supervisor roles in order to simulate real conditions as best as possible. Mutual-aid agreements and deployment standard operating procedures must be developed before an incident to allow for effective resource deployment and tracking.



- Incident Management Teams in Eden District and across the Western Cape Province need supporting logistics and equipment to function optimally. The Western Cape Directorate Disaster Management and Fire & Rescue Services as well as the District Municipalities are urged to create a strategic network of equipment caches. Such caches need to include, among other things:

- » Communication equipment (interagency communication devices) – a high priority. If all arriving resources can be assigned a communication device allowing for interagency communication, this would alleviate a massive communication problem prevalent throughout the Western Cape.

- » Laptops loaded with standardised ICS forms and apps that assist with incident management systems and information.

- » IT support (personnel) and related equipment.

- » Base Camp facilities (tents, stretcher beds etc.).

- » Generators.

- » Identification, uniforms, bibs, tags.

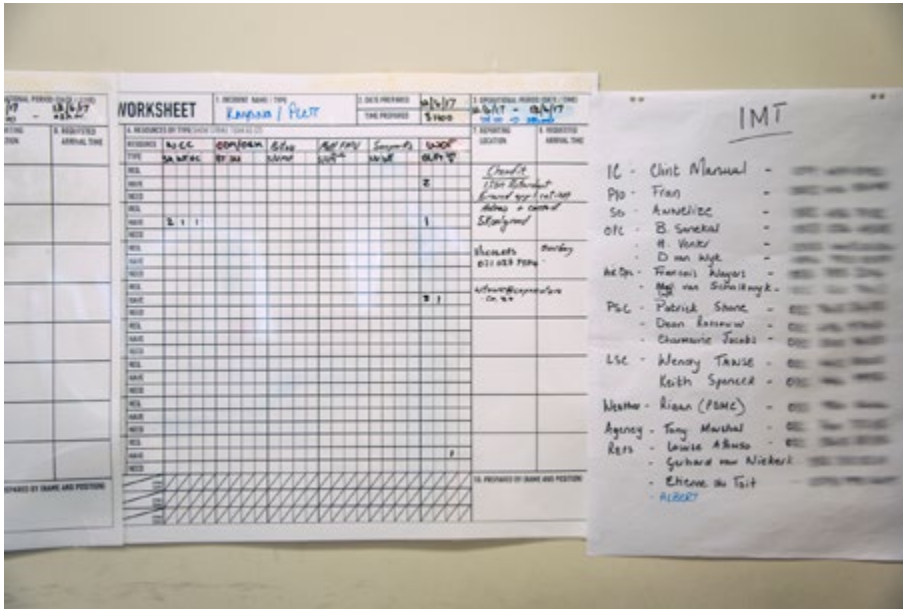
- The Western Cape Directorate Disaster Management and Fire & Rescue Services as well as the Eden District and B Municipalities need to develop a standardised strategy for communication to the media and public. (This would benefit all Districts and B Municipalities).

- There needs to be a standardised and optimised communication plan and strategy for wildfires given the communication challenges experienced during incidents. Incident Management Teams need to have a communications team under the command of a Public Information Officer and use numerous media channels and platforms to establish reliable sources of communication very early on in an incident timeline. This is a specialist role and requires skill and experience. The larger the incident, the bigger the support team required for this function. Predetermined and permanent incident communication channels should be established so the media and public know where to find the latest, reliable incident information.

- The Incident Commander role is central to the successful outcome of an incident and the person filling this role needs to be carefully identified once an incident begins escalating in complexity. The Incident Commander is ultimately responsible for all aspects of the incident and factors such as stress, fatigue, potential bias and experience should therefore be considered. It is advised that annual strategic planning of who can fulfil this role in the Eden District should be considered and documented, especially for large ongoing incidents.

- Eden District Fire Service, B Municipalities and Eden Disaster Management need to develop plans to ensure local knowledge intelligence can feed into the Incident Management planning and operational assignments. Local knowledge of areas, firefighting methods (e.g. when and where to back burn) and best practice is an important tool or resource, especially in the Operations Section. This local knowledge should not be neglected. The Liaison Officer role also needs to become more instrumental in the IMT's Command Staff, particularly for engaging with community and neighbourhood leaders. The IMT needs to have plans (and personnel) in place to reassure, guide and advise communities. In some Knysna suburbs, residents did not see any officials for days (and sometimes weeks) during and after the incident.





Images from the Incident Command Post. Top left: Incident Command Post 'working documents' displayed. Top right: Patrick Ryan of Vulcan Wildfire Management meets Clinton Manuel (Incident Commander) of Knysna Municipality Fires Services. Bottom left: Johan Brandt (Safety Officer) of Eden District Fire Services speaks to Ryan Heydenrych from Vulcan Wildfire Management. Bottom right: Early maps attempting to plot affected areas.



- Eden District Fire Services, B Municipalities and Eden Disaster Management must develop enhanced systems, checks and balances to ensure all resources on an incident are accounted for and a formal 'Check In' procedure is adhered to. There was a large contingent of landowner resources operating in isolation of the formal Incident Command. As a suggestion Division Supervisors should be made aware that they need to:

- » determine what landowner resources are in their respective areas

- » ensure they are checked into the Incident Command and have been assigned to that Division under the command of the Division Supervisor, and

- » establish a communication link with the landowner resources.

- Eden District Fire Services, B Municipalities and Eden Disaster Management must look into improving assignment instructions as well as debriefs. Both should be addressed through training and ongoing performance or after-action reviews following incidents. Briefings from supervisors need to be detailed and thorough and cover topics such as: Situation, Mission, Communications, Resources/Support, Safety and Risk Mitigation.

- Eden District Fire Services, B Municipalities and Eden Disaster Management need to develop standard operating procedures for Incident Command Posts – specifically around clearly defined stations for the different Sections as well as restricted-access control to prevent disruption/distraction.

- Eden District Fire Services, B Municipalities and Eden Disaster Management need to develop standard operating procedures for the setting up of Base Camps for incident responders (even local crews). Travelling after shifts is a safety hazard for tired crews and the time taken to travel and find food and accommodation adds to crew fatigue. The Western Cape Directorate Disaster Management and Fire & Rescue Services could be requested to take the lead in developing Base Camp standards and standard operating procedures.

- The Western Cape Directorate Disaster Management and Fire & Rescue Services, together with District Fire Services, need to establish a centralised and updated database of available resources that can be used in all-hazard incidents. Each resource in the database needs to be 'typed' based on their level of training, expertise, equipment, vehicles, etc. Other important data fields include availability, cost, contact person and rating of the resource. This database should be available to all Incident Management Teams so they can call on resources as and when they are required.

- Eden District Fire Services, B Municipalities and Eden Disaster Management should establish a logistics system as well as policy/guidelines to manage the influx of donations during future incidents. During the Knysna Fires (and other large-scale incidents in the Western Cape) there was a tremendous amount of support from the general public in the form of donations for incident responders and those affected by the incident. The donations function should fall under the Logistics Section in the IMT so that guidance can be provided on what items are required to aid the incident. There should also be a link to the Public Information Officer and Liaison Officer so that priority items can be requested. Financial donations provide a greater challenge in terms of management, accountability and transparency. Managing financial donations requires a strategic plan.

- Eden District Fire Services, B Municipalities and Eden Disaster Management should establish demobilisation standard operating procedures. Although this seems to be a less-important function of the incident, the IMT should ensure that this process receives due attention. Firefighting crews should also be rested in base camps before being allowed to travel home – in some cases, on the Knysna Incident, these involve long journeys directly after extended shifts.





Above: A hive of activity existed in the Incident Command Post as information flowed in regarding the situation on the ground.



Landowners' Responsibilities

Introduction

For the purposes of this section, the following are referred to as landowners:

- rural homeowner / rural landowner
- farming homeowner / farming landowner and farm workers' community, and
- large landowners: conservation area, State, other.

Landowners have many responsibilities associated with wildfires. Their legal responsibilities are set out in the National Veld and Forest Fire Act No. 101 of 1998. However, compliance with the Act alone is insufficient for a landowner to be truly resilient to wildfire. Landowners need to implement further preventative/preparatory and reactive strategies to safeguard themselves. The key to becoming wildfire resilient is strategic planning for wildfires and implementing risk-mitigation strategies.

The “it will never happen to me” mentality

— Adriaan Swanepoel, Bitou Fire and Rescue Services



Above: Five months after the wildfires burned through the landscape the scars are still visible and a stark reminder of the intensity of these wildfires. This image shows that the fire burned through the different kinds of vegetation. In the foreground is Fynbos, the pine trees of the Kruisfontein plantation are in the middle and in the distance there are clear burn scars in the indigenous forest, normally considered resistant to fire.

According to the National Veld and Forest Fire Act No. 101 of 1998 (DAFF, 2005a) an owner is defined as follows:

Who is an “owner”?

“Owner” has its common law meaning and includes:

- any landowner with a title deed to property
- lessees
 - lessees who lease DWAF commercial plantations
 - a person who rents land from the owner
- any person controlling land under a contract
 - a lease is a type of contract
- any person controlling land under a law
 - for example, managers of State forests who control the land under the National Forests Act
- any person controlling land under a will
 - for example, where someone has the right to control land until she dies, at which point it will go to the heir
- any person controlling land under an order of the High Court
- the executive body of a community set up under its constitution, law or custom
- a Minister or person authorised by him/her where the land is State land and it is not controlled by someone else
- a member of the executive council or a person authorised by him/her where the land is provincial land and is not controlled by someone else
- the chief executive officer of any local authority or a person authorised by him/her.

Rationale for the National Veld and Forest Fire Act No. 101 of 1998

Veldfires are natural – they have been part of life for millions of years. We use veldfire to manage grazing and habitats, and to help prevent wildfires. Wildfires are a risk to life, property and the environment. South Africa is becoming more and more vulnerable to veldfires because of urbanisation and the development of rural areas.

The purpose of the National Veld and Forest Fire Act No. 101 of 1998, as amended by the National Fire Laws Amendment Act, is to prevent and combat veld, forest and mountain fires throughout South Africa. The Act applies to the open countryside beyond the urban limit and puts in place a range of requirements. It also specifies the responsibilities of land owners. The term ‘owners’ includes lessees, people in control of land, the executive body of a community, the manager of State land, and the chief executive officer of any local authority.



INDUSTRY VIEWS

Summary of main points covered in a meeting on 2 November 2017 with Forestry and Veldfire Management Programme Co-ordinator Tiaan Pool of the Nelson Mandela Metropolitan University.

Since the demise of forestry as a government department and the subsequent privatising of this industry, there has been a constant drain of the knowledge of holistic fire management that existed. This can also lead to a lack of historical knowledge being available, to inform strategic decisions during wildfire responses. The practise of combining small plantations together into larger plantations to save on management staffing has resulted in a reduction of the capacity to manage effectively, as the scale of the plantations they are responsible for has increased. As early as 1986 foresters knew the change of government would result in the commercialisation of forestry but there was no clear progression as to who would take over the management of the mountains and catchments, so for between 10 to 15 years, there was no management or plan undertaken and this allowed unconstrained propagation of alien invasive vegetation into these areas. Many of these areas have now fallen to the responsibility of nature conservation or private land owners who have very limited programmes, if any, of education and training on fire management practises. Some fields may include a course on Fire Ecology, but this is not Fire Management and Forestry programmes are likely the only courses that might still include limited fire management modules these days.

The other issue is that while forestry had a large amount of resources (both of personnel and equipment), the nature conservation organisations are very limited in what they can afford and the scale of landscape they are responsible for is vast in comparison. The agriculturists, the conservationists, the foresters and the local authorities are the people who have to manage the land and make strategic decisions, but how can they manage the land if they don't understand the risk from wildfire? While forestry was still a government department, training was an extended programme that began with 'ground experience' for future managers who would be required to spend two years working with crews before they could move into higher-level management tasks such as being responsible for burning fire belts (fuel breaks). The fast tracking of people taking place in recent times into plantation managerial positions is creating a structure where these positions are occupied by people with a limited amount of actual on the ground and fire experience and fire management knowledge.

Summary of main points covered in a meeting on 3 November 2017 with Senior Firefighter Adriaan Swanepoel of the Bitou Municipality Fire and Rescue Services.

There is a degree of wildfire awareness conducted by the Fire Management Units in the area however it seems a lot of community members just 'like living in the bush' and have the 'it will never happen to me' mentality. Defendable space and thinking about the

vegetation around homes is very important and it was observed that during the wildfire that those homes, which had such space around them, stood a much better chance of surviving. (It didn't guarantee survival; in some cases further actions would have been required to save them). Two older wooden structures survived because of defendable space – created by grass area and large indigenous trees around the property whereas in the same property brick structures burned down due to surrounding vegetation growing up against the buildings.

Summary of main points covered in a meeting on 13 November 2017 with Managing Director Paul Gerber and Eastern Region Manager Dirk Smit of the Southern Cape Fire Protection Association.

Gerber was of the opinion that the Plantations, out of all the landowners, were the most prepared for fires. They conduct prescribed burning, have fire breaks in place and are required to have fire management plans. They also have extensive resources and in general, well managed areas.



Summary of main points covered in a telephone conversation on 24 January 2018 with landowner Callie van Wyk of Elandskraal community.

Years ago, there was regular burning which he feels helped to prevent fire spread. On the 7th June 2017, this was proven to him when the Elandskraal Fire burned through the Buffalo Bay area. A section of this fire burned through land, which he owns in the area, where he had managed to do a prescribed burn. The fire stopped in its tracks in this area where the burn had taken place.

He has found that the attitude of the Fire Department is one that is very unhelpful and even aggressive in their approach with him. Van Wyk specifically mentions Sedgefield Fire Department in this regard. It is very hard to get permission to burn. One stack burn that he did took six weeks to get permission for. Landowners have burning experience, but Van Wyk remarks that the approach from the Fire Department was 'as if he was an enemy'. He feels there is no co-operation with landowners who are just trying to do the right thing.

During the winter, it is sometimes necessary to burn on a Orange (Fire Danger Index) day in order for the fuel burn. If burning takes place on a green Fire Danger Index day, by the time the vegetation has dried out in the morning there is very little time left to burn properly before having to stop burning at 14:00 and then finish mop-up by 16:00. In terms of

burning and fuel management the problem is that the Fire Department seems uninformed. Van Wyk also says that when they are inspecting the property, fire breaks and everything that needs to be in place before the burn permit is issued, they also don't really seem to know what they are doing.

When the landowners used to do regular burning of fire breaks and areas of land, they did not have the same risk of fire spread. Van Wyk believes one of the ways to reduce risk is block burning, however he realises that there are many more people with small holdings in the area now and they do not have the knowledge to burn or understand why other landowners should burn. Burning has become unpopular. Awareness and education are needed.

The other way to reduce risk is to create an open space or green lawn (defendable space) around homes. The problem is many people want to live in the forest and have the trees right up to their windows.

Summary of main points covered in a meeting on 14 November 2017 with Deon van Zyl of the Rheenendal Fire Management Unit.

Rheenendal FMU continued suppression activities for 6 days after the initial spread of the fire only receiving support from the Featherbed firefighting resource who assisted them in the form of a 8000L bowser. In terms of local resources, the private landowners pooled their resources which consisted of tractors with water bowsers, tractors with small

water trailers and approximately 7 Skid Units with capacities between 500 – 1000L. Van Zyl says there was a feeling of isolation in Rheenendal as by day 3 the only fire vehicle they saw was a Working on Fire truck that was lost and trying to get somewhere else. By day 5 they still weren't receiving any support and at one point Van Zyl phoned to complain to Dirk Smit (Area Manager of the Southern Cape Fire Protection Association) that crews were playing football on the sports field in town (Working on Fire firefighter base camp) while the FMU and residents in Rheenendal were struggling to manage the fires. Van Zyl feels that the lack of support is due to the low density of homes in the area when compared to Knysna, however had the fire broken through their lines, it would have directly impacted Rheenendal Village, with approximately 6000 residents.

Van Zyl, who represents the Rheenendal FMU landowners, says there is a strained relationship with Clinton Manuel, Chief Fire Officer of Knysna Fire Services. Possible reasons for this include:

- Manuel had previously been out to Rheenendal to explain that his background and all his equipment is structural not wildland. However, he is still the person who should be called out to wildfires.
- Manuel is the person who has to give permission for prescribed burns and advice on clearing the land of vegetation loading. Van Zyl feels Manuel doesn't have a full understanding of this.
- The burn permit process is not conducive to ease of burn operations as one has to get permission



on the day of the burn from the Chief Fire Officer. The problem comes in when the landowner wants to start burning at 07:30 for example, when low wind conditions are safest for burning, he has to speak to the Chief, but the Chief does not get into the office till later or if he leaves a message it is not passed on. This ultimately results in the landowner starting their burn later than they want to, which can increase the risk. This difficult process is discouraging to people who want to burn. Additionally Manuel will not let more than three landowners burn at the same time on a given day as reportedly he only has 3 resources available. He does not understand statistics that it is highly unlikely that all three fires will get out of control on the same day and surely if burn permit conditions are met all landowners wishing to burn should be allowed to. Another question is how can the Chief Fire Officer understand the local weather conditions in Rheenendal when he is in Knysna? (As local climate conditions vary across the areas). Again, this complicates the process.

Van Zyl understands that a good working relationship is essential and raises these points in a constructive manner in the hope they can be looked at and addressed which will go some way towards improving the relationship between landowners and the Municipal Fire Services / Manuel.

Van Zyl takes fire and fuel load management seriously. He has his own firefighting equipment, fuel load reduction strategy and his fire breaks are maintained. He has good defendable space around his home and he is very alert to wildfires in the area and is quick to help identify their location and call for assistance from the FMU and Fire Services.

Van Zyl has planted a row of approximately 20 milk woods on his boundary to help stop fire spread as he had heard that milk woods don't burn. He found the only reference to fire spread being halted from a fire in Betty's Bay. However, he has heard that during the Elandskraal Fire, there was a row of milk woods in the Lake Pleasant area of Sedgfield that stopped a back-burn operation from spreading. He feels this is due to the heavy latex in the plant.

Summary of main points covered in a meeting on 8 November 2017 with Manager Gerhard Otto of Eden District Disaster Management and Richard Meyer of the Knysna Municipality.

The uncertainty of wildfire responsibility existed prior to the incident and it still exists after the incident with a number of negative consequences.

This situation must be framed within The National Veld and Forest Fire Act No. 101 of 1998, which places the landowner responsible for wildfires on their property. Otto goes on to explain that:

1. The landowner, under the National Veld and Forest Fire Act No. 101 of 1998, is responsible for wildfires on their property and it stays their responsibility.
2. If the landowner does nothing then the Government must step in and do something. If the fire is out of control the responsible local authority must respond and put out the wildfire. The powers of the Chief Fire Officer / Fire Protection Officer allow them to act in this regard. Once this operation is completed then the landowner can be billed for this.

Summary of main points covered in a meeting on 13 November 2017 with Fire Protection Manager Gideon van Lill, Silviculture Area Manager Jeff Taylor and Kruisfontein Plantation Manager Christiaan Smit of MTO.

MTO resources are centred around their business units i.e. plantations. They have a variety of resources such as fire tankers, fire tenders, bakkie sakkies, personnel such as managers and foresters on standby, lookouts for detection, standby firefighting teams and this is duplicated at each plantation. If you combine these total resources they become quite substantial. If you look at the June 7th Fire, within a day teams arrived from the Boland. In terms of readiness,



the Fire Danger Index (FDI) is also considered in terms of how many resources are on standby and how the standard operating procedures will then be followed. There are various training courses for the different levels of fire crews, managers and incident management teams. The training provided varies depending on what assignment each person is expected to undertake. Their fire lookout towers are staffed 24/7. If the lookout sees a fire they report it to the Supervisor on duty (Crew Leader), which has the strike unit with him on standby. Additional resources are then activated while he is en route to the fire depending on the nature of the incident. This forms part of the initial response and more resources are then activated based on the needs of the incident. Aerial resources are always considered as early as possible to prevent the spread of the fire.

Summary of main points covered in a meeting on 11 November 2017 with residents Ritchie Morris and Mary Jane Morris of the Elandskraal community.

After the fire on the 21st August the Morris's were hand delivered an email dated to the 8th August, which was signed by Kam Chetty (Knysna Municipal Manager). This seemed to be in response to their communication that they wanted to be disassociated from the Knysna Municipal Report and wanted an apology.

Ritchie Morris says the letter stated "Our Chief Fire Officer will within 14 days of date hereof inspect and analyse all properties etc. and if the chief is of the opinion that conditions create an emergency, we will do the necessary work and charge you. It references the Veld and Fire Act. Ritchie Morris claims that he was the only one in Elandskraal who received such a letter. He asked around, no one else had received one. It was hand-delivered within one day of them saying they would be here within 14 days. The Morris's have never heard from them nor seen them.



Above: The view from the Morris property towards the MyForest property where the Elandskraal Fire that burned towards Knysna originated. The slope that is believed have been central to the lightning strike theory is down slope from the visible burned area to the far right of the image.



DISCUSSION

- Successful management of wildfires in the landscape requires skill, knowledge and experience. In the 'old days of forestry', wildfire management was arguably at its best. However, since the collapse of forestry, much of the wildfire focus and development on the required skills, knowledge and experience have been lost. It is deeply concerning that appreciation and respect of wildfire management as a specialist field has degraded.
- Experts and specialists in wildfire management still exist, even among the various types of landowner. However, their value is trapped or isolated, as the various landowners often tend to work in silos. In order to cope with the escalating wildfire problem, synergy and collaboration is needed. Landowners need to pressurise other landowners as well as other role-players (FPAs, Fire Services, municipalities, developers, insurers, etc.) to share the wildfire-risk responsibility.
- Firebreaks and prescribed burning are generally considered and relied upon but they are only two elements in a much larger, holistic fire-management strategy. With large and rapidly spreading wildfires, such as the Knysna Fires, fire suppression becomes almost impossible. It becomes a priority, and is only possible, to try limit the amount of damage and destruction. Landowners need to take responsibility for developing their own strategic plans (reassessed annually) for wildfires. The plans must include elements such as:
 - » the creation of defendable spaces and the installation of defence measures (sprinkler or drencher systems) around their homes, assets and infrastructure
 - » access to firefighting resources that are adequately trained and equipped
 - » mutual-aid agreements with neighbours
 - » water availability
 - » safety zones for people and livestock, and
 - » evacuation plans.
- Landowners in remote areas are even more vulnerable and are required to be more self-sufficient. When planning for wildfires, a community approach to preparedness and safety is preferable. Sharing ideas, plans and resources will offer more options and solutions than going it alone.
- There are many concerned and frustrated landowners in Eden District who want to conduct prescribed burns as part of their fuel-reduction strategy but struggle to obtain burn permits or permission. Various opinions are given for why prescribed burning is not supported by Eden District and B Municipality Fire Services. There is:
 - » resistance to landowners conducting burning
 - » a lack of understanding of adequate burn preparation
 - » a lack of understanding of adequate prescribed burning weather and appropriate timing for burns, and
 - » an administrative capacity issue where Fire Services cannot keep up with the permit requests and no-one is available to give the required final permission on the day of the burn.
- If landowners have the responsibility for fuel-load management then they should not be barred from conducting the prescribed burns provided that:
 - » the weather is conducive
 - » the burn site is adequately prepared
 - » there are sufficient resources and water available, and
 - » appropriate safety measures are in place.



- There also appears to be other strains and challenges in the relationship between landowners and Fire Services. Fire Services need to address this issue and find ways to build positive relationships with landowners.
- During the Knysna Fires, some landowners were compelled to conduct their own fire-suppression operations in isolation of the formal Incident Command. While this came out of necessity in this unprecedented incident, it presented an extreme safety hazard due to conflicting strategies and not knowing where people were. Presently in Eden, there is no accepted system or standard operating procedures for incorporating assisting landowners into the Incident Command structure.



Above: The area near Leeuwenbosch Farm Stall shows the scorched earth and devastated landscape that results from the invasive alien vegetation burning at higher temperatures than our indigenous species.

Left: Collapsed trees lie across a home while the ground fuels smoulder in the aftermath of the fires and extreme wind conditions. Many homes in the Eden District are built surrounded by vegetation growing right up to the homes. The result of this lack of Defendable Space is massive exposure to wildfire risk and the probability of damage and destruction is extremely high. Photo Source: Southern Cape FPA, 2017.

RECOMMENDATIONS

- Eden large landowners, who have permanent firefighting resources, need to make a concerted effort to develop career paths and positions (as well as the people to fill them) within their organisations. There needs to be recognition that wildfire management is a complex and a specialist field. It should be regarded as its own profession. It is noted that there are already some suitably qualified and dedicated wildfire professionals within these organisations but the focus on wildfire-specific roles (their main focus is on wildfire management) needs to be developed. Emphasis also needs to take place on succession planning and the transfer of skills, knowledge and experience. Relevant education-and-training programmes need to be established to support the wildfire profession career path in large-landowner organisations.
- Eden landowners who are not large enough to support the employment of wildfire professionals still need to be proactive in accessing wildfire information and expertise to help them prepare and respond to wildfires. They should seek assistance from the Southern Cape FPA in receiving education and training relevant to landowners in order to develop basic knowledge and skills. For concerns needing more advanced knowledge and skill, the landowner should again approach the Southern Cape FPA or Wildfire Specialist Services and Eden District Fire Service for guidance or assistance.



Above: An example of landowner resources (not from the Knysna Fires) responding to a wildfire incident. One can clearly see the lack of Personal Protective Equipment (PPE) which is common place amongst many landowners staff responding to a wildfire. The occurrence of this supports the clear need for greater awareness of the risks of responding to a wildfire without the correct PPE or the correct training on suppression and fire behaviour risks.

- All Eden landowners should conduct an annual audit/assessment of their property. They need to actively imagine what would survive and what would not if a fire burned through their property. The landowner must put plans and measures in place to safeguard what they can. By placing a value on what can be lost, including life, there is increased incentive and understanding of the need to take action.
- The Southern Cape FPA, together with Eden District Fire Services and relevant FMUs and B Municipalities, should devise a strategy to assist communities in developing a community protection plan for wildfires. Fuel reduction, firebreaks and resource sharing can all be done at a community level. This will enhance the effectiveness of the devised formal response strategies from Fire Services. Community plans can also reduce the overall cost of actions taken and allow for shared knowledge in the collaborative process of working with one another. An essential component of the community plan is the identification and maintenance of a community safe zone.
- Eden B Municipalities should assist landowners and communities in developing a plan for a community safe zone. This is a predetermined space clear of vegetation and survivable in a worst-case wildfire situation. Community members would gather at the community safe zone when the exit route out of the area is too dangerous. The space must be carefully considered and must be large enough for the



Top: Example of area where a firebreak has been included on a plantation boundary between landowners (from the Elandskraal area not affected by the wildfire).

Bottom left: An example of a plantation area nearby Sedgefield where young pines are sprouting (they do not appear to be planted as part of a new plantation). This could potentially create a fuel hazard for the area. It is unknown what fuel load management planning, if any is occurring.

Bottom right: An example of a firebreak in the Concordia area where fire crossed over. (Note: It is rare that a firebreak alone can stop a wildfire. There are numerous other factors such as suppression activities, fire behaviour, etc. which impact on the ability to use a firebreak to prevent wildfire spread).



number of people planning on using it. The area must be checked annually – before each fire season – and any improvements should be made, based on the same principles (but on a much larger scale) as you would use for building defensible space around a home. The relevant Eden B Municipalities fire chief must be consulted in assessing the suitability of the chosen area.

- Eden District Fire Services and B Municipalities must work with landowners to find a solution to the current, identified prescribed-burning challenges. Landowners should have a simple and convenient process whereby they can obtain permission to conduct a prescribed burn provided that the conditions are right and the appropriate measures have been put in place. Further to providing permission for burns, Eden District Fire Services should actively provide supporting crews and resources wherever possible to build relationships with landowners and incentivise good fuel-load management practices (which would also help maintain wildfire readiness for their crews).
- Eden landowners, together with the Southern Cape FPA need to devise a strategy to ensure landowners are incorporated and considered by Incident Management on all incidents. It is essential that landowners assisting with wildfire suppression operations be overseen by the formal Incident Command structure. The challenge is that there is currently no predetermined way to manage this process,

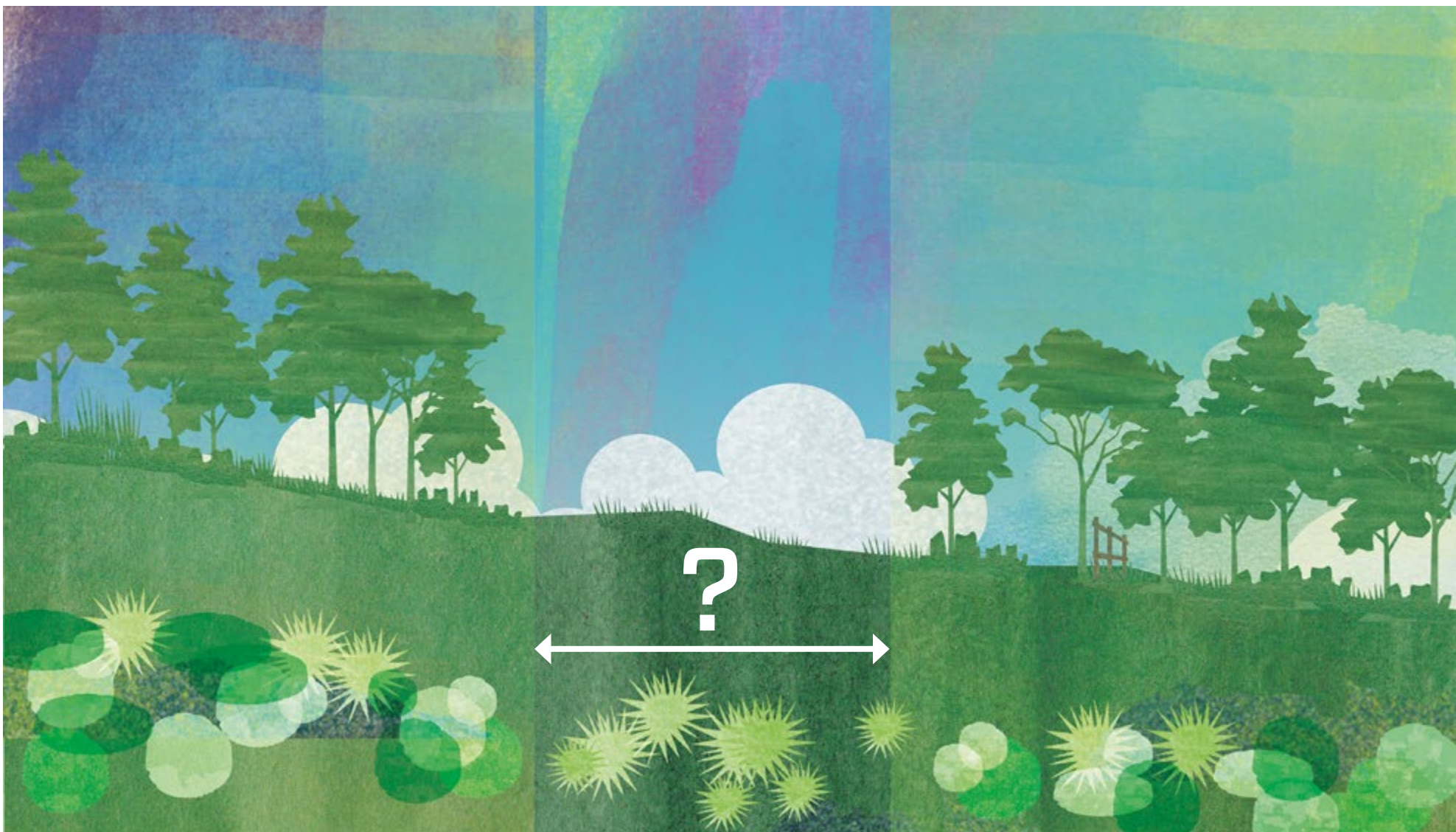
especially with smaller landowners. Established protocols must be identified.

- It is highly recommended that the Southern Cape FPA (supported by Eden District Fire Services and B Municipalities through their FMUs), encourage every community to hold an annual Wildfire Awareness Day followed by a Wildfire Preparedness Month. There are many benefits to doing this but perhaps the most beneficial is building and reinforcing localised relationships. All role-players from the area should be involved, including landowners, Fire Services, Southern Cape FPA, security companies, schools, animal shelters, contract fire crews from the area, volunteers, NGOs, businesses, the public, etc.



Top: Fuel load reduction burn. Reducing fuels before a wildfire strikes.

Above: Prescribed burning operations are required to manage fuel loads and biodiversity. It is important that they form part of an integrated fire management strategy.



Where should a firebreak or FuelBreak be placed and how wide should the break be? It is advisable for landowners to consult with their local FPA, FMU, or a Wildfire Specialist. The size and positioning should be influenced by fire management considerations such as the degree of the slope, prevailing wind directions, the vegetation type and density, availability of suppression resources, access to the firebreak etc. Further considerations should include how firebreaks are interlinked and form part of a greater strategy to prevent wildfire spread across a larger area. This highlights the importance of neighbours working together as well as the involvement of FPAs.



Fire Protection Associations (FPAs)

Introduction

The Fire Protection Association's primary function is to support landowners who are members of the association. They serve an important role in bringing landowners together, helping them understand their localised wildfire risks as well as compliance with regulations. They help members to predict, prepare for, prevent, react to and manage wildfires.

An FPA covers a defined geographic area (often closely aligned with District or Municipal boundaries) and performs an oversight function for the area. The Fire Management Units (FMUs) then break up the large area into smaller management units. The FPA's and FMU's staff compliment is usually restricted due to finances. Most, if not all, FPAs in the Western Cape are understaffed.

Because of staff limitations, FPAs often lack the capacity to fully address their members' needs for interaction, guidance and advice. However, some FPAs are stronger than others. The FPAs which thrive despite the financial challenges are normally very determined organisations with dedicated and knowledgeable people working for them. In most cases, those that have good support structures from their District Fire Services (or another role-player) are also stronger.



Above: This image of the burned landscape from the Elandskraal area shows the mixed use of the land which ranges from cultivated farmland, small holdings through to forestry plantations and even private nature reserves.

According to the National Veld and Forest Fire Act No. 101 of 1998 (DAFF, 2005c):

Formation of fire protection associations

3. (1) Owners may form an association for the purpose of predicting, preventing, managing and extinguishing veldfires and apply for its registration as a fire protection association in terms of this Chapter.

(2) A fire protection association may be formed by owners who wish to co-operate for the purpose referred to in subsection (1) in respect of an area which has—

- (a) regular veldfires; or
- (b) a relatively uniform risk of veldfire; or
- (c) relatively uniform climatic conditions; or
- (d) relatively uniform types of forest or vegetation.



Top and above: Burned vehicles and equipment at the ruins of the Johnston property.
Left: A map indicating all the various Fire Management Units in the Southern Cape FPA. Source: Southern Cape FPA (2017).



INDUSTRY VIEWS

Summary of main points covered in a meeting on 3 November 2017 with Senior Firefighter Adriaan Swanepoel of the Bitou Municipality Fire and Rescue Services.

The Bitou Fire Management Unit (FMU) volunteers are a very helpful, motivated and effective resource. In this incident, they helped to reduce the number of home ignitions and assisted with evacuations. They play a vital link within the community and have a relationship with the landowners, which is important. The only way a Municipal Fire Service can be effective to face the number and types of wildfires they get each year is through relationships with other resources and organisations. The members of FMUs know the areas very well, which helps when navigating around the remote areas in particular. It must be remembered that the FMU resources support the Fire Service and back them up. The added resources and assistance makes a valued difference but there are a few occasions where improvements can be made:

- Sometimes the equipment for the task is incorrect. They do their best with what they have. However, it sometimes complicates operations, i.e. not having the right type of pump, hoses, fittings, protective equipment, etc.

- Equipment maintenance and knowing how to use the equipment correctly is sometimes lacking. (An example is that sometimes the skid unit will stand unused for a long period of time resulting in corrosion, water in fuel tank etc. so it's important that the equipment is regularly used.)

Volunteer groups and FMUs should be properly organised and trained. Part of the training should be getting to know their firefighting equipment and keeping it well maintained with regular checks.

Summary of main points covered in a meeting on 13 November 2017 with Managing Director Paul Gerber and Eastern Region Manager Dirk Smit of the Southern Cape Fire Protection Association.

The Southern Cape Fire Protection Association (SCFPA) is a huge FPA with 4554 paid-up members with an office in Riversdale and the Head Office in Knysna.

They have 8 WoF teams as well as contracting aerial resources from Working on Fire (WoF). Structurally the FPA plays a strategic role overseeing a very large area, which is divided up into Fire Management Units (FMUs).

The FMUs act within the community as a touch point and conduct the ground work in terms of first response to wildfires and alerting the relevant authorities as well as preparing for wildfires. There is a desired level at which the FMUs should be at in

order to adequately advise and assist landowners. Some FMUs fulfil this function perfectly but a lot still need outside assistance and that is where the SCFPA helps out wherever possible. Through the SCFPA's Regional Managers, they will directly interact with landowners. Within the FMUs there is normally a major focus on reacting to wildfires and this needs to be addressed to also working on preventative measures.

The stronger FMUs are starting to get on top of planning and arranging for work to be done on fire breaks, fuel load management and speaking to neighbours to make sure fire breaks are in place. There are challenges with landowners however, and these can be summarised as:

- Lack of awareness, understanding or appreciation of the potential of wildfires to cause damage.
- People tend to forget if there hasn't been a wildfire for a period of time.
- Not knowing their responsibility or accepting responsibility as a landowner in terms of the Acts and laws which they are required to abide by.
- Insufficient budget or funds to manage their property. Fire Management on property is expensive and lots of landowners simply do not have the funds to carry out the work required.

- *In terms of the National Veld and Forest Fire Act No. 101 of 1998 there is focus on firebreaks but not on fuel loads within the property resulting in this often being neglected. In some areas, there may be Municipal Bylaws, which cover this aspect but in terms of a consistent approach to fuels on properties this is something lacking.*
- *In terms of ecology of the veld, in fynbos for example, there is a point at which Fynbos needs to burn. This needs to occur through prescribed burning to achieve objectives in fuel load reduction as well as ecology of the vegetation. Again, this aspect is not covered by any legal framework.*

A big challenge for landowners is that when they try to plan for and conduct prescribed burning they run into challenges. This is a huge issue which Gerber and Smit stress that it really needs to be addressed. Local or District Municipalities (depending on the area) are currently making it difficult for landowners in a number of ways:

- *They don't understand the weather, especially around the Fire Danger Index (FDI), which guides what days are allowed for burning.*
- *Another point about the FDI is that the South African Weather Service FDI is the only legally accepted FDI. This however provides general area FDI forecasts. In Eden and many areas around the Western Cape, local conditions vary greatly across regions. It could be raining and cool on one side of a mountain and hot and windy*

on the other side. There needs to be an accepted local FDI forecast such as the one which AFIS provides, which gives more accurate local FDI forecasts on which prescribed burning can then take place. Gerber suggests that if the Minister of DAFF can accept AFIS as a credible source of FDI's, in terms of the National Veld and Forest Fire Act No. 101 of 1998, then AFIS can then be used.

- *They are limited by time and resources to inspect properties and issue burn permits.*
- *Post Knysna Fire there is still a lot of fuel that needs to be removed. There are massive stacks that have been created as landowners clear up their property and attempt to reduce the risk for fires in future. It is also a safe and opportune time to conduct a lot of burning due to the surrounding vegetation already having being burned. It's unrealistic to chip or remove all this fuel. The Municipality has stopped all burning because they don't have the capacity to deal with all the calls and complaints made by the public about the flames and smoke from these fires. The other worry they have is that the Fire Service does not have the personnel to oversee and/or assist at these burns. Landowners are not being allowed to burn and this fuel load will now accumulate. It seems the fear of fire is now preventing any burning take place, which is a major concern.*
- *During quieter periods District and Municipal Fire Services should support landowners with burning at little or no cost as a way to allow more burning to take place. It will also make it*

more achievable for landowners who may not be confident enough to do the burns.

These issues leave the landowner extremely frustrated, despondent and as a result not enough ecological and fuel reduction burning is taking place. Fuel reduction and risk reduction needs to be promoted and encouraged but when it comes to the landowners following this advice, they just run into roadblocks.

An example of a good fire is a prescribed burn that the SCFPA managed to conduct. They did an ecological and fuel reduction prescribed burn, which was carried out in the months prior to the fire. Gerber and Smit believe this helped to slow the speed and spread of the Knysna wildfire. If more burns could have taken place this might have assisted in reducing the impact of the fire.

Gerber says from a broad and holistic perspective that everyone needs to implement Integrated Fire Management: private landowners, FPAs and all tiers of government. Integrated Fire Management is made up of many different components of which firefighting (response) forms a small component. The problem at the moment is that reactive fire suppression has too much focus. Fire suppression should be your last resort and your focus should rather be on prevention. How much budget currently goes towards prevention? ... very little to none. This is a major problem. Awareness and prevention needs to be a focus. Landowners need to focus more on



defendable space and Municipalities need to look at the Wildland Urban Interface from a broader perspective and focus on creating 'buffer zones' to reduce the impact of fires on communities. Wildfire appropriate resources which can support both prescribed burning as well as wildfire and Wildland Urban Interface challenges need to be carefully looked at. Across the Western Cape Province, the lack of appropriate resources needs to be looked at. Note: This must not fall into the same trap of focusing on resources for reaction, which has already been mentioned as having too much focus.

Some landowners comment that they are members of an FPA but receive no benefits for being a member. Gerber and Smit explain that for what landowners pay in terms of membership fees to belong to the SCFPA they must realise that there are limitations as to how much the FPA can provide them. Membership fees vary quite considerably but it's impossible for everyone to receive personalised guidance. There is a lot of general information on Fire Danger as well as lots of information and assistance if they choose to actively engage with the FPA.

With regards to wildfire suppression the FPA has crews and resources available that they can provide the landowner with. These are not FPA-owned resources generally, they are rather contractors who the FPA has agreements with and they help make these resources available to landowners if they require assistance. These resources have costs that the landowner needs to cover. There is a misconception that the helicopters must be provided.

Learning from this incident, when a wildfire of a large size occurs, the following is beneficial to have:

- Pre-existing, formal and informal relationships with partners.
- Lists of wildfire contractors and sub-contractors for firefighting, incident management team support, etc.
- A Chief Fire Officer who understands how the FMUs work and what resources they have. Having an understanding of what they can tap into as resources and their capabilities will help especially on large incidents when Fire Services are stretched.

Summary of main points covered in a meeting on 11 November 2017 with residents Ritchie Morris and Mary Jane Morris of the Elandskraal community.

There seems to be confusion between the roles of the FPA and the municipality and the ball appears to be tossed backwards and forwards between them. Landowners in Elandskraal did however receive a lot of assistance from PG Bison. The same confusion between the FPA and the municipality continued post the fire incident to the point where the FPA issued a letter stating what their responsibilities were.

The Morris's believe that the FPA has become too big from a geographic perspective and they felt the actual advice and assistance was insufficient, with a lack of professionalism with regards advice on firebreaks and warnings to landowners. Ritchie Morris also felt that the FPA and the FMUs are not as effective as they could have been, which he put down to a lack of knowledge and formulation of the required strategies and plans. The Extension Officer should be a very technically capable person in order to control teams and do risk analyses.

Summary of main points covered in a meeting on 3 November 2017 with Chief Fire Officer Hedley Venter of the Bitou Municipality Fire and Rescue Services.

While the FPA is a very necessary organisation to have with regard managing landowners and the risk, there is a feeling that the Southern Cape Fire Protection Association (SCFPA) is too closely linked to the larger landowners such as PG Bison, SANParks, MTO, etc. who get a greater response when it comes to sharing resources. It is almost as if there are cliques of favourites. There is also a perceived mistrust between many landowners and the SCFPA, which is not helped by the central pooling of funds and donations. In the past when the FMUs existed as FPAs, whatever money was brought in by a FPA was kept by that FPA for its own use, now all the donation and fees income is sent to the SCFPA and the FMUs sometimes feel they are not getting their share of this.

Summary of main points covered in a meeting on 4 November 2017 with representatives of the following Bitou Fire Management Units (FMUs): Plett South FMU, Harkerville Rural Protection, Fisantehoek FMU, Wittedrift FMU, Crags FMU and associated FMUs.

There is often communication between the Southern Cape Fire Protection Association (SCFPA) and the FMUs requesting that the FMUs raise awareness of the risk and the risk reduction measures that

landowners must take. However, the FMUs have a limited capacity with regards time to apply to this as most people are volunteers and have full or part time jobs. The FMUs are also the link with the community so they cannot be the 'friend' and the 'enforcer' and they feel the SCFPA should assist in some way with this challenge.

While the laws need to be acted on it is also important that this be done reasonably, so that people are given time to do the work required which is expensive and time consuming. Progress must be seen in these cases, otherwise action must be taken. Another problem with regards to properties in the FMU areas is that many properties are owned by people who live in another area of the country or are overseas and only visit irregularly. This makes it hard to contact the owners and put pressure on them to do the risk reduction work required. What was encouraging to hear is that in KwaZulu-Natal the attitude and behaviour of risk reduction on property has been widely adopted and has become a 'good neighbourly way' of being.

The history of the Bitou FMUs is that they were once separate FPAs, but when the SCFPA was formed they became FMUs and sat underneath the SCFPA as an oversight body. Historically each farm or small-holding had to be part of an FPA in order to secure insurance and this helped to increase memberships. The members of the FMUs are mostly like-minded farmers and small holding owners who wish to provide support to their community. They are often

also members of the Neighbourhood Watch groups and are actively involved in the community in some way before becoming part of the FMU.

The FMU charges a membership fee of which a percentage is paid to the SCFPA, however the FMUs face a struggle with regards to consistent funding, and while they do manage, it is on a shoe string budget made available through donations. Each FMU tries to raise money and pays an annual fee to the SCFPA. While the FMUs wish to retain their independence, they are also aware that there is a need for training, standardisation and having an increased level of governance. They have mentioned the National Sea Rescue Institute as a possible model as a goal. The issue of medical cover or medical insurance was brought up, especially relevant to these small units run by a few people who have careers and if injured will have to take time off work. Who would medical insurance fall under if these volunteer groups were unable to secure private insurance, which would be a very costly exercise?

Training was also seen as a problem with most new members being trained on the job while overseen by a more experienced member. While there are members with firefighting experience not all of these have wildfire experience so they have learned by trial and error with a little help from Bitou Municipal Fire Services when possible. There is very little training done before the beginning of fire season. Bitou Municipal Fire Services will be offering a Fire Officer course in the near future but limited spaces on the



course will be available to member of the FMUs, which means the knowledge gained will hopefully be disseminated informally to the others in the FMU. Another issue affecting the FMUs, is acquiring the correct PPE. They currently use PPE more suited to structural than wildfire suppression. Other volunteer units have been witnessed arriving at incidents without appropriate PPE or any training, especially after the recent large fires. The FMUs would be open to advice on the correct PPE, operating procedures and governance protocols.

Summary of main points covered in a meeting on 13 November 2017 with Fire Protection Manager Gideon van Lill, Silviculture Area Manager Jeff Taylor and Kruisfontein Plantation Manager Christiaan Smit of MTO.

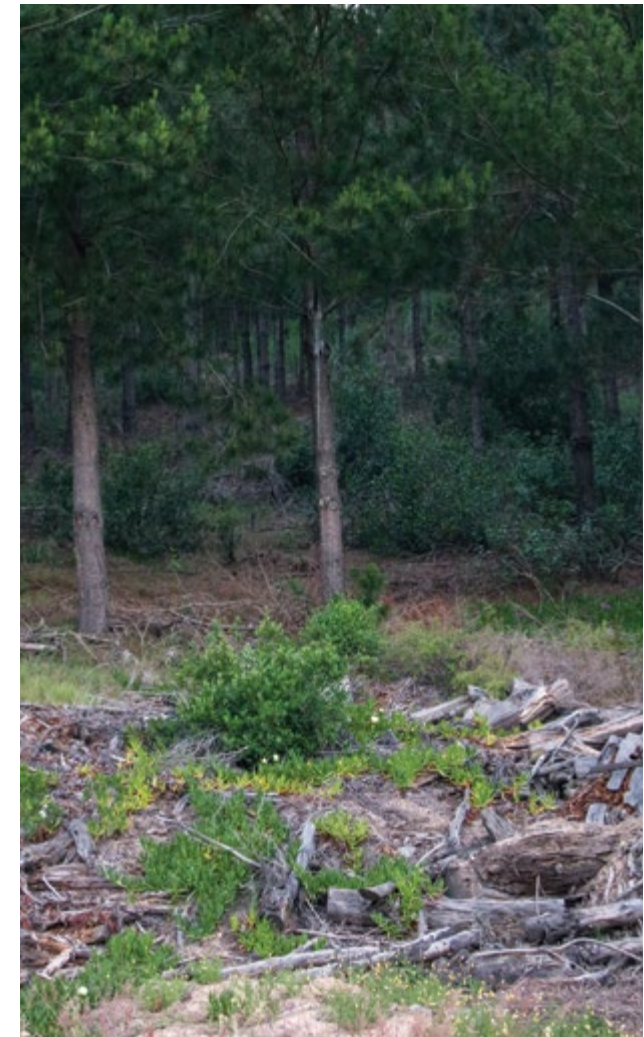
The SCFPA acts as a great link between all the landowners during fires. MTO has a good working relationship with them and where landowners ask each other for assistance; MTO tries to assist other landowners wherever they can. This co-ordination is particularly useful when there are multiple fires burning and there is a need to spread resources and work together to cover these fires.

In Knysna area the Fire Management Units (FMUs) seem to be working really well. The FPA has made a lot of effort to get the FMUs running. The one thing they was pointed out, that they have picked up on, is that as bigger landowners are working effectively together. It seems as though the less active FPA

members, possibly the smaller landowners who are not part of the bigger circle, might be feeling left out and this is maybe something that can be worked on. MTO feel that they put a lot of time into interagency and organisation relationships and this is why the system works well for them.

A possible idea to engage as many landowners as possible is to co-fund the FPAs to get more field extension officers, get the FMUs functioning optimally and give the FMUs a greater capacity to build relationships in their areas. Another suggestion is to try and get the insurance industry involved in mitigation work, which has a cost but it will prevent and start to limit claim costs as a result. Financial incentives to join FPAs and take preventative measurements could also possibly be given by insurers. A take home message from these ideas is that “the more time and effort on prevention, the less you should spend on protection and suppression”. There is no perfect solution but a big challenge is “what can people afford to put into prevention” and there needs to be ways in which the industry addresses this.

Another aspect to look at is the emotional sentiment of wanting to live in the bush, with great views on top of the hill, etc. It is all well and good when there are no fires but this type of living requires being aware about the risks. More fire awareness in the rural areas needs to take place.



Above: Fuel management for landowners must form part of a risk reduction strategy. This image was taken in the Eden District. The dry fuels on the perimeter are most likely the result of clearing work where vegetation has been cleared, cut and stacked but not removed. Ideally these stacks should be removed (chipped or burned) and the accumulation of fuels under the plantation (needles, slash, plants) should be reduced in order to limit fire spread.

DISCUSSION

- In general, FPAs are the support system that brings together landowners and enable them to develop effective and coordinated wildfire preparedness and response mechanisms. If you consider the importance of their role, they should receive sufficient support. Challenges restricting the growth of FPAs include:

- » inconsistent and insufficient financial support

- » limitations in raising finance through membership fees which can only go so far

- » limited membership capacity – not all landowners are required to be members

- » limited ability to build staff capacity, and

- » lack of enforcement of regulations against non-compliant landowners (creating an environment where there are no consequences for non-compliance).

- The FMUs in the Eden District play a vital role in building relationships between Fire Services, large landowners and small landowners. Considering that collaboration and working together is critical to managing wildfires in the long term, this role should not be undervalued. The local knowledge of FMU members who live and work in the area is incredibly important. During the Elandskraal and Kruisfontein wildfires in 2017 some remote areas would have been extremely difficult to operate in and navigate without local assistance.

- FMU volunteer firefighting crews play a very important supporting role for Eden District and Municipal wildfire operations. However, it is important that they have the right training, equipment, safety gear, vehicles and standard operating procedures to work in synergy with the firefighting resources they assist.

- Southern Cape FPA and Knysna and Bitou FMUs echo the frustrations the landowners are having in trying to conduct burn operations. In the Industry Views section, Paul Gerber from the Southern Cape FPA gave a very good overview of these concerns and issues as well as the challenges they have. As an example, prescribed burning was put on hold after the Knysna Fires. As landowners began to go through their properties and clear the remaining hazardous fuels they created stacks of vegetation. With everything burned around them the fire risk was negligible. However, they were still prevented from burning the material by the Knysna Municipality and, instead, had to resort to chipping the material, which is a costly process. The intention from the Knysna Municipality to stop burning due to the recent wildfires was probably made with the best of intentions but it had the unintended consequence of preventing hazardous fuels

from being removed.

- The Southern Cape FPA does not have firefighting resources of its own. The FPA helps to coordinate landowner resources and this happens in different ways, including:

- » coordination of individual landowner resources coming together in times of need, and

- » formalised FMU landowner response and volunteers.

- The Southern Cape FPA does have the ability to offer firefighting ground crews or aircraft to landowners. These are contracted resources and are for the landowner's cost. In anticipation of different types of wildfires, they could experience, it is important for FPAs and landowners to have pre-existing plans and procedures for how they will respond, or make use of external resources.

- In order for the Southern Cape FPA system of landowner preparation and response to be optimal, good working relationships between role-players – especially with the Eden District and Municipal Fire Services – are required. Each party needs to understand clearly how the others operate and they need to provide an environment which promotes working in synergy.





Above: This image is an example of how a control line or 'firebreak' was used to stop the spread of wildfire near Sedgfield.

RECOMMENDATIONS

- DAFF as well as Provincial, District and Municipal government must hold a meeting in 2018 to devise strategies to strengthen the ability of FPAs across the Western Cape. They must empower them to deliver the support and services landowners need to manage their responsibility for wildfires. It is essential that the FPAs are also involved in this process.

- The Eden District FMUs need to be proactive in building institutionalised relationships with their local Municipal Fire Services as well as the Eden District Fire Services. Efforts in this regard need to be facilitated by the Southern Cape FPA with a concerted effort from landowner FMUs, Municipal and District Fire Services to get this process going in 2018. Eden District Fire Services need to recognise the importance of the FMU volunteers' support role. Both formalised and informal relationships and channels of communication are vital.

- The Southern Cape FPA must facilitate a process where Eden District Fire Services and Municipal Fire Services can play a supporting role in developing the capability and capacity of their local FMU volunteers and landowners. If landowners are supported, they can make a considerable combined contribution to supporting incidents. Accordingly, it makes sense for the Municipalities to offer advice, guidance and assistance in terms of:

- » what type of equipment to purchase (and ensure compatibility of equipment)

- » providing training opportunities wherever possible, even if it is in-house training

- » providing mentoring and oversight of development, and

- » reinforce 'good behaviour' and guide them in areas where they can improve.

- On the back of the Knysna Fires, the Southern Cape FPA needs to adopt a strategic communication campaign targeting landowners, focusing on:

- » risk awareness

- » complacency and apathy, and

- » responsibility.

- It must be noted that finances and the capacity to achieve this goal are restricting factors. It is therefore recommended that DAFF should support this endeavour on a Provincial scale so that all FPAs can work on a communication campaign dealing with the highlighted issues. This cannot be a 'one size fits all' communication solution. It is vital to understand the different landowner market segments and what type of communication will 'speak to them'. It is hoped that DAFF will support the growth of FPAs in this communication campaign as well as with growth and the development of capacity in other areas.

- Eden District Fire Services and, more specifically, the B Municipalities must become better at enforcement, as well as creating bylaws aligned with the National Veld and Forest Fire Act No.

101 of 1998. The Southern Cape FPA and its FMUs need to be the 'good guys' in the eyes of the community. There is, however, a major challenge with non-compliant landowners who are not FPA members. Action must be taken against landowners who are putting other landowners at risk. This includes State-owned land where there is also non-compliance. It is recommended that the B Municipalities consult with the Southern Cape FPA when drafting these bylaws, as there are aspects that the Act might not cover, e.g. prescribed burning, taking into account the ecological requirements of the system (i.e. required fire-return intervals).

- Landowners, in the Eden District, are experiencing challenges with the current systems for prescribed burning. It is recommended that Eden District Fire Services and B Municipalities, which should be encouraging landowner-prescribed burning, hold a strategic meeting in 2018 to put together a plan for an optimised system for burn permits, burn approval days and assistance with burning. The Southern Cape FPA should represent the landowners in this strategic planning.

- It is recommended that the Southern Cape FPA, together with their FMUs, should be performing wildfire-risk analyses of their areas and sharing this information with other landowners as well as Eden District Fire Services and B Municipalities. This bottom-up, localised information is essential to keep Fire Services up to date with local risk factors. Before doing so, Eden District



Fire Services and B Municipalities and the Southern Cape FPA should determine the risk-assessment criteria, methods of assessment and put together a template so information can be focused and standardised. This should then form part of the FMU annual planning process. Tied to the risk analysis must be a tactical intervention plan covering all aspects of integrated fire management taking place in the community.

**Fire suppression should
be your last resort.**

**Your focus should rather
be on prevention**

**— Paul Gerber, Southern
Cape FPA**



Awareness, and acting on that awareness, is essential to reducing the risk landowners and homeowners face from wildfire. The more landowners and homeowners in the WUI areas adopt this behavioural change approach and support their FPAs and the Wildfire Specialists striving for positive outcomes, the more we will see the development of wildfire-resilient communities.

All homeowners need to look at their home and ask themselves if they are confident it will withstand a wildfire. If they are unsure they need to be proactive and seek information and guidance.



Above: For FPAs to be effective, it is imperative for all landowners to join and support them, as well as become proactive members. Wildfire risk reduction on a community level is much stronger than individual efforts.





Homeowners and the WUI

Introduction

The Wildland Urban Interface (WUI) is an area where urban homes are situated close to or in the veld, forests and mountains – which are prone to burning. The WUI normally extends well beyond the perceived urban edge. There are three ways that fire spreads in the WUI:

- **Flame and heat:** Direct flame contact and radiant heat burns homes, vegetation and flammable materials such as fences, garden furniture, etc.
- **Ember attack:** Embers (burning matter such as bark and twigs) are thrown up into the air by the fire (convection) and carried in the wind until they fall and collect in areas vulnerable to ignitions (e.g. wooden decks, garden vegetation, wood piles, in gutters filled with leaf litter, through roof ventilation, on dry timber, under gaps in windows and doors and onto carpets and curtains, etc.).
- **Structure-to-structure:** Once homes start to burn they generate an extreme amount of heat. If there is another home in close proximity, especially downwind, that structure will have a high probability of ignition. One or two homes catching alight can cause a chain reaction, which can destroy an entire block or even suburb.



The illustration above depicts burning material (embers) carried from a fire towards a structure. The structure ignites if there are vulnerable areas which catch alight easily. For example, homes that have organic debris in gutters, open vents into roofs, exposed wooden decks connected to homes, wood stacked against the house, open areas under doors and windows etc.

Wildfire spread by all three of these mechanisms through the Knysna WUI at an incredible rate. In some cases, over 100 homes were lost per hour. The probability that a home will survive is dependent on a number of factors and it has very little to do with chance or luck. There are clear patterns and reasons why some homes burn and why others do not. The images on these following pages show examples of homes that were lost during the Knysna Fires.

The probability that a home will survive is dependent on a number of factors and it has very little to do with chance or luck

- Vulcan Wildfire Management



Above: Flames approach a home.
Photo Source: David Morris (2017) ©

The fire 'front' moving through the WUI is very complex. Unlike areas of continuous vegetation, not everything is consumed by the fire. Fire intensity is high in some areas and low in others. The spread of fire can appear patchy, sporadic and isolated due to embers landing in different areas.



Top and above: Examples of destruction in the Knysna WUI.

Summary of main points covered by Cohen (2008):

- Fire is not a single wave; it is burning in different areas, at different times, and at different intensities. It is burning some homes in its path and not others. It is burning some homes that are outside the main path of the fire.
 - » Fire spreads from ignition to ignition, not like a flow of water but rather:
 - > Thermal radiation (Heats fuel until combustion)
 - > Convection (Fire contact with fuel)
 - > Embers (Firebrands) swept along fast-moving wind currents and blowing ahead of the main fire.

Home Ignition Zone: Homes are fuel, and everything around them that can burn is a potential source to ignite the home. If multiple homes share the ignition zone then both are essentially fuel which can burn each other. (i.e. ignitions sources). This becomes a shared concern and responsibility.

A blizzard of embers can collect and pile up in vulnerable areas. Roofs are usually the most vulnerable part of the home to ember attack. Decking also ignites very often.

“Non-flammable roofs and homes with 9-15m buffer tend to survive” (Pertains to a fire in z Air, CA in 1961 and another in Santa Barbara, CA in 1990.)





Above: This shows the remains of two wooden homes. These homes were destroyed by embers raining down on vulnerable parts of the homes and/or on vegetation growing up against the home igniting and then causing the home to ignite.



Above: Shows the neighbouring home (to the two wooden homes destroyed in the image left). With extensive heat damage to the outer wall (closest to the neighbouring wooden homes) this suggests that this home was destroyed by structure-to-structure ignition. The extreme heat from the homes burning, as well as the strong prevailing wind direction promoting transfer of heat meant this home stood little chance.

Right: The vulnerability of a thatch roof to ignition is shown. This is heightened by the proximity of vegetation and lack of defensible space in the area known as the Home Ignition Zone.
Photo Source: David Morris (2017) ©





Above: The Robberg home in the centre of the image above was destroyed by direct flame contact but the homes on the other side of the road (acting as a barrier) did not suffer any damage.



Above: Homes in White Location (an informal settlement above the town of Knysna) were lost due to direct heat and flame exposure, structure-to-structure ignition and ember attack. If you follow the path of destruction, imagine the intensity of the wildfire spreading up the slope and impacting on the homes, especially on the edge of the community.



Left: Undamaged homes in the Plettenberg Bay area, on the right-hand side of the image had less vegetation around them and were built from materials that are more fire resistant. Fire Services also had better access to these properties. There is some vegetation which has burned in close proximity to the homes however this did not significantly affect the structures. In contrast, in the left of this image, there is almost total destruction of the homes (only visible as patches of rubble). Prior to the wildfire these homes were completely surrounded by vegetation as well as built from materials less resistant to ignitions.





Above: The images above (taken from a video) show a palm tree nearby the Knysna Town that has ignited from embers. This palm tree ignition has subsequently compromised the building next to it as the embers from the palm tree caused the structure to ignite. Photo Source: Jacky Stassen, Knysna Fire Stories book (2017)



Above: In comparison these images were taken during a visit to Knysna by Vulcan Wildfire Management in November 2017. There was no evidence of a burn scar in the neighbourhood surrounding the destroyed structure and further analysis proved that it was embers which caused the palm tree and then the structure to ignite.



Above: This home was positioned on top of a slope and had large and dense vegetation in close proximity. Heat and flames rushing up the slope would have had a direct impact.



Above: Burned areas of an exterior wooden door clearly show how embers can become lodged and slowly burn the material. Left unnoticed the ignition of this door could have led to the entire home being destroyed.



Above: With fine fuel matter and dry grass below the wooden stairs all it took was an ember to ignite the stairs. If there was no one to put out this ignition, it could have resulted in the home connected to the stairs catching alight.



Above: Homes in the Knysna area being rebuilt seemingly with no regard to future wildfire risks. They are being constructed out of the same easily flammable materials and are placed in a dangerous position on a slope with decking extending out over the slope. Without the creation of Defendable Space and once the vegetation grows back, the flames and embers from a fire moving up the slope and the valley could easily reach under the deck causing it to ignite. While a rebuild is important it is equally important that lessons are learned and wildfire risks are understood.

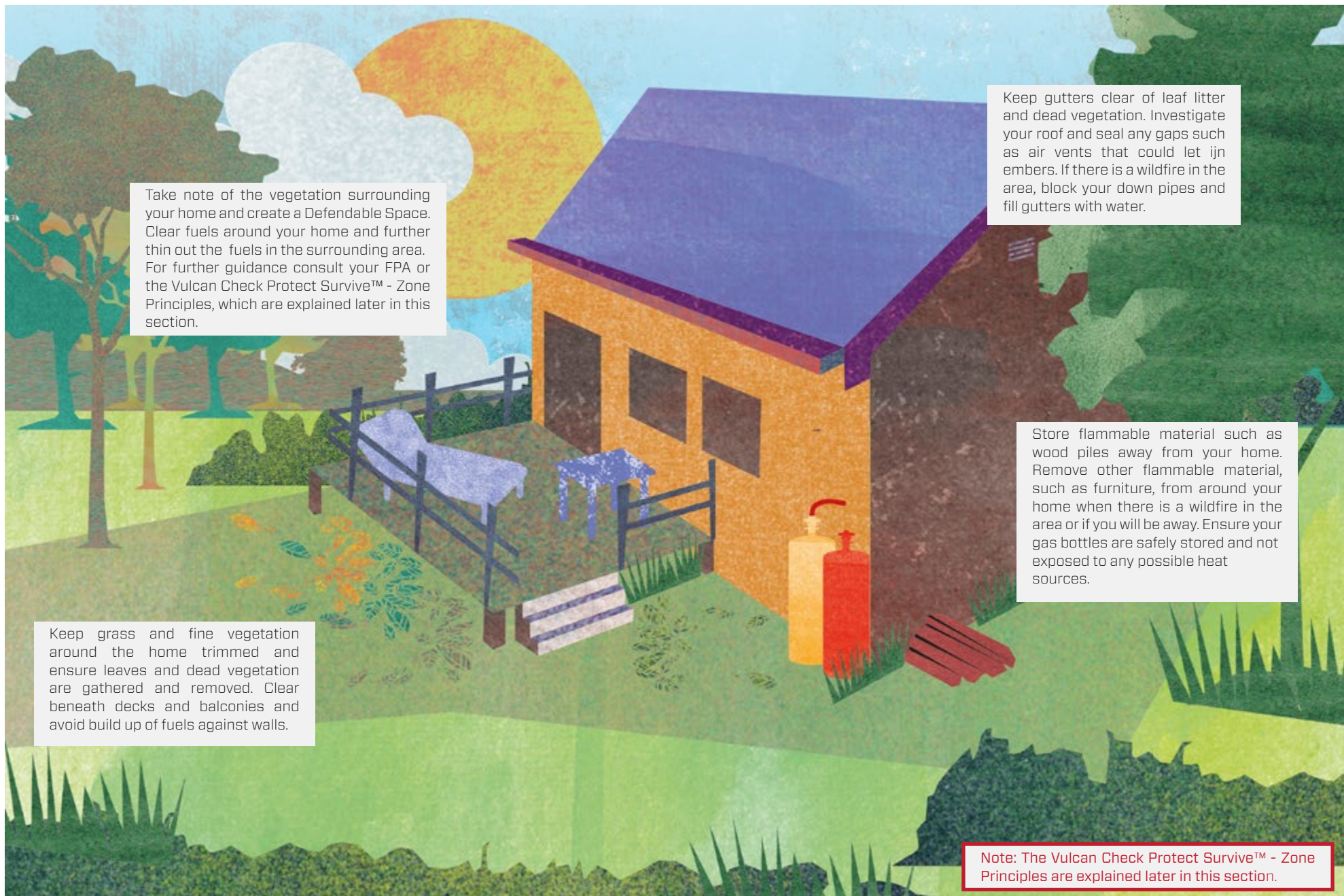


Above: The image clearly shows the positive outcome of good Defendable Space. Even the positioning of the homes on the slope is optimised to have the least risk. There are numerous factors which you have to consider in relation to wildfires. It's always a combination of risk reduction measures that will give your home the best chance of survival.



Above: This image shows how the smallest vulnerability can lead to a home burning down. This photo shows what's left of a burning leaf which had collected over time with other organic materials. Embers blowing into this area, between the gutter and fascia board, caused the leaves to ignite which caused the fascia board to begin burning. Fortunately the homeowner noticed this and extinguished it before the fire could cause serious damage. This small vulnerability could have resulted in the home being lost.





Take note of the vegetation surrounding your home and create a Defendable Space. Clear fuels around your home and further thin out the fuels in the surrounding area. For further guidance consult your FPA or the Vulcan Check Protect Survive™ - Zone Principles, which are explained later in this section.

Keep gutters clear of leaf litter and dead vegetation. Investigate your roof and seal any gaps such as air vents that could let in embers. If there is a wildfire in the area, block your down pipes and fill gutters with water.

Store flammable material such as wood piles away from your home. Remove other flammable material, such as furniture, from around your home when there is a wildfire in the area or if you will be away. Ensure your gas bottles are safely stored and not exposed to any possible heat sources.

Keep grass and fine vegetation around the home trimmed and ensure leaves and dead vegetation are gathered and removed. Clear beneath decks and balconies and avoid build up of fuels against walls.

Note: The Vulcan Check Protect Survive™ - Zone Principles are explained later in this section.



INDUSTRY VIEWS

Summary of main points covered in a meeting on 3 November 2017 with Senior Firefighter Adriaan Swanepoel of the Bitou Municipality Fire and Rescue Services.

(Editor's Note: Swanepoel is speaking about the wildfire spreading from Kruisfontein into Plettenberg Bay)

The Bitou Fire Services assisted in protecting the Kranshoek community as the first community to be impacted by the fire coming down the coastline during 7th June. This was partially successful with no losses occurring but later that night a home and another structure were lost due to embers. Embers most likely took hold due to getting through broken windows or any gaps in the home or wooden structures or items catching alight next to the home. The embers were particularly bad due to Pine Trees being on the land adjacent. Another home was lost because it was surrounded by bush.

One home had reeds on the outside deck, which caught alight and the heat must have caused the window nearby to break and embers to land inside the home. The room and the garage were destroyed as a result, but due to firefighters being on scene early enough, the rest of the structure could be defended. This was a rare save on a home. Most structures, which had caught alight burned very quickly and there was nothing that could be done once the fire had spread through the home.

Summary of main points covered in a meeting on 7 November 2017 with Environmental Planning Manager Pam Booth, Planning and Development Director Marlene Boyce and Town Planning and Building Control Manager Hennie Smit of the Knysna Municipality.

Boyce heard many stories of people who hadn't heard the evacuation order had stayed home and then stopped their homes from being burned by extinguishing the small spot fires that would develop, whereas the homes left alone by people evacuating burned because there was no one there to extinguish the fire while still a small spot fire.

Summary of main points covered in a meeting on 13 November 2017 with Managing Director Paul Gerber and Eastern Region Manager Dirk Smit of the Southern Cape Fire Protection Association.

The WUI is a risk that must be managed by Municipalities. It should be looked at a community safety issue and appropriate budgets should then be set to address these risks and the adequate attention should be given to maintaining a reduced risk status. A positive move that the Knysna municipality made was to add sections of National Veld and Forest Fire Act No. 101 of 1998 into their by-laws. As a result, landowners started contacting the FPA asking for advice. This was a fairly recent action so it's hard to say what effect it had with this fire. Having better preventative strategies would not have stopped a

large-scale fire but it would have definitely reduced the loss and devastation which occurred.

Summary of main points covered in a meeting on 13 November 2017 with Chairperson Chris Gould of the Knysna Heads Association.

During the ongoing wildfire affecting Knysna and surrounds Gould sent out messages to the community to keep a watch out for spot fires (in the Heads area) as there were no firefighting vehicles around. (He points out that there were none seen in the Heads area at any time during the next 5 days.). Soon after this, Gould received a report of a spot fire, (which was near the Alexander Guest House), and Gould called on the WhatsApp group for all able-bodied people to respond to the end of Glenview.



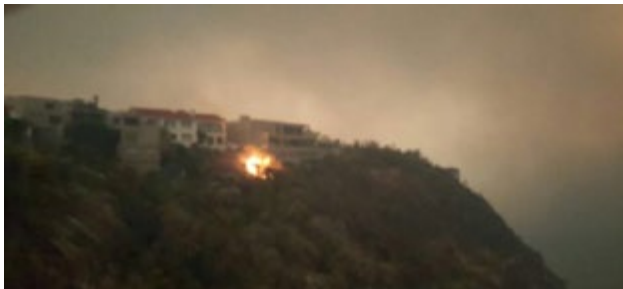
Above: Ignition from spot fire beginning on the East Head near Alexander House. Photo Source: Wayne Alexander (2017)

They arrived to find Dirk Vanderbank and Wayne Alexander (the owners of the Alexander Guest House) and two other people suppressing the fire with their garden hoses. They were managing to keep the wall of the one house wet down and prevented



the fire from causing any significant damage to it. However, the wind blew the fire away from them and the houses, along the cliff line and towards the John Duffy farm. It then continued on to Pezula Estate.

A little later Gould heard about another spot fire below the Top View site near Keith Hollis's property. Gould again asked the community to assist. Hollis had been alerted by his daughter (on holiday in Namibia), who had received a photo of the spot fire from a friend. People responded and suppressed it using buckets and water from the pool.



Above: Photo showing the spot fire near Keith Hollis's property on the East Head. Photo Source: Chris Gould (2017)

Once these fires were contained Gould and his wife (Liezl) formed a roster of volunteers to patrol 2 at a time, every hour on the hour, for 24 hours a day. This carried on for the next 5 days but luckily no other spot fires or flare ups occurred. The fire did burn back towards the Heads and the Duffy property during that night and a few days later but was fairly easily contained and posed no major risk. The closest this came was about 800 metres from the urban edge. Some people did start evacuating that evening but

Gould met up with them and informed them there had been no order to evacuate and they would do better to go back to their homes and wet down their gardens, homes and the trees on the open land near their fence lines and keep watch. He would inform them if there was an evacuation order and if they should evacuate to Leisure Isle.

Since this incident Gould and the community have had a fire risk assessment and fire management plan done and are implementing the actions advised by this. They have also received training in basic wildfire from the SCFPA and how to use and roll up hoses from the Knysna Fire Brigade, despite Clinton Manuel not being keen on communities having fire hose boxes or having a capability to try and contain a fire. The community acknowledges there is risk and recognise they are not firefighters but want to gain the training and equipment to keep themselves safe and stop a fire getting large if possible.

The concern is based on historical fire behaviour as in 2008/2009 a fire started beside the road alongside the lagoon into the East Head and burned very quickly up the slope towards the homes. It was stopped tens of metres from the homes next to the farmhouse on the corner of Emu Crescent and Eagles Way. There is also a risk posed by the braai area at the Heads municipal braai area. While the municipality has agreed to do some clearing, he asks how can braai fires be allowed on an orange or red day? (Referring to the Fire Danger Index).

Hydrants in the Heads area are not clearly marked out and cannot be easily seen. In fact, during a recent visit from the Fire Brigade, several hydrants were discovered that had been forgotten about and become hidden. There is not a lot of confidence in the Fire Brigade's accountability or willingness to keep up to date with hydrant maintenance.

Summary of main points covered in a meeting on 10 November 2017 with 13 residents of the Brenton and Belvidere communities.

Lake Brenton has had fires previously and the last one in recent memory was the December 2009 fire, which by all accounts the community played a major role in reacting to and fighting the fire on the ground. At some stage there were helicopters, which came in and assisted with the operations. A noteworthy and significant difference with the 2009 wildfire compared to the fire of 2017 was that there was very little to no wind, which made the fire conditions very different - a lot more manageable. A big problem that they had was that they ran out of water. Reportedly there was a slow response from the Fire Services and they had very few resources when they did arrive.

In the June 2017 wildfire, the Lake Brenton community had water for a very short period. The fire hoses were rolled out in preparation for the oncoming wildfire. The hoses came from planning for fire many years ago, "from a by-gone era", but they would have certainly helped to a degree to defend the properties. With the hoses all ready to

go, an evacuation order then came ahead of the fire, which meant these hoses and defensive actions were abandoned. There is an understanding of why an evacuation was ordered, to protect life, but with the benefit of hindsight it was felt that some fit and able community members could have safely stayed behind to defend the properties. This quite likely would have saved some of the homes, which were lost.

When the evacuations took place, some community members chose to evacuate to the Brenton Lagoon area. Once the fire had passed and the risk had reduced they were then in a position to check on their homes. Being able to quickly return allowed some homeowners the opportunity to save their homes from burning down. In some instances, small areas on the home had ignited or there were woodpiles or fences attached to the home that were burning. Had they not gone back or been able to go back and check on their property they felt that they would have lost their homes. Having had a safe area to seek refuge close by afforded them the opportunity to safely ride out the fire but then return to save their homes.

One homeowner who evacuated early had time to go back and 'improve the defence of his home' before the fire hit. He wet everything down with a hose as best he could and he believes this saved his home, as all the houses around his burned down.

Another homeowner recounted how the wind was the major problem with this fire. It carried embers in Belvidere and he believes this was the major cause

of ignitions of most of the houses that did burn down. "The sparks were hitting the roof, running up the roof and through the corrugations gaps into the roof". At one stage, he opened his roof to store a couple of boxes his wife wanted out of the way and he saw "sparks flying into the roof". Since the fire he has spent R5000 on rubber foam to seal these gaps to prevent this from happening again. He doesn't know how his home survived this and counts himself very lucky.

Another close call was someone who found his roof truss half burned away, slowly smouldering. There was no appearance of any damage outside the wooden home. Fortunately, it had been burning very slowly and this was picked up upon inspecting the roof.

A power line had come down and blocked an important roadway, which a whole community uses to exit their area. A planning suggestion for potential future incidents is to rather change overhead power lines to underground lines especially at important points where they cross roads.

For weeks after the main fire front the Lake Brenton community felt quite isolated from Fire Services or outside help. They had to work on flare ups and mopping up the fire as little to no help came from outside. The community had run out of water at approximately 17:00 on the 7th of June so they had to improvise a solution. Using swimming pools and any other available water source to get water they

filled rubbish bins, buckets etc. and loaded these on to bakkies and drove around and carried the water to where it was needed.

A similar situation occurred in Brenton-on-Sea where they ran out of water on Wednesday evening, 7th June. Fire services only arrived for the first time on late Thursday night.

Their feeling is that their communities need to become self-sufficient. One of the options that they are considering, and would be willing to set up, is a fire unit of volunteers. They would then look to gather equipment and get the necessary training.

On top of fighting the fires the community set up security patrols and access control roadblocks to their neighbourhood. Apart from people coming and "gawking" at the destruction, there were people coming to steal what they could from the unattended homes. This was very unsettling for the community who had already gone through a traumatic event. The police and traffic services were not prepared to do this and so the community took action themselves.

After 2009, the municipality was supposed to put a disaster management plan together with the ratepayer's association. There was a question as to how disasters are planned for and if there is a disaster centre that could be set up to manage incidents better.





Top: From the air one can gain a better view of the Wildland Urban Interface. It's important to note the wildfire spread pattern throughout this suburb. This highlights the need for risk reduction in all areas, not just on the perimeter of the WUI.
Above: Vulcan Wildfire Management holding an information gathering meeting with members of the Belvidere, Brenton-on-Lake and Brenton-on-Sea communities. Speaking to members of these and various other different communities offered important insight and helped to understand this incident from different perspectives. It also allowed Vulcan Wildfire Management to better understand the personal difficulties and challenges they faced, both during and after the incident.

Summary of lessons learned by the Brenton and Belvidere communities.

- *Interaction with authorities and relationships need to be better. There appeared to be no emergency plan in place. Better pre-planning needs to be made for "Disaster Management". Knysna needs a disaster management plan and communication plan.*
- *Enforcement of firebreaks and fuel management, especially alien vegetation needs to take place.*
- *Fire hydrants need to be checked and maintained regularly.*
- *Every area must have a community safety zone planned for and designated.*
- *Common sense needs to be applied around access points and roads. Anything that can fall down and cut off vital roads, such as power lines, needs to be addressed.*
- *Communities must accept the fact that they are practically on their own during these types of major incidents and as a result the community needs to be better organised. Each community needs their own disaster plan in order to look after themselves.*
- *The Municipality seems to have the responsibility to deal with disasters, but they don't know how to do it. They should look at getting better professional training, even from overseas, in order to be better equipped to handle situations like*

this. They also talk about homeowners 'planning and prevention' but they don't do anything themselves to plan and prevent disasters and this is wrong.

- *Nobody thought this could happen, no one believed it would reach them so fast. We need to have our own fire equipment in our areas. We know how to use it and at least then we could stand a chance.*
- *It's important to look after our own equipment. All fire equipment was taken away after the fire. Now they have nothing left; hoses, stand pipes, nozzles etc. all has been taken from them as people helped themselves to their equipment.*
- *Municipal/official communication needs to be addressed. If a municipality disaster plan fails, we must have our own community plan. You can be as prepared as you like but if you don't know it's coming you will be in trouble.*
- *Thinner hoses are required. They had many 65mm hoses, which are too heavy and use a lot of water. Thinner hoses will still be effective and make operations a lot easier.*
- *An escape plan for the different suburbs is required.*
- *The real disaster will be if we don't learn from what has happened. The community needs to get together and take ownership and responsibility.*

Summary of main points covered in a meeting on 6 November 2017 with resident John Noble of Knysna.

It seems quite clear from the feedback from Noble that the Knysna public had no idea of the wildfire risk they were living with prior to this incident. In fact, another Knysna Fire resident who he has spoken with said they saw the large smoke plume in the early morning but felt no concern about it. They said there are always fires out there.

One of the outcomes from this incident is that Noble wants to form a volunteer unit to assist with Disaster Management in Knysna. This unit would need to be correctly trained and equipped to deal with large fire incidents, floods, etc. and would need to operate within a governed framework such as that of Sea Rescue for example.

Summary of main points covered in a meeting on 9 November 2017 with Sedgefield Station Commander Wayne Sternsdorf of the Knysna Municipality Fire and Rescue Services.

Sternsdorf witnessed that homes with Palm trees, aluminium gutters and asbestos gutters were the houses that burned down the quickest.

- *Sternsdorf has a theory that those gutters held organic material in them, which caught alight and then in turn, set the rafters of the roof alight. He also has a theory that the plastic gutters melt before this happens and this is possibly why*

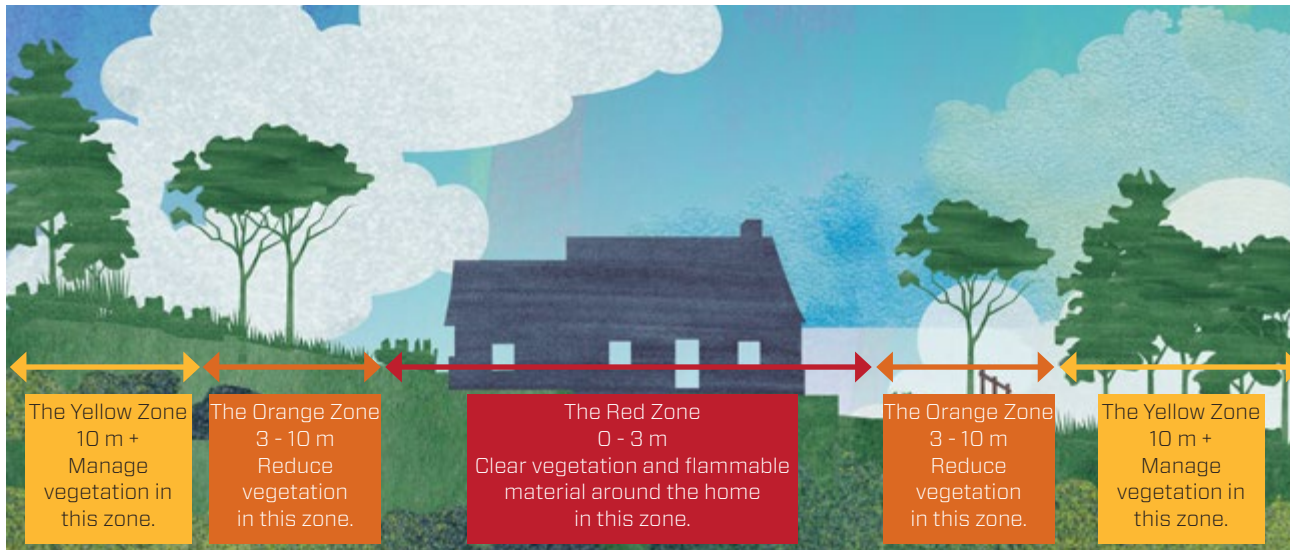
some homes with plastic gutters did survive. (Editor's Note: Homes with plastic gutters also burned. The trend is that gutters trap organic litter which catches alight easily and allows fire to get into the roof. Having plastic gutters is not an enhanced safety feature.)

- *Palm trees were also noted as a definite hazard in the urban interface causing structures nearby to ignite. They ignited due to the embers released from the palms in the strong wind.*
- *Wooden homes with big wooden decking areas and decking on stilts with a large amount of vegetation underneath were also extremely vulnerable and stood no chance with the fire moving through.*
- *The invasive alien vegetation and the lack of defensible space with homes being situated in amongst the vegetation are cited as the main problems with regards wildfire risk faced in the Southern Cape. This was an issue at the Johnston's home and Sternsdorf felt that at the first sign of fire, they should have left home.*

Another issue is the struggle to raise awareness of the risk with landowners and homeowners. Shacks being built further and further into MTO land in the Karatara area encroaching on the firebreak, which is also a problem as it increases the risk to life should a wildfire occur.



DISCUSSION



The illustrations above depict the creation of Defendable Space in the area termed the 'Home Ignition Zone'. This is the area most likely to lead to a home igniting if a fire enters this area. Homes can be made more wildfire resilient by cutting back the larger vegetation in close proximity to the home, trimming and clearing the leaf litter and dry surface vegetation and assessing the risk factors for ember attack on the structure of the home itself.

- If homeowners choose to live and build in high fire-risk areas they must look at ways to lower their risk and exposure to wildfires. They cannot rely solely on Fire Services' response to a fire. They need to prepare. Pre-emptive action and preparation are key to preventing and limiting the spread of fire in the WUI. Examples of some pre-emptive measures include:

- » The location of homes is assessed in relation to potential factors which cause dangerous fire behaviour conditions (e.g. a home located at the top of a slope or a home in a valley surrounded by heavy fuels).

- » Fuel-management strategies.

- » Defendable spaces around homes and assets.

- » Homes built or retrofitted with wildfire-resistant materials.

- » Defensive measures such as sprinklers or window shutters are installed.

- Creating an environment where fire spread is limited in the WUI ensures a safer suppression environment for Fire Services and increases their chance of success. The response to wildfires can have a significant effect in reducing losses but only if that response is well prepared and the homeowners have implemented measures to prepare their homes.

- Due to the continued development and expansion further and further into natural areas the size of the WUI is increasing. Poor land management practices and the build-up of vegetation fuel loads (especially alien vegetation) are priming the WUI area for disaster with homeowners (suburbs and communities) wanting to have privacy and be surrounded by nature. The biggest barrier to change in areas like Knysna and Plettenberg Bay is that communities don't understand the risk they are exposed to and cannot imagine the severity of a wildfire moving through their landscape. Academics and fire experts cautioned that wildfire posed a significant risk in the Eden District years before the Knysna Fires. Vulcan Wildfire Management further cautions landowners living in Eden WUI areas that wildfires like the Knysna Fire are inevitable and will happen again. A shared-responsibility system which promotes a high level of awareness, understanding, acceptance of risk resulting in significant action is required to ensure the outcome of future wildfires is improved.

How homes ignited in the WUI

The processes of how homes ignited 1) before, 2) during and, 3) after the main wildfire fronts hit the Knysna and Plettenberg Bay WUI areas are summarised here:

1) Before the main wildfire front hit the WUI:

- Burning embers were lifted high into the air by the convective energy (updrafts) caused by the fire and were carried by the wind to land in areas ahead of the main fire front. There were accounts given of extremely thick smoke and embers raining down in the suburbs before there were any signs of flaming fronts. Due to the extreme fire behaviour and the types of vegetation on the outskirts of the WUI, the number of embers was significant and they were carried kilometres ahead of the main front.
- Falling embers ahead of the main fire front then destroyed homes in two ways:
 - » Embers would land in flammable vegetation igniting a fire that then spread directly towards a home. Natural and man-made fuels allow for the spread of fire (e.g. vegetation, wooden fences, garden furniture, etc.).
 - » Embers accumulating in vulnerable areas of a home would cause an ignition of the home itself (e.g. embers entering gaps in doors, broken windows, and roof spaces or by embers igniting leaf litter in gutters).
- Once a home had ignited, it was then possible that there were structure-to-structure ignitions (although Vulcan Wildfire Management did not come across any direct accounts of this before the main wildfire front hit the WUI. Note: These types of ignitions did occur later on).

2) During the stage when the wildfire front hit and spread through the WUI:

- As the wildfire entered the WUI, the exposed edges of suburbs were exposed to direct flames and radiant heat, as well as an increased bombardment of embers. Proximity to fuels/vegetation and a lack of defensible space appeared to be one of the biggest factors that determined which homes were lost. Areas where homes were isolated and surrounded by vegetation, positioned on slopes with vegetation below them, built from thatch or had flammable building materials, suffered the most damage/destruction.
- With the flames and incredible heat generated ahead of the flaming front, flammable surfaces on the home and in the garden, would have caught alight and, once alight, fire would have spread through the home very rapidly. Those homes on the urban edge which survived likely either had:
 - » defensible space creating an adequate barrier
 - » were fortunate enough to have firefighters or residents there to extinguish fires or prevent fire from taking hold
 - » were built in such a way that they were more resistant to ignition, or
 - » were positioned in a location where they were not in the path of the fire spread.
- The radiant heat and flames caused by burning fuels around homes could also easily cause



a windowpane to break, allowing embers into the home. Internal fires would then start (on couches, carpets, table clothes, curtains, etc.) and spread very rapidly through the home, destroying it in a matter of minutes.

- Once homes had ignited, structure-to-structure ignitions then started taking place at a rapid rate. The Knysna Heights area was a clear example of this; where homes downwind and in close proximity to an already burning home stood little chance of survival. Large areas, particularly in the Knysna WUI, but also in Plettenberg Bay, were destroyed from structure-to-structure ignitions. Acting on this information, future defensive actions in this instance would require strategies and tactics to focus on preserving downwind homes from ignition and limit chain-reaction ignitions in order to save urban blocks or suburbs from being destroyed.

3) After the main wildfire front had passed through the WUI area:

- There was no longer an identifiable wildfire front (as you would see in a vegetation fire) but rather burning pockets or areas of homes and vegetation. Spot fires that occurred at different intensities caused entire blocks to burn in some areas and only one or two homes to burn in other areas. The fire was still spreading in the general direction of the prevailing wind but also followed the urban topography. Fuels caused the fire to move through the landscape in a complex and dynamic way.

- Homes that had seemingly survived the passing of the main fire front also began to burn once the main threat had passed. In Knysna some homes still burned down on the morning of 08 June 2017, approximately 12-16 hours after the main wildfire front. Small ignitions or a smoulder somewhere on the home may have taken longer to develop (finding a more flammable substance or receiving a burst of air or oxygen to fan the smoulder into flame) and start burning.

- Even though the main fire front had passed through the WUI areas, all three mechanisms of fire spread were taking place.

» Areas that hadn't burned when the main fire front passed through the area could catch alight at a later stage (due to embers or smoulders that take time to develop) continuing the spread of fire to previously unaffected homes.

» Embers were still falling but these were now also originating from the burning homes, gardens and green pockets of vegetation around the suburbs.

» Structure-to-structure ignitions continued to occur as homes ignited after the main fire front had passed through the area, creating new chain reactions.

Right: A garden hose hangs melted into its frame. This home was positioned at the top of a kloof filled with thick vegetation. The fire would have raced up this slope with great intensity. This Eastford Country Estate home, along with many others in this area, was completely destroyed.

Looking at the before, during and after phases described above, it is immediately apparent how difficult fire suppression becomes in this dynamic and rapidly evolving environment. Further to the complexities of fire spread in the WUI, there is the added challenge of human factors to consider (e.g. stress, panic, trauma, evacuations, loss, etc.). This highlights the need for communities to become wildfire resilient and to take proactive steps to mitigate their risk.



Actions taken by Fire Services and homeowners

Fire Services actions

- Some homes in the WUI were saved by the actions of firefighters. Successful accounts include:
 - » Being able to quickly extinguish fire in an outbuilding or vegetation in the surrounding area before the fire spread to the home.
 - » Once a small part of the home had already ignited, being able to extinguish the fire before it had a chance to spread around the rest of the home.
- It was easier to save homes by preventing fire from igniting the home in the first place, rather than trying to extinguish a home that had already ignited. In most cases, once a home ignited, any attempts to save the home were futile.
- Even in the early stages of the Knysna Fires, the fire was spreading at an almost unimaginable rate. With tens of thousands of people residing directly in the path of these fires the priority of Fire Services became evacuation over fire suppression. This further demonstrates why homes in rural and WUI areas need to be made wildfire ready and ignition resistant.

Homeowner actions

- Even though Knysna Municipality Fire Services had ordered mandatory evacuations (which are discussed in a dedicated section of this report), some homeowners chose to ignore the orders and were able to save their homes or their neighbours' homes. These homeowners made the assessment that their life was not in danger and they were in a position to save their homes. There were simply not enough firefighting resources to protect all areas affected by the Knysna Fires and many more homes would have been lost had it not been for the actions of ordinary residents. It must be noted that not everyone who stayed behind was disobeying orders. Many homeowners did not hear or receive the evacuation orders and had to make up their own minds as to what they needed to do.
- Some residents (e.g. Chris Gould from Knysna Heads and Dave Davies of Brenton on Lake) took the lead and organised their communities to save properties (when safe to do so) while keeping in mind the intensity of the fire spread and the need for safe zones. These actions are representative of wildfire-resilient communities. For the most part, in the case of the Knysna Fires, actions were largely reactive. Wildfire-resilient communities need to plan and prepare for wildfires before incidents occur in areas such as safety, tactics, evacuations, equipment, etc.

General observations of how ignitions occur in the WUI area

It is often the small weaknesses in homes that allow fires to ignite and take hold. It can take just one vulnerable point and the entire home can be lost. Below are some key points on common weaknesses, based on residents' eyewitness accounts and Vulcan Wildfire Management's observation of the WUI a few days after the fire had passed through.

Gutters/roofs/eaves/attics

- For homes that weren't completely destroyed by fire, it was observed that gutters/roofs/eaves/attics were the ignition point of fires on the structure. Dry debris normally collects in these areas and is easily lit by embers (particularly gutters). These ignitions then cause the structure to ignite.
- The drought period that the Eden region was experiencing would have meant that the accumulation of any organic debris was extremely dry.
- Once fires ignited in the roof of a structure, it spread quickly and compromised the entire home.

Wooden decks

- Usually ignited at a point close to the ground, i.e. where stairs meet ground fuels or where decks are built on a slope and the fire was able to reach beneath the deck due to the slope and/or vegetation.



- Ignited on top surfaces of the decking and especially in corners where many wind-driven embers accumulated. These are the same areas where the wind normally deposits/accumulates finer organic material, dirt and dust.
- Ignited from fuels or other materials such as furniture or mats which caught alight and then compromised the deck.
- It was observed that well-maintained decks seemed to resist fire better (without any analysis of deck materials, treatments, finishing techniques, etc.).

Home/garage doors and windows

- Ignitions resulted from cracked and unmaintained wooden doors and window frames. This was most likely from embers settling in these areas.
- Internal ignitions were caused by embers entering through gaps.

Fences

- Wooden fences in the WUI ignited due to embers and/or direct flame and heat contact from surrounding vegetation. Fencing was often attached to homes, gates and decks and allowed the fire to spread from the fences onto these structures.

Landscaping and vegetation

- Palms, pines and – to a lesser extent – gum trees were a major hazard in the WUI. They were extremely prone to ignition, burned for long periods, and were the source of many of the embers that caused downwind homes to burn down.
- Branches overhanging homes or vegetation in close proximity to homes (within 3-5m) often resulted in ignition of the home if the vegetation caught fire.
- Most fire-resistant plants did not ignite and those that did only smouldered. These plants posed no significant threat to homes.
- Dense bush/vegetation near windows and/or covering a large area around the home dramatically decreased the survivability of the homes, if this bush/vegetation ignited.
- Homes with open lawns and less-flammable materials surrounding the homes were less likely to ignite due to direct flame/heat contact as the fire front moved through the area. They were still vulnerable to embers.

Construction and position of structures

- Thatched roofs without drencher water systems were invariably destroyed. Thatch that had been hosed down or had mediocre sprinklers fared only slightly better. The thatch dried very

quickly and once the thatch had ignited, it was almost impossible to extinguish.

- It is well known that, all other factors being equal, homes built out of flammable materials have a higher ignition rate. There was some confusion among the Knysna and Plettenberg Bay residents post fire as there were areas where wooden homes had survived but brick homes had burned down. This could be attributed to brick homes being exposed to more heat/flame contact due to a lack of defensible space surrounding the homes – or other weaknesses vulnerable to embers. The wooden homes in these instances may have been very well-maintained or had treated wood and were located away from the direct path of the fire.
- Homes on vegetated slopes were especially vulnerable (e.g. Knysna Heights), particularly those that had wooden decks extending out into with vegetation below.
- Homes that were sunk into the ground and had soil, grass or light vegetation berms on the exposed side had much better survival rates. It is presumed that the wind, heat, flames and embers were mostly deflected over the homes by the berms.

RECOMMENDATIONS

- Eden District Fire Services and B Municipalities, in consultation with the Western Cape Directorate Disaster Management and Fire & Rescue Services, must develop focused awareness campaigns targeting the WUI homeowners in Eden. The aim should be awareness, education and actionable safety and tactical interventions. National Veld and Forest Fire Act No.101 of 1998 is geared towards landowners who receive support from the FPA. If you consider the wildfire challenge and loss experienced by homeowners in the Knysna and Plettenberg Bay WUI, a strategy must be developed to guide and support these types of homeowners. The communication campaign should consider:

- » comprehension of risk

- » creation of defensible space

- » favourable positioning of homes on terrain and ways to lower risk if homes are already built in unfavourable positions

- » building homes out of ignition-resistant materials and good maintenance/retrofitting of those already built

- » wildfire-ready landscaping

- » maintaining fuels on and around the home (e.g. clearing gutters, removing leaf litter from under decks, etc.)

- » home-defence measures (e.g. water tanks, hoses, removal of outside furniture, wetting down areas, stay-and-defend tactics, etc.)

- » evacuation procedures, and

- » instruction for homeowners' high-risk fire days.

- B Municipalities in the Eden District must develop a strategy to provide incentives as well as enforcement of risk reduction in the WUI. Awareness is a major problem. However, there is also a segment of homeowners who lack the motivation to take proactive measures in safeguarding themselves from wildfires (this puts other homeowners at risk). A strategic and multifaceted approach to both incentivise and enforce behavioural change is therefore required. Other role-players (e.g. FPAs, insurers) could also be factored in to the strategies developed by B Municipalities to encourage behaviour change. The focus needs to encompass and target entire risk areas and not sporadic, isolated areas.

- Southern Cape FPA and Eden B Municipalities need to have a strategic meeting to see if the Southern Cape FPA could possibly provide some support to Eden WUI communities. The FPA would need to receive support from the local B Municipalities in order to sustain this increased service and responsibility. Just as there are FMUs for landowners in rural areas, WUI community FMUs could possibly be

developed.

- Homeowners in Eden WUI areas need to put pressure on building engineers, architects, town planners, developers and builders, home material manufacturers, etc. to ensure attention is focused on wildfire risk and how each of these role-players can play a part in reducing these risks.

- Eden District Fire Services and B Municipalities, Southern Cape FPA and well as Eden District Disaster Management need to look into computer modelling of fire spread. This should be used to investigate “what if” scenarios for ignitions – especially high-risk areas such as Wilderness and The Craggs areas. This would provide an understanding of the possible and probable fire spread (and potential damage) so that it can be prepared for and mitigated. These scenario outcomes could also help motivate and prioritise the proactive actions required by homeowners and landowners.

- Eden District Fire Services and B Municipalities need to engage with Eden WUI communities and take the lead on proactive interventions. Before an incident occurs, they must:

- » have strategic and tactical response plans for WUI areas. These plans must be shared with neighbourhood groups and leaders. The plans must detail actions that homeowners can take or maintain to enhance the operations.

- » Have evacuation plans for all WUI areas.



» Set the example in and around the WUI in terms of how they maintain and lower risk on municipal land.

• Eden WUI community groups, B Municipalities and Fire services need to have detailed and well-established evacuation plans. Part of this process is creating designated Community Safety Zones. The benefit of local evacuation points is significant:

» Evacuation is more orderly as everyone knows where to go before an incident.

» Multiple Community Safety Zones reduce the accumulation of too many people in one spot.

» A central location allows communication of incident information and updates to be shared at these locations.

» Support and outside aid have known places to interact with affected community members.

» Community Safety Zones can be chosen at places where there are facilities to support people's basic needs such as water and toilets. Alternatively, a plan should be in place to provide these during an incident.

» Being in close proximity to their homes, those who are willing and able can then go back to check on their home after the fire front has hit and it is safe to do so, to

prevent any small ignitions taking hold on structures (if the community has done wildfire-ready planning).

» An annual audit of the Community Safety Zones must be done by the B Municipal Fire Services and must be signed off by the Chief Fire Officer.

• A recommendation is that the Western Cape Directorate Disaster Management and Fire & Rescue Services establish a Provincial WUI Task Force which has a mix of scientists, wildfire specialists, videographers, photographers, investigators and researchers. Further comprehensive documenting and analysis of Western Cape WUI incidents is required during an incident or as soon after as possible. If such a Task Force is established, it can be activated to the next significant incident in the very early stages. The analyses and footage obtained can be used to drive ongoing improvements in WUI strategy and tactics in the Western Cape.



Right: A home in Belvidere situated in the middle of tall gum trees lies in ruins. Despite there being a cleared area around this home, there is the possibility that large embers flew off the trees and found a vulnerable access point into part of the home, leading to its ignition.



Above: A large home in Pezula Estate, outside of Knysna reduced to rubble. It is likely that the position of this home, on a slope with the close proximity of the vegetation contributed to its destruction.

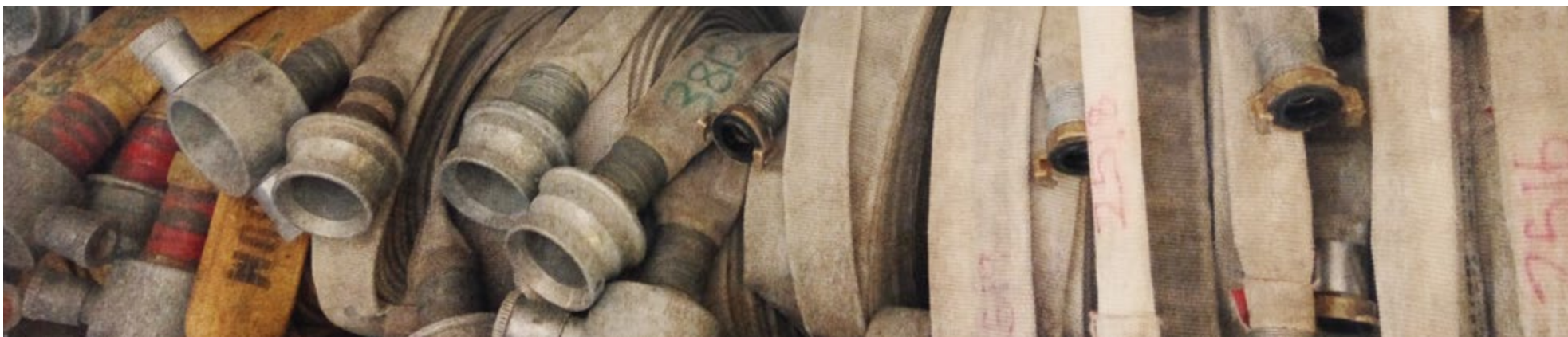


Fire Services

Introduction

In terms of the legal framework, Eden District Fire Service is the official Fire authority mandated to respond to wildfires in the Eden District, supported by the B Municipalities. However, in order to cope with the abundance and complexity of wildfire incidents, the collective resources and expertise of other role-players are required:

- large landowners such as Cape Nature, SANParks and forestry companies such as MTO, PG Bison, etc.
- Expanded Public Works Programmes (e.g. Working on Fire)
- private firefighting from contract crews
- NGOs and volunteer firefighting organisations such as the Bitou and Knysna FMUs, and
- small landowners and their localised resources.



The Fire Services are made up of:

- A Municipalities: Metropolitan Fire Services (e.g. Cape Town or Johannesburg Fire and Rescue Services). They deal with Urban Fire and Rescue, vegetation fires on city land and assist in WUI wildfire operations.
- B Municipalities: Municipal Fire Services (e.g. Bitou, Knysna and Hessequa). Their function is urban firefighting and rescue and they play a support role in wildfire operations.
- C Municipalities: District Fire Services (e.g. Eden, Overberg, Cape Winelands). They focus on wildfires and hazmat operations.

When it comes to wildfire operations, B Municipalities and District Fire Services are vehicle-based firefighting crews. Wildfires often tend to occur in or burn into more remote areas, requiring ground crews. These ground crews can be requested or dispatched from a number of wildfire organisations (e.g. Working on Fire, private wildfire contract crews, formal volunteer organisations and volunteers of the FMUs).

Aerial resources are also available, mostly from Kishugu Aviation. They offer firefighting helicopters, fixed-wing air tankers, and spotter aeroplanes. In some areas there are limited privately-owned helicopters that are available on contract.

Even with the above resources, wildfires continually stretch the ability of the Fire Services to suppress and manage them. Wildfires are complex. Their spread is affected by different weather conditions

and varying terrain and vegetation (fuel) types. It requires firefighters who understand wildfire behaviour to suppress these fires safely and effectively. Firefighters can be classified into different kinds based on the functional tasks they are trained and equipped to carry out, the geographic areas they serve and the types of fires and incidents they respond to. The following is a generalised summary of types of firefighters.

Urban firefighters

Respond to structural (home and building) fires, informal settlement fires, rubbish fires and grass fires in urban environments. Urban firefighters don heavy-duty protective gear and breathing apparatus to protect themselves from hazards. They are also involved with urban rescue (e.g. motor vehicle accidents and high-rise building rescue), hazmat operations and, in some cases, water rescue. They will assist in structure protection during wildfires and provide wildfire defensive actions on the perimeters of the WUI. Urban firefighters are largely vehicle bound (they rely on water supplied by tankers) and their priority lies with structure protection (after life safety).

Rural/urban firefighters

The scope of these firefighters is very similar to urban firefighters. However, they usually operate in smaller towns bordering rural land and conservation areas. These firefighters are exposed and respond to more wildfires and, as a result, will have a greater understanding and experience with wildfire-specific suppression tactics. They are still not wildfire specialists and they are required to

perform similar structure and rescue operations as their urban counterparts. These firefighters are also vehicle-based crews.

Wildland firefighters

Wildfires occur in areas of natural and/or alien vegetation that fall outside of or on the edges of urban areas. These wildfires are often referred to as veld, bush, forest or vegetation fires. Wildland firefighters specialise in firefighting in the natural environment and do not respond to urban fires.

There are vehicle-based resources which deal with wildfire management, suppression and hazmat situations (District Fire Services).

The other category of wildland firefighter operates as ground crews made up of between 10-20 firefighters required to follow wildfires deep into the mountains or remote areas. While these crews are normally trained in using water-suppression tactics from vehicles, they primarily work in remote areas with hand tools, physically beating down flames, cutting control lines in the vegetation or conducting counter-fire operations.

WUI firefighting

WUI firefighting takes place in a very complex and hazardous environment and wildland and urban firefighters from various organisations are needed to tackle these incidents – and, more importantly, interagency collaboration is needed for them to be effective. There are currently no specialised fire crews to perform this function in the Western Cape or South Africa. This is surprising, given the specialist nature of this environment. The current



approach is to use combinations of different types of firefighters to fight WUI fires. In limited areas this works very well. However, in most cases, the important elements of teamwork, cooperation and multi-agency command are challenging. This is perhaps a result of personalities, questions around responsibility or poor relationships. These can lead to dysfunctional operations and crisis management in the WUI.

Aerial firefighting

Aerial firefighting is another strategy for suppressing wildfires. Their presence and visibility often leads the public to assume these resources to be the primary wildfire resources. This is not the case. They are very effective – but only during certain stages of wildfires and when combined with an efficient ground crew (wildland firefighters) to secure and contain fire lines. Aerial firefighting is extremely expensive in South Africa.

Knysna and Plettenberg Bay Wildfires

It would be unfair, incorrect and counterproductive to apportion blame to the Fire Services for the crisis and loss that occurred during the Knysna Fires. This type of incident is extremely complex and crews in the field did their best with the available resources. There was phenomenal interagency support and cooperation during the Knysna Fires and more must be done to ensure these ongoing partnerships and relationships become entrenched. There are, however, big improvements that can be made to ensure Fire Services are better equipped to handle these types of incidents in future.



Above: The extreme weather and dense vegetation meant firefighters had very difficult conditions to work in. Photo Source: David Morris (2017) ©



Above: Firefighters found safe areas to rest and recover before engaging the fire again. Photo Source: David Morris (2017) ©

INDUSTRY VIEWS

Summary of main points covered in a meeting on 7 November 2017 with Environmental Planning Manager Pam Booth, Planning and Development Director Marlene Boyce and Town Planning and Building Control Manager Hennie Smit of the Knysna Municipality.

Boyce was concerned about the municipal fire resources being stuck outside of Knysna and not able to get back in to assist with structural protection. By all accounts, there were no resources at Knysna Heights, Paradise and that general area of town.

Booth said that there was no cell phone reception or landline in Elandskraal that first morning and there were also very few formal resources which she could see - although the local farmers and PG Bison were there. Smit stated that there are very few resources in the rural areas and this is why growing the capacity and knowledge of the FMU/FPA is so important. However, it is also important for the neighbourhoods to empower themselves with firefighting capabilities so they can aid the overstretched Fire Services in the rural areas. This was especially relevant for areas delineated as nature reserves as well as communities and residential units that exist on the urban edge and are at risk of wildfire impact.

Summary of main points covered in a meeting on 2 November 2017 with Forestry and Veldfire Management Programme Co-ordinator Tiaan Pool of the Nelson Mandela Metropolitan University.

There is a lack of fire management knowledge and experience, which exists within critical areas of management and authority in the Fire Services, Municipalities and some Fire Management Units (FMUs). There exists within these structures a disconnect between practical experience, the knowledge of fire management practises and how the two fit together in a strategic framework. There is a fundamental issue with the low level of education required to become a firefighter especially when they move into the role of an officer who is required to make strategic decisions. When considering wildfire specifically, there is a problem with the lack of ongoing wildfire related training and a real understanding of what integrated fire management is within the Fire Services. On the other side of the coin are organisations, such as Working on Fire, that offer a large amount of basic on the ground wildfire training but have a high turnover of personnel due to economic driven factors and a ceiling for real career development. This results in a loss of knowledge and skills when their personnel leave the fire arena.

Summary of main points covered in a meeting on 9 November 2017 with Chief Fire Officer Clinton Manuel of the Knysna Municipality Fire and Rescue Services.

Manuel described the standard resources available to Knysna Fire and Rescue Service on any given day are as follows:

3 Stations:

Knysna: fully manned fire station

Sedgefield: fully manned fire station

Concordia: sub-station

Additionally:

In Karatara there is a volunteer fire station with firefighting duties provided by current municipal employees on a roster system as a first response. In the Rheenendal area another Municipal Employee performs fire standby studies as a first response.

Vehicles:

Knysna: 1 x Medium Pumper, 1 x Skid Unit

Concordia: 1 x Tanker

Sedgefield: 1 x Tanker, 1 x Bush Tender, 1 x Skid Unit

Karatara: 1 x Medium Pumper

Human Resources:

29 Full Time Employees

12 Reservists

2 Municipal Employees who share standby duty, Karatara (first response)

“On the morning of 07 June 2017 Knysna Fire Station had two fire engines manned by five firefighters. Sedgefield had two fire engines manned by four firefighters. One firefighting vehicle was away for refurbishment at the time and another in for repairs.”
Taken from: Report of the Chief Fire Officer: Knysna Fire and Rescue Service on the Fire originating in the Elandskraal area, Knysna on 07 June 2017.

Clinton Manuel makes the analogy of the Knysna Fire Services and Municipality versus this incident being like a school rugby team facing the All Blacks - you



are simply not going to beat them... you just need to see out the 80min and hope you come out alive. The reality was that there was nothing that could be done to stop that fire under those conditions and the best that could be done was get out of harm's way. As a small Fire Service, you need partners, you need to be able to call for help and ask for assistance.

Summary of main points covered in a meeting on 14 November 2017 with Deon Van Zyl of the Rheenendal Fire Management Unit.

The fire response procedures in the Rheenendal area need to be looked into as Van Zyl feels they are not adequate. Charl (known only by his first name), a local municipal worker is required to head out to view a fire when one is reported. He will then assess it and confirm with Knysna Fire Services whether or not they should send resources. This can result in a 20min or more delay in response time after a fire has been called in by a landowner or Van Zyl (head of the FMU). The delayed response can lead to increased fire activity by the time the Knysna Fire Brigade arrives, which is more difficult to suppress. As a constructive suggestion, the Rheenendal Village community would like to see a firefighting resource situated much closer by. There are many ex-members of the Goudveld Working on Fire team that are still living there and perhaps they could form the basis of this crew. A meeting with the Knysna municipality was promised after the incident, but to date had not occurred.

Summary of main points covered in a meeting on 3 November 2017 with Chief Fire Officer Hedley Venter of the Bitou Municipality Fire and Rescue Services.

Bitou Fire Service feels like they are at the forgotten edge of the Western Cape. They struggle annually with not being given enough budget. Furthermore, the supply chain management process to keep their vehicles running is not working. They are also required to have resources placed at the Plettenberg Bay Airport, which means that their response capability is affected due to this commitment. Bitou Fire Service is also severely lacking in the required number of people to handle the daily administration and logistical demands. These tasks are currently being overseen by the senior operational firefighters themselves. During the Knysna Plett Fires Venter could not assist with overseeing the Disaster Plan (despite initiating it) because he was required to be operational from the night of the 7th until the 18th June. Only then was he finally able to step into the Disaster Management role.

Summary of main points covered in a meeting on 8 November 2017 with Gerhard Otto of Eden District Manager Disaster Management and Richard Meyer of the Knysna Municipality.

On Saturday 10th June, with all the resources that had already assembled (over 1000 firefighters on the line, over 10 aerial resources and a fully functioning Incident Command System) we still lost 10 houses

that day. This just demonstrates that active response tactics and an abundance of resources are not always sufficient to prevent structure loss and damage. It highlights the importance of the preventative work. It also speaks to the previous days where the fire was running out of control. Even if Knysna had all those resources there from day 1, with the wildfire burning in the way it did, it would not have been possible to stop it.

Before the establishment of Working on Fire (WoF), Eden District would call on the South African National Defence Force (SANDF) for assistance with helicopters for wildfires and there was no bill for this assistance. Then WoF was established which created a wide network of helicopters. The challenge is that these helicopter resources are expensive and in one fire you can deplete the whole District Municipality aerial budget. The aviation bill for the recent Stillbaai Fire was in excess of 3 million Rand, and that's Eden's aviation budget for the whole wildfire season. "If you look at the Mopani District Municipality court case, when the helicopters were there, they then didn't use it (the helicopters) because they said they did not have the budget for it (the helicopters), and now they have been held accountable [...] If we look at a way forward, we need to have more clarity (on budgets and what to do if there is no budget etc.)."

“Fly rates for this season 2017/2018 R53 593 per hour Huey, Bomber R44 462 per hour, Spotter R7 688 per hour.. Standby Fee’s, if you want it for this season 2017/2018: Huey R352 000 per month, Bomber R448 000 per month, Spotter R78 000 per month.”

Ground crews are extremely important, as you need crews on the ground to fully extinguish wildfires. Because of the pressure to put out wildfires and the repercussions for not using aerial resources, there exists extreme pressure to always use aerial resources. Contributing to this is public perception and pressure that aerial resources are always the best option for wildfire suppression.

The WoF ground crews have their place. However, they have limited operational ability. Their crews need supervision and oversight to keep them on task. The nature of the programme means you are not building long-term career firefighters and generally there is a high turnover rate of crew members. So firefighter knowledge and experience is not built over the years. The District, given its size and complexity cannot always respond to all wildfire incidents, making relationships with other role-players extremely important. The available resources that the Eden District have in order to cover their 42000 square kilometres are included in the Chief Fire Officer Freddy Thaver’s answers.

Historically there were relationships with WoF, CapeNature, FPAs and Contractors to assist the

District with wildfires. However, where there were MOUs, they have now lapsed. Relationships have also unravelled under the existing Eden District Chief Fire Officer.

The limited staffing resources of the district then become a further challenge when you need to send firefighters on training courses or any other reason that will mean they are not available for duty.

These are the questions and answers taken from an email, which Chief Fire Officer Freddy Thavar of the Eden District Fire and Rescue Services responded to on 30 November 2017.

Question: What resources do Eden District Fire Services have?

- Answer:
“3 fire stations, 36 firefighters, 4 officers, 1 admin assistant, 7 Water Tankers, 1 Hazmat Unit, 6 Skid Units, 1 Rescue Vehicle, 1 Quantum”

Question: Based on your resources, what limitations and challenges do you face?

- Answer:
“Inadequate resources to cover the area”

Question: How can/do you overcome these challenges?

- Answer:
“Acquire more resources”

Question: What resources does the entire District have if you include your Municipal Fire Services, Forestry, Large Landowners etc.?

- “The following local municipalities have dedicated fire and rescue services:

» George

» Mossel Bay

» Knysna

» Bitou

» Hessequa

» Kannaland is attempting to establish a Fire Service and currently have 1 permanent firefighter and 2 volunteers

» CapeNature and SANParks have dedicated firefighting resources

» Forestry companies have dedicated firefighting resources

» Local FPA have WoF teams”

Summary of main points covered in a meeting on 8 November 2017 with Manager Gerhard Otto of Eden District Disaster Management and Richard Meyer of the Knysna Municipality.

Meyer claimed that fire safety, specifically wildfire safety, needs greater focus in the IDP. It is imperative that wildfire budgeting, especially regarding mitigation work be included in the IDP. If it’s not included, you will not get money for this work. There



has never really been a focus on wildfires within the IDP. House fires have featured but not wildfire risk. Disaster management has a slot in the IDP that could be used to highlight preventive measures. Included in the budgeting for work to be done, it is important to include plans and budget for making this work happen and for enforcing it.

Summary of main points covered in a meeting on 3 November 2017 with Senior Firefighter Adriaan Swanepoel of the Bitou Municipality Fire and Rescue Services.

There is a need for a better shift system where there is a standby crew to back up the crew on duty when required in large incidents or multiple fires. The right amount of personnel and staffed positions is required for this system to work optimally.

Budget restrictions are a major concern. Simple things like fire hoses are even difficult to purchase. Most of the breathing apparatus items need replacing but there is no budget to cover this. The station compressor needs replacing but they are unable to do so. Supply Chain Management is a major issue. The time it takes to get quotes and repairs to vehicles for example is a major concern and then the repairs don't even get done correctly. The Fire Service is a costly service and there is constant wear and tear on vehicles and equipment. The feeling is that there is a lack of understanding of this within the Municipality and Supply Chain Management and that Fire Services is one of the first to receive budget

cuts and have to keep making do with out-dated or patched together vehicles and equipment. Another point is that the budget for Fire Services items could be better managed from within Fire Services. An example is that Human Resources manage the training budget. Swanepoel feels that if this budget were managed within the Fire Services division, they would be able to maximise this spend and achieve more with what has been allocated. One of the worst hydrants in town is located at the fire station. It takes 15 minutes to full a 1000 litre tank at times. There have been talks and plans of a new fire station for years but nothing has materialised to date. A fire station can really make a big difference to the crews and overall with all the challenges they face. It really feels like there needs to be more all-round support for Fire Services.

He highlights that there is a misunderstanding of what the District Fire Services tactics are at times. There is also a major communication challenge at times because the District Fire Services only have vehicle radios and not portable radios (If they do have any portable radios they are extremely limited and Swanepoel only ever recalls on one occasion them having one). So, when their crews are away from their vehicle, which is often the case during operations, there is no way to communicate with them.

Summary of main points covered in a meeting on 8 November 2017 with Manager Gerhard Otto of Eden District Disaster Management and Richard Meyer of the Knysna Municipality.

There are currently no formal mutual aid agreements between municipalities in Eden for mutual aid assistance in times of wildfire incidents. Mutual assistance sometimes takes place but it is largely based in personal relationships that have been developed. For continuity and a more effective system, especially where resources are limited, it would be preferable to have more formalised mutual aid agreements in place. This assistance could be in the form of human resources, equipment or anything that could be shared in times of need across Municipalities.

Summary of main points covered in a meeting on 4 December 2017 with National General Manager Shane Christian and National Spokesperson Linton Rensburg of Working on Fire.

If you look at how Fire Services are operating in the Western Cape compared to the other Provinces, they are light years ahead. The thing that will break all this down is if we start disrespecting each other's functions and ignoring indigenous knowledge and people going forward.



Important people are going to be retiring in the next five years. What happens after that? All that knowledge and experience will be lost. We need to get people to shadow these positions.

Summary of main points covered in a meeting on 13 November 2017 with Managing Director Paul Gerber and Eastern Region Manager Dirk Smit of the Southern Cape Fire Protection Association.

Wildfire experts are generally not taken seriously or respected by Fire Services. The Managers and Field Operators in particular often come from backgrounds with valuable on the ground experience as well as wildfire risk reduction experience linked to experience in understanding the real landowner challenge. For some reason Fire Services “think they are the experts”. For relationships within the industry to improve as well a better Integrated Fire Management, Fire Services need to respect the fact that there are other experts in the industry, which they can work together with. Wildfires are a specialty, and there are specialists in this area, mostly sitting outside the Fire Services.

Summary of main points covered in a meeting on 4 December 2017 with National General Manager Shane Christian and National Spokesperson Linton Rensburg of Working on Fire.

WoF has approximately 9-10 teams in the Eden District and they work with partners including the SCFPA, CapeNature and SANParks.

WoF have 1 spotter and 1 chopper based near Knysna all year round. They are paid by role-players including MTO and then there is a standard agreement for choppers from 1st December to end April. Training, crews receive advanced firefighting training and various other skills training all of when is wildland specific training and Type 1 crew leaders. They also do basic and intermediate ICS training. ICS is Standard Operating Procedure and management system for WoF in all firefighting operations including prescribed burning.

WoF are normally activated through their partner organisations or any other requesting party. Teams must be dispatched from the dispatch centres (to ensure insurance cover etc.). WoF always sends an agency representative to sit at the designated ICP. They don't have set tactics for dealing with different types of fires (e.g. lightning fires). Partners call out and manage teams. Teams arrive, size-up the fire and decide on tactics from there. Crews are involved in Wildland Urban Interface operations, not just wildland operations



DISCUSSION

When it comes to Fire Services, a ‘see what you can do when you get there’ approach will not work in large and complex wildfire incidents. Clear objectives and predetermined tasks are essential to ensure favourable outcomes. Time is a critical factor, as observed during the Knysna Fires. The rapid-fire spread, at times a home lost every minute in the Knysna WUI, meant that it was difficult to establish plans as the incident was unfolding. Strong crew leadership in dynamic situations is also important. On the ground, rapid decision-making backed by good judgement is needed so that teams can adapt tactics to meet challenges and achieve their strategic objectives.

While the initial attack strategies are in effect (i.e. first response), Incident Command can then begin planning for the next operational period based on feedback from the initial responders. This becomes the time when live planning based on the unfolding situation is essential.



**Even if we had the whole of the Cape Town fleet there is
no ways that we could have stopped it
— Wayne Sternsdorf, Knysna Fire Services**

Eden B Municipal and District fire crews

The Knysna and Bitou Fire Services, considering their resources, equipment and training, did the best they could during a wildfire of great scale and complexity. Areas where both Eden District Fire Services and B Municipal Fire Services require greater support or improvement:

- Wildfire-specific training for all levels/rank of crew.
- Advanced wildfire education and training for leadership must become a requirement for senior firefighters, officers and higher ranks.
- WUI-specific strategic and tactical training.
- More involvement in work relating to risk reduction within the WUI and the rural environments.
- Improving the relationships between Districts and B Municipalities to promote mutual assistance, sharing of resources and interagency command.
- Better relationships with Southern Cape FPA, landowners and homeowners to encourage risk sharing and a climate of shared wildfire readiness.
- Equipment and vehicles appropriate to WUI fires and wildfires.
- Support landowners with their fuel-reduction burn operations (both administrative and operational support).

- Predetermined strategy and tactics planning for wildfires, ignition hotspots, fuel buffer/reduction zones, WUI operations, evacuation planning.
- Improved communications with public and media. Important messages about what is happening, what to do, what to expect, where to help, etc. must be communicated timeously. There must also be a channel to receive communication from the public, i.e. a feedback mechanism.
- Improved recognition and support of contract wildfire crew services that supplement B Municipality and Eden District Fire Services.
- More effective and efficient use of aerial resources. Huge budgets are drained through the use of aerial resources.

Firefighting aircraft

Over a number of years, there has been a large investment in aerial resources. Firefighting aircraft are very powerful tools in the resource arsenal and have amazing capabilities. However, they do have a number of limitations:

- They cannot operate at night or in high winds.
- They are extremely expensive to operate (in excess of R50 000 per hour for a Huey helicopter), and there are substantial additional standby rates.

- They are largely ineffective in isolation and are required to work in conjunction with ground crews to successfully contain and manage wildfires.

The reliance on aerial resources could become problematic as there is increasing pressure to use the resource and subsequent costs are overwhelming to firefighting suppression budgets. This spend can be argued as having a detrimental effect on ground and vehicle crew development and use. The eagerness to use aerial resources has, in some instances, created situations where they are being used in situations where ground-based crews could have greater impact – for example helicopters water bombing a smouldering area in Wilderness for an entire day only to have it flare up the next day. Excessive and wasteful expenditure is the result. The use of aerial resources and the budget applied to aerial resources should be better balanced with the use of ground and vehicle crews.

Contract fire crews

While there has been significant investment in aerial resources, investment in wildfire ground crews has been severely lacking. Eden District Fire Services, B Municipalities and large landowners need to contract wildland firefighting ground crews because they do not have sufficient capacity themselves. Wildfire crews are available through Expanded Public Works Programmes,



volunteer organisations and crews employed by large landowners. Even with these ground crews available, they lack capacity in terms of numbers and skill.

The wildfire industry needs to make use of private contract crews; however, the contract rates and budgets applied to these crews are shockingly low given the type of work and the skill that is required. The extremely low contract rates promote:

- low levels of training
- low standard of protective equipment
- dangerous transportation of crews (i.e. overloading of vehicles)
- high crew turnover rate and low motivation
- low equipment standards, and
- low leadership ability or a lack of leadership presence.

It is hard to blame the private contract crew providers for this considering they get paid in the region of R35-R45 per hour (2015/2016 Rates exc VAT) per firefighter. That is what the contract crew provider receives and not the firefighter. Contract crew providers occasionally receive standby hours paid on an even lower rate of approximately R10-R15 per hour (2015/2016 Rates exc VAT) per firefighter (but not all crews receive standby rates). There are sometimes weeks without fires where

the contract crew provider receives no income (they only receive the hourly remuneration for the time they are on the fireline). However, they are still expected to remain available for rapid response.

Out of fire season, these contract crews need to find other work. Some will do private work and some will find just enough work (also at low rates) with large landowners or municipalities, creating firebreaks. The contractor has to buy vehicles, equipment, protective clothing, transport, feed, train and run all company related matters with this money. Considering that the landowners and municipalities are the ones paying these rates and considering the wildfire challenges and responsibilities of these firefighters, this is a matter requiring urgent attention and reform.

Low contract crew rates have meant the ground crew aspect of the wildfire industry has remained in a state of infancy. A possible contributing factor and an unintended consequence of the Working on Fire Expanded Public Works Programme is that it has created a no/low cost resource provided to municipalities and landowners funded by government. This means any other private contract crews struggle to compete or survive. This might be fine if the Working on Fire crews could do all the work and meet all requirements, but they have their limitations. In the Western Cape, the general view of those who use these crews is that they are good

for basic operations but, in some cases, lack the leadership, skill, motivation and capability required for more complex operations. Private contractors can provide these elements, but not at the current rates.

The Western Cape Directorate Disaster Management and Fire & Rescue Services have identified this challenge and, over the past few years, introduced a specialist wildfire crew programme. This is a positive step but it is not yet a large enough operation to have significant impact. It has also not yet led to the development of broader industry capabilities. Careful management and funding strategies are required to ensure this specialist programme is sustainable and stays on track.

Knysna Fire, fire operations and important areas to analyse

Even in the initial hours of the Knysna Fires, the fire intensity and rate of spread was extreme. Knysna Fire Services had to prioritise evacuating people out of harm's way because of the size of the affected area; this was the primary objective for an extended period of time. Later, when the intensity dropped and it became safer to reenter the suburbs, there were no or limited crews available to prevent partially burning structures from completely igniting and to prevent further fire spread (i.e. prevent home-to-home ignitions from occurring).

If Knysna Fire Services had, in this case, other support resources to manage the evacuation process (further enhanced by planning for evacuation) this may have allowed their firefighting crews and vehicles to focus on structure protection and the ignitions after the main front had passed (i.e. when it was safe for crews to enter the area again). Future strategic plans for fire operations in the WUI (how fire resources are organised and assigned) need to be determined.

It's important to point out that other role-players, such as homeowners, share a responsibility to plan and prepare for wildfires in the Eden landscape. These actions have a significant effect on how Eden Fire Services can operate in the area (e.g. where homes are built, fuel management around homes, building homes out of ignition-resistant materials, etc.). If these other role-players focused on wildfire risk-reduction measures, it would create a more effective and stable environment for Eden Fire Services to respond to, especially in large and complex wildfires.

Right: Even after the flaming front of a wildfire has been contained, the hot and smoky environment is something firefighters have to deal with.



RECOMMENDATIONS

- The Western Cape Directorate Disaster Management and Fire & Rescue Services needs to conduct an audit of wildfire capabilities in the Eden District Fire Services and the Fire Services of the B Municipalities (within the Eden District), looking at:

- » wildfire-specific leadership ability, level of training and education among all ranks
- » risk-reduction work that has been carried out over the past five years
- » relationships with supporting resources
- » relationships with Southern Cape FPA (and landowners)
- » levels of wildfire strategic and tactical planning
- » Incident Management capabilities
- » financial constraints, and
- » resources availability.

This process will provide more clarity on the areas requiring improvement. This wildfire capability audit would establish priority areas for improved wildfire training, equipment and support structures. The same process could also be used in other Western Cape Districts as a comparative study to establish what is and what isn't working well.

- The Western Cape Directorate Disaster Management and Fire & Rescue Services needs to look into the long-term strategic planning for how the Fire Services are structured (between

District and B Municipality). The division of function between Eden B Municipalities and Eden District Fire Services as well as other contributing factors have negatively affected relationships and have created operational concerns in the Eden District.

- Eden B Municipalities and Eden District Fire Services need to reform their training requirements to include more wildfire knowledge, skills and expertise. The Western Cape Directorate Disaster Management and Fire & Rescue Services, which has oversight of Fire Services, should consult with educators, Fire Services, FPAs and Wildfire Specialists to determine where gaps exist and implement a long-term programme to improve wildfire understanding and knowledge. Current gaps that exist in Eden include:

- » wildfire, WUI and education for officers and higher ranks
- » wildfire, WUI strategy and tactics training for all crew members
- » Incident Command System training for all crew leadership positions
- » ongoing skill development (e.g. incorporating new trends and skills, advancing skills, and refresher training) for all crew members
- » annual scenario training for all crews, focusing on preparedness for different types of incident, interagency cooperation and command

- » strategic planning skills for officers and higher ranks, and

- » leadership development training.

- Eden B Municipalities and Eden District Fire Services should look into the viability of skills and training exchange programmes with Cape Town Fire & Rescue Services (CTFRS) which has a good training centre and culture of training. CTFRS can send some of their firefighters to Eden Fire Services to impart skills as well as gain more rural experience. In return, crew members of Municipal and District Fire Services could spend time at the CTFRS training academy and do shifts with crews in the Metro for skills transfer to take place.

- Eden District Fire Services as well as B Municipalities and the Southern Cape FPA need to collaborate in order to enhance their relationships with landowners. Cooperation is essential in tackling the wildfire problem and landowners can provide a valuable firefighting support service if they are well organised and supported. It is proposed that the role-players in Eden District help to develop a more formal Rural Wildfire Support Service. The FMU volunteer fire crews offer a platform from which to start, but require the strategic support of Fire Services and the Southern Cape FPA. The suggested principles would be as follows:

- » The crews are landowner volunteers who would normally fight fires on their own and neighbouring land, but now benefit



from being part of a more formal rural firefighting force.

- » The crews receive training, support and equipment assistance.
- » Accident insurance cover and worker's compensation is provided for these crews when providing operational support.
- » The Rural Wildfire Support Service remains independent of Fire Services but has well defined Memorandums of Understanding in place.
- » Southern Cape FPA works to gain funding and support from large insurance companies (insurance risk to the area is reduced).
- » The Rural Wildfire Support Service can also conduct fuel-reduction burning operations with the assistance and support of Eden Fire Services, especially for landowners or communities that cannot afford it. This collaboration would build relationships in the community and reduce the overall wildfire risk.
- Bitou Municipality Fire Services have an aging fire station in Plettenberg Bay. Their equipment, minimal training and large operational area (as well as an airport) are inadequate or, at the very least, outdated. The fire hydrant at Plettenberg Bay Fire Station is barely functional. All Fire Services should be provided with at least the basic support required to keep their services functional and The Western Cape Directorate

Disaster Management and Fire & Rescue Services is requested to take a look into this.

- The Western Cape Directorate Disaster Management and Fire & Rescue Services, Eden B Municipality and Eden District Fire Services, and the Southern Cape FPA need to change the public's perception of aerial resources. Segments of the public believe that if they do not see aerial resources that no fire suppression operations are taking place. An awareness campaign should highlight the roles of engine crews, ground crews and aerial resources in different types of firefighting environments.
- Eden B Municipality and Eden District Fire Services must develop predetermined wildfire response plans which cover a variety of possible scenarios. For example:
 - » What is the plan when there are multiple ignitions and there aren't sufficient resources available?
 - » What is the plan during drought and severe weather situations?
 - » What is the plan if a firefighting resource gets injured or if there is a fatality?

These predetermined plans would help optimise responses, especially initial attack operations. All role-players must also anticipate future wildfire incidents that will inevitably affect rural and WUI environments.

- It is essential that Eden District Fire Services and B Municipalities develop WUI-specific

resource deployment and readiness plans. If the damage caused from ignitions (e.g. embers, direct flame and radiant heat) could be contained/limited before spreading to the rest of the structure, total structure loss and structure-to-structure ignitions can be limited or prevented. Preplanning must include the following types of action:

- » Predetermine Response Plan for Wildland Urban Interface Incidents. (Include an analysis of rural and urban interface areas and how the strategy and tactics will be implemented.)
- » Predetermine Mutual Aid Plan and Resource Activation Plan to support small-town resources.
- » Development of Structure Protection Units/Crews. These are specialist units trained to perform optimally in protecting homes and communities from wildfire in the WUI.
- » Provide further WUI-specific Structure Protection training to existing resources. (Fire Services, Southern Cape FPA, volunteers, wildfire contract crews, etc.)
- » Educating homeowners/landowners that they also have a responsibility to create environments in which Fire Services can safely and effectively defend properties.
- » Guide urban planners and engineers in the planning of communities from a wildfire-suppression perspective (e.g. location of



homes, fire-resistant building materials, access roads, hydrants, turnaround points for vehicles etc.).

- Eden B Municipalities need to ensure that wildfire preparation and risk reduction work, wildfire training, and wildfire response is represented in the Municipality IDP.
- The Western Cape Directorate Disaster Management and Fire & Rescue Services should conduct a comprehensive cost-benefit analysis of aerial resources, vehicle based, and ground crew resources in Eden as well as around the Western Cape to guide strategic deployment and possible development strategies for resources.
- Incident Command System training for Eden B Municipal and Eden District Fire Services needs to be enhanced by conducting frequent interagency incident simulations including personnel at all levels/ranks. This simulation and wildfire-readiness training needs to involve wildland firefighting personnel and experts from other organisations including the FPA, contractors and large landowners, etc. This will assist in sharing knowledge and building mutual respect.
- Eden District Fire Services and B Municipalities Fire Services need to work closely with their communications departments to develop communication strategies for warnings, evacuations, incident information and updates.
- The Western Cape Directorate Disaster

Management and Fire & Rescue Services should establish a wildfire 'lessons learned' database containing all firefighter fatalities as well as serious injuries. This is an essential training resource which would enable analysis of what occurred by other fireline- going personal and possibly prevent future fatalities and injuries. Two firefighter's deaths occurred during the Knysna Fires. Any firefighter death should be treated with the utmost respect by the industry (especially Fire Services) and this type of database and lessons learned approach will go some way to remember and honour the fallen.

Below: The Knysna Fires saw agencies from all around the Western Cape coming together to assist.
Photo Source: David Morris ©





Above: A firefighter begins the tough and dirty work of mopping up a fireline after a main flaming front has been contained. This is vitally important work and if not done correctly can lead to flare ups and continued suppression operations.





Wildland Firefighting volunteers and other volunteers

Introduction

The volunteer spirit and sense of wanting to assist in time of need are to be cherished. One of the positive, standout occurrences of the Elandskraal and Kruisfontein wildfires was the overwhelming number of people who volunteered to help make a desperate situation a little better. The volunteer efforts were immense – not just in firefighting but in various support functions. The firefighting volunteers who assisted with the Knysna Fires can be classified into three broad groups:

1. Formal, organised volunteer groups that were part of an NGO/NPO.
2. Community Fire Management Unit volunteers that fell under the Fire Protection Associations.
3. ‘Spur of the moment’ volunteers.

The first two groups of volunteers have established structures, procedures and working relationships that drive their actions and determine responsibilities. Some, like the Volunteer Wildfire Services, are highly organised, well-trained and have great systems to safely manage and deploy crews. Other volunteer groups are smaller, more community-based, but still have some basic training, equipment and procedures/policies.



Above: Volunteer firefighter and member of the Plett South Fire Management Unit

The other type of volunteer offering help at the Knysna Fires was the 'spur of the moment' volunteer. They may have had some relevant firefighting experience in the past but most lacked personal protection equipment, firefighting equipment and recent training.

The focus of this section is on the firefighter volunteers but all volunteers are to be commended for their actions and efforts during and after the Knysna Fires.



The volunteers from Johannesburg who travelled down to assist with the ongoing fire suppression operation.

Photo Source: Diederick Stopforth, Twitter (2017)

INDUSTRY VIEWS

Summary of main points covered in a meeting on 3 November 2017 with Senior Firefighter Adriaan Swanepoel of the Bitou Municipality Fire and Rescue Services.

While the more formal FMU volunteers understand the systems better, the once off and informal volunteers on larger incidents need to be carefully managed. Understanding the chain of command and their role in suppression operations (especially on the bigger incidents when everyone and their bakkie arrive) is important. They need to play a supportive function and be involved in areas where there is less risk.

Summary of main points covered in a meeting on 25 October 2017 with Operation and Planning Manager Peter Wynne of the Volunteer Wildfire Services.

Volunteer Wildfire Services (VWS) works to assist partner organisations and Fire Services. The standard process of responding to a fire is when they get activated by a partner or Fire Service. With regards to the Knysna Fire, the VWS were alerted to the incident from very early on and tried to make contact with various people in order to get officially activated to the incident. (VWS does not normally operate in the Eden District so there are no formal partner agreements in the area.)

It was only by the morning of the 8th June that CapeNature gave official request for the VWS crews

to start working on the 9th June. Wynne remarked that if the VWS received a request for help sooner, they could have sent teams sooner. It's important to receive an official request for help and fit under the command structure for the incident as opposed to just showing up.

Wynne says going forward, there needs to be a better point of contact that can permanently fulfil the role of activating mutual aid resources. Perhaps this could assist the Disaster Management Centre but what is important is that there is a pre-determined process to activate resources as early as possible.

Summary of main points covered in a meeting on 4 November 2017 with representatives of the following Bitou Fire Management Units (FMUs): Plett South FMU, Harkerville Rural Protection, Fisantehoek FMU, Wittedrift FMU, Crag's FMU and associated FMUs.

During the Knysna Fires the Bitou FMUs were responding primarily to the wildfire which originated from Dam Se Bos. Members of the Plett South FMU responded and assisted Knysna Fire Services with suppression near 'the Middle Erf area' and were then sent back towards Kranshoek at a later stage. During the incident, the FMUs assisted Bitou Fire Services with structure protection by directing the fire around structures as well as warning community members about the advancing wildfire and assisting with evacuations. Structures were triaged on scene as to whether they could be defended or not and



where they could not be defended safely, they were left to fate. Bakkie Skid Units were very effective at protecting houses from burning (before home ignition) due to their quick turnaround, response times, speed and maneuverability. These skid units were used extensively to continually refill the larger tanks of the Buffels and Bitou Fire Tankers. This allowed the Buffels and Tankers to remain on scene and keep water running for suppression operations. Embers were a constant source of flare ups and spot fires. It became abundantly clear to the FMU responders that homes with defensible space had a much greater chance of survival. The importance of standardising firefighting equipment, especially hose connections, was also understood.

Indigenous vegetation that normally doesn't burn was seen burning for the first time, though with less ferocity than the invasive alien and fynbos. Some FMU resources were held in reserve in case of fires occurring in different areas of Bitou Municipality. During the incident members of the FMUs used their connections to gain the use of large water carriers from local quarries, which proved extremely helpful. At times the FMU crews and Bitou Municipal Fire Services crews faced landowners and homeowners who did not want their stored water to be used to fight the wildfire because of the drought.

Summary of main points covered in a meeting on 3 November 2017 with Chief Fire Officer Hedley Venter of the Bitou Municipality Fire and Rescue Services.

Volunteers are a viable solution to assisting with the limited local capacity however these must become more structured and professionally governed. Currently the majority of the volunteers operate via the FMUs, which sit under the FPA. However, there is no control over who can volunteer and no monitoring of SOPs, skill levels or fitness. Venter feels the FMUs should become professional bodies through the FPA. District Fire Services and any FMU member or volunteer should carry a card showing what skills and fitness level they can operate at. This would also allow for better understanding in the operational chain of command and the Incident Command System, as well as address the question of who is covering the volunteer's medical insurance. At the moment, the oversight of these groups sits at a municipal level and there is a lack of admin capacity for this. Having this oversight at the District and FPA level then allows the municipal Fire Services to have service level MOUs put in place to allow direct call out of local volunteers when required. Sea Rescue is becoming more involved as a resource when it comes to large-scale incidents and as such it might be a good idea to have them trained in basic wildfire and ICS.

Summary of main points covered in a meeting on 13 November 2017 with Knysna Station Commander Jerome Simonis of the National Sea Rescue Institute.

NSRI is becoming more and more involved in all incidents, including wildfires. However, Simonis is not keen to engage with wildfires after experiencing the fire behaviour in the Knysna Fires. NSRI have received some firefighting training, though it is very limited. This was done through the Knysna Fire Department and was not seen as very thorough. Simonis felt the person running the training did not have the skills to train and they all walked away feeling that they had not learned how to deal with a wildfire, however gaining the right training is as important as it is to getting the right Personal Protective Equipment.

After the evacuations and initial assistance provided in the community the NSRI remained on standby but spent most of their time assisting the public, mainly communities they had ties to, with suppressing flare ups on their properties. Simonis felt that the NSRI members could be of value in this way as they have training, understand a command structure and know the community, but he did not want his members being put in a situation where there was risk of injury, especially after seeing the fire behaviour. He feels that Neighbourhood Watches could be more involved in these kinds of incidents and could be trained and have equipment (that they can access) to combat fires. He was also unimpressed with the deployment of resources, especially to the outer more rural areas.

Resources were visible in town appearing not to be doing anything while calls for help were coming in and no assistance was arriving. Simonis phoned Clinton Manuel personally and asked him to please send some resources to assist the farmer he knew. He doesn't know how the communication system was working or how the information was being received.

Summary of main points covered in a meeting on 8 November 2017 with Manager Gerhard Otto of Eden District Disaster Management and Richard Meyer of the Knysna Municipality.

The Eden District typically has a 10-month fire season, which means ongoing operations and focus on operations. Volunteers can be of great assistance but they need to be planned for prior to incidents and ideally have experience and training in certain areas. Especially in ongoing incidents, volunteers can help to fill shifts where full time staff require rest periods. Insurance for them is important in high-risk areas of operation as well and protective gear and the correct tools if so required. Again, this needs to be planned for. When people are pulled from outside, with no insurance and you don't know their experience you put yourself at risk if anything were to happen with them.

Involvement of private industry is important as they are prominent members of the community and often they can make things happened faster and cut through red tape faced by the public sector. They are knowledgeable and influential and this can help projects get momentum.



Above: The Volunteer Wildfire Services assisted at the Knysna Fires. Here two members work together. (Picture not from Knysna incident).



DISCUSSION



- Organised groups of firefighting volunteers play a valuable role in supporting fire-suppression operations, especially when professional permanent resources are stretched or lack capacity. During the Knysna Fires local volunteers, and volunteers from all over the country, served alongside professional firefighters with great effect..
- There were numerous challenges experienced with the more informal or 'stand-alone' volunteers.

- » They presented a safety hazard to themselves and other resources.
- » They were often ineffective in suppression operations.
- » They were often only willing to work on the active and 'heroic' parts of the fire.
- » They proved an administrative and logistical burden for the Incident Management Team which was required to:
 - > examine and evaluate the volunteers' capabilities
 - > group volunteers with similar skill sets
 - > source and assign leadership to oversee them
 - > source firefighting equipment and protective equipment for them
 - > ensure oversight and take responsibility for them, and



Top: members from the Volunteer Wildfire Services working on the Knysna Fire Incident. Photo Source: Peter Wynne (2017).

Above: Enviro Wildfire Services from Cape Town also offered assistance during the Knysna Fires. Photo Source: David Morris (2017).

> manage additional logistics around them.

Furthermore, these volunteers need to accept that active firefighting is a dangerous activity and there are also different types of fire expertise. A former city-based structural firefighter does not have the skill, training and experience to fight wildfires for example. There are other safe and essential functions for these volunteers. They can assist with refilling firefighting vehicles, access control, incident logistics roles, etc. This does not require formal training. There must be an understanding that volunteer work is hard and, most often, involves work without glamour or glory.

- Business professionals with management and leadership skills are an extremely valuable and available resource that is not currently being used. All that is required is a predetermined system and procedure for them to fit into the incident management function/response. Fire Services sometimes claim that they do not have sufficient personnel to implement the Incident Command System for large incidents due to staffing limitations. Business professionals, with the required training, would be more than competent and capable to function within ICS.
- There are also other non-wildfire volunteer organisations that have easily transferable incident management, logistics and leadership skills. Over the past few years the National Sea Rescue Institute (NSRI) has been assisting at wildfires (as was the case with the

Knysna Fires). While they must be cautioned from assisting directly on the firelines (they don't currently have the correct protective equipment and training), they are invaluable in many other areas and functions. These are positive examples of mutual aid and all Fire Services should be speaking with these types of groups to formalise future help and have plans to maintain the relationships between incidents.

- Formal organised wildfire volunteer's groups, such as the Volunteer Wildfire Services (VWS), integrated into the incident response far more easily and were more beneficial/reliable to the Incident Management Team (IMT). The IMT did not have to spend time evaluating what the resource was capable of as the VWS has a known reputation or level of operational capability that it provides. It was also beneficial that these VWS crews came with leadership, a support structure, their own equipment and vehicles. Self-dispatching a team or resource to an incident presents major safety issues. It is imperative that all resources requested by Incident Command check in at the ICP and receive official assignments. This process was accurately followed by VWS. However, in hindsight, these crews should probably have been requested earlier by Incident Command.
- Fire Management Unit (FMU) volunteers are local resources that provide tremendous support to Eden B Municipality and Eden District Fire services. The FMU crews are

passionate about the areas they live in and, as a result, have a good understanding of local areas and conditions. They do what they can with what they have available to them, which is resourceful and admirable. Given their value, it would be great if they could become more formalised and receive the necessary training, guidance, oversight and equipment to operate in a safer, more effective manner. The various Bitou FMUs admit that there are aspects in training and standard operating procedures where they need assistance. They are willing to accept guidance and help if it is forthcoming.

- Bitou Fire Services suggested the importance of looking at the equipment volunteer groups are acquiring and using. Volunteer equipment should be compatible with the Eden Fire Services' equipment as well as other volunteer groups (e.g. firefighting hoses, branches, connections, pump fittings, etc. should all be compatible).



Above: Steve Myburg — Plett South FMU volunteer.



RECOMMENDATIONS

- Eden District Fire Services together with B Municipalities must develop a predetermined plan, procedure and system to allow for the inclusion of organisations that want to volunteer during an incident. A list of required roles (and their associated skill requirements) should be established so that volunteers can be allocated to appropriate support and logistics functions. Individual volunteers or informal groups of volunteers should not be accepted as fireline-going personnel but should rather be assigned elsewhere. The added risk of having unknown entities on the fireline combined with the additional administrative and logistical work to manage this process does not justify the benefit. There are many supporting roles away from the fireline where they are needed and could assist.
- Eden District Fire Services together with B Municipalities must develop a District database of resources where formalised, organised volunteer firefighting crews and resources are included. This must be updated annually and shared with relevant role-players as well as the Western Cape Directorate Disaster Management and Fire & Rescue Services (to be added to the Provincial resource database as recommended in the Incident Management section of this report). This means all volunteer resources can be requested to respond with a predetermined understanding of their training, leadership, resource capabilities, etc. It is further recommended that if any landowner

or Fire Service requests a response from a volunteer firefighting unit, they should have a Memorandum of Understanding including:

- » details and provision of firefighter insurance
- » who will cover what costs, and
- » call-out, check-out and demobilisation procedures

- The Western Cape Directorate Disaster Management and Fire & Rescue Services needs to establish a basic set of policies, guidelines and standards for all volunteer firefighting units in Eden and the Western Cape. This is to ensure their safety and operational effectiveness. To do this, the Western Cape Directorate Disaster Management and Fire & Rescue Services should engage with well-organised volunteer organisations such as the Volunteer Wildfire Services (the VWS has strict operational, training and governing policies which could be used as a template) as well as the less-formalised FMUs such as the Bitou FMUs (who require policies and structures that are conducive for them). The Knysna and Pletten Bay Wildfires of 2017 also highlighted the need for oversight of wildfire volunteer groups. An oversight body could be the Provincial Disaster Management Centre or a specific sub-workgroup of the Western Cape Provincial Fire Workgroup.

- Eden District Fire Services together with B Municipalities should play more of a role in setting up agreements with and providing support to volunteer firefighting units. Volunteer firefighting units need to be recognised for the value that they add (at a fraction of the cost). Eden Fire Services should begin by building relationships with these groups, conducting shared training exercises, or even inviting volunteers to do standby duties at fire stations (so crews can interact and get to know each other). The wildfire industry has a very limited resource base. Therefore, every resource serves an important role and we need to develop better cohesion and synergy. It need not require additional finances to achieve this – it is all about attitude and approach.

Volunteers are a viable solution to assisting with the limited local capacity however, these must become more structured and professionally governed
- Hedley Venter, Bitou Fire Services





Responsibility beyond the homeowner

**Town planners, developers,
builders, architects and
landscapers**

Introduction

The role of those who build homes and those who plan towns and suburbs must not be underestimated when it comes to wildfire or, for that matter, any hazard that can pose a risk. Storm-water drains and roofing attachments for high-speed winds are already two common proactive risk-reduction measures that are considered and planned for. The question must be asked: What wildfire risk-reduction measures are being considered and implemented today?



The potential for wildfire to cause damage has been very clearly demonstrated in Knysna and Plettenberg Bay areas in 2017. The Eden District and Western Cape are known for their natural beauty and it is desirable to live in nature. As a result, the Wildland Urban Interface (WUI) areas are large and commonplace. There must be more pressure for all role-players to become more proactive and apply wildfire intelligence to planning and building processes.

Homeowners must share part of the responsibility for choosing to live in these environments. However, before the homeowner even moves into their home there are decisions, plans and actions which will be taken that have future consequences. These decisions can mean the difference between homes, infrastructure and assets withstanding or being destroyed by wildfire. It is important to be proactive and to design smart homes and communities that can withstand or resist their surrounding environmental threats. This will require all those involved in these processes to understand the wildfire risks.



Above: Specific hazard-reduction measures must be considered. These should include the manner and materials with which homes and developments are built. It is important for those involved in new developments from architects to the town planners, to be aware and have an understanding of what constitutes a Wildfire-Resilient home and incorporate these into the build.

He who creates the risk should be responsible for the risk
- Gerhard Otto, Disaster Management, Eden District

INDUSTRY VIEWS

Summary of main points covered in a meeting on 7 November 2017 with Environmental Planning Manager Pam Booth, Planning and Development Director Marlene Boyce and Town Planning and Building Control Manager Hennie Smit of the Knysna Municipality.

Prior to the 2017 Knysna Wildfires, there were occasionally conditions of approval for town planning that include that developments had to join the FPA and there were sometimes conditions where fire breaks were required. However, these instances were very limited. One aspect that they feel was missing prior to the fire was comment on the building plans by the Fire Services. This has now been made compulsory for all building plans, whereas in the past it was only required for large complexes, hotels, filling stations, etc.

Town Planning now circulates applications to the relevant role-players, which include the Fire Department, SANParks, Environmental Management, Technical Services. These role-players must then highlight any areas of concern. Prior to the 2017 wildfires, the people and the authorities were very relaxed. This can be shown in the lack of adherence to the building line regulations for example which resulted in fire vehicles not being able to get to the back of properties as property lines have extended to a point where they limit access for vehicles. This is hopefully an aspect for the rebuild that will be addressed.

A problem with incorporating wildfire risk into aspects of Town Planning is that the 'risk' for town planning is governed by a different law from risk from wildfire, which is regulated by the National Veld and Forest Fire Act No. 101 of 1998. One can mention the Act but one cannot make a condition of one law in another law, i.e. Town Planning. There are nevertheless overlaps, which you can try and work in to planning. There needs to be a means to enforce the Bylaws and in particular the Community Safety Bylaw needs to be unpacked and worked on. One of the issues facing this though is that many homeowner associations have their own constitutions with their own architectural guidelines that do nothing to decrease risk and can in some cases actually aggravate this risk. Town Planning does not have any control over this and this responsibility sits with the National Home Builders Registration Council (NHBRC), which is something that needs to be looked in to.

The concept of giving incentive driven rates or rebates to people for clearing their land of invasive aliens or reducing their fuel load risk is being looked at. In this way landowners and homeowners who don't comply don't get rebates, which avoids the creation of a further 'tax' on people but offers those who act an incentive to make the changes. There are still laws and bylaws that can assist with pressuring those who don't comply but the rates can then assist with the cost of clearing.

It was noted how gas bottles exploded and became missiles during the fire, so it is being considered that a By-Law be passed to enforce all gas bottles are contained in caged / roofed structures to prevent this occurring again. Other noted hazards assisting the fire spread in the Wildland Urban Interface (WUI) were thatch roofed houses, pine trees (flying burning pine cones) and palm trees so again a By-Law needs to be looked at with regards the tree hazards. For example, those trees may be prohibited and people would be given an amnesty period to remove them. Smit noted that the fire spread in a sporadic fashion through the urban interface and this was directly linked in his opinion to pine kernels from big pine trees, which were "like bullets landing in gutters and roof spaces".

Boyce was concerned about the homes being spread a large distance apart in the Pezula estate and how that could hamper evacuations or the risk to emergency services accessing the properties, i.e. travelling through an area of fynbos. These areas in the future will need evacuation plans and possibly will have tighter controls on layout with regards to zoning regulations, before getting approval for certain land use.

Boyce discussed how Town Planning's strategy going forward is now aggressively addressing fuel loading of invasive aliens. The plan, budget permitting, would be for the municipality to start using tax/financial incentives or penalties in terms of property owners who allow alien species to grow on their land. Town

Planning is also very aware that a lot of municipal owned land has invasive aliens on it and they need to set an example. They need to focus on eradication around the water sources, and the residential spaces from the urban edge out into the more rural areas. From a fire risk perspective, the Fire Department would issue fines for non-compliance to a landowner who doesn't comply with vegetation on their property. They have reportedly already issued notices. They will work closely with fire department as opposed to a single entity approach. Even though Fire Department can issue a notice, Booth's department can give landowners who own large tracts of land access to government programmes they can tap into. The Budget and Finance department can look at ways to link rate rebates as an incentive for landowners to clear land. Multi-pronged interventions that can be done in terms of different municipal departments would be ideal.

Summary of main points covered in a meeting on 8 November 2017 with Manager Gerhard Otto of Eden District Disaster Management and Richard Meyer of the Knysna Municipality.

If a developer builds homes in a wildfire area, they should then be required by law to contribute to risk mitigation and build with wildfire risk in mind. "He who creates the risk should be responsible for the risk. For real change to take place in risk reduction landowners must be responsible and property tax must be linked to risk. So, if you have not got fire breaks on your property you pay more tax, if you have alien

vegetation on your property you pay more.". Money is the only way we are going to change behaviour. The extra money will provide for better capacity building in this regard to enforce any regulations.

Summary of main points covered in a meeting on 14 November 2017 with Deon van Zyl of the Rheenendal Fire Management Unit.

Knysna Municipality has said that they will come to an arrangement and give some kind of rebates on taxes and rates if land owners do clearing of the alien vegetation on their land, but this was 10 years ago and it has been mentioned 3 times since. All that has happened is that the rates have gone up 40% this year (before the fire) after, 100% the year before. People are asking where is the incentive? Where is the follow through from the Knysna Municipality? Van Zyl feels people are disappointed - they don't respond to threats; they respond to incentives. Another issue with regards the rates is that if a landowner clears their land of invasive alien vegetation; they will increase the value of the land, which will then increase the rates. This is a legitimate landowner concern and again there needs to be some incentive for a landowner, who invests money in fuel management.



Above: Homes and vital town infrastructure are both found within the WUI. Here you can see how the Knysna Fires has burned in an area near power lines, water reservoirs and homes. A holistic risk reduction strategy for all assets and infrastructure is required.





DISCUSSION

- There appears to be little, if any, wildfire intelligence being considered by town planners, developers, builders, architects, landscapers and homeowners in the Eden District.
- Wildfire readiness must be the responsibility of a homeowner. There should be an expectation on homeowners to ensure they are wildfire ready. Homeowners must apply pressure to ensure fire-resistant building materials are used and homes are designed to meet the risks of the environment in which they choose to live. However, some aspects of urban planning and home development will be out of their control – for example, if they purchase an existing home. Their risk resilience can be strengthened if their starting point includes wildfire risk reduction.
- Housing developments typically have their own standards, guidelines and rules. These are normally centred on aesthetics, and planning for wildfire risk is often not a consideration.
- Even in the rebuilding of Knysna, homeowners are making the same mistakes:
 - » Homes are positioned mid-slope and at the top of slopes with wooden decking extending out over the slope.
 - » Untreated wooden decks, fences, doors and structures are attached to homes.
 - » Thatch-roofed homes are being built without water-drenching systems.
- WUI access in some areas was an issue for Fire Services' vehicles during the Knysna Fires due to:
 - » Homes and structures being built too close to the roads.
 - » Access restricted by overgrown vegetation.
 - » One way in and one way out access to communities. (Congestion and wildfire cutting off access roads occurred.)
 - » Narrow roads with limited turnaround or passing spots.
 - » Locked gates in rural areas with no access control or means to contact the owner.
- Knysna Municipality has been considering rate rebates for landowners who reduce fuel hazards on their property. A landowner commented that they are aware of the Municipality's plan, which has been discussed for years, but it has never materialised. This doesn't give the landowner much faith that it will ever happen.

RECOMMENDATIONS

- Eden District Municipality along with all the B Municipalities must hold a symposium focusing on the ignition-resistance strategies for homes, structures, assets and infrastructure in both rural and urban environments with the focus on how town planners, developers, builders, architects and landscapers can implement risk reduction. This strategy needs to consider:
 - » How ignitions occur: that is ember attack, heat exposure and structure-to-structure ignitions.
 - » What influences ignitions and spread of fire: aspect, placement on slope, fuels, proximity of homes to one another, prevailing wind directions, etc.
 - » What mitigation measures can be applied: Fire-resistant building materials, road access, hydrants, urban hazard reduction, defensible space, etc.
- Further to this, it is recommended that the audience include other municipalities, organisations and role-players as this strategic meeting will be of interest and offer insights that can be implemented across the Western Cape. Local, and if possible international, wildfire experts as well as organisations such as the National Home Builders Registration Council (NHBC) should be involved.
- The B Municipalities, together the Eden District Municipality, need to investigate how they can create and use bylaws to promote good wildfire risk-reduction practices as well as have

a means to enforce regulations. Aspects to consider:

- » To create consistency and strengthen the effect of the bylaws, the B Municipalities should create the same bylaws across all B Municipalities in the Eden District. This will ensure consistency and better understanding among residents and landowners.
- » A wildfire-compliance certificate should be initiated, requiring homeowners and landowners to become compliant within a set time frame.
- » Housing estates in the WUI environment should require architects and developers to submit signed plans to the Municipality detailing wildfire risk-reduction planning for; evacuations, fuel hazard management, defensible spaces, access paths and roads that Fire Services can use, etc. Furthermore, there should be procedures to compel builders and homeowners to acknowledge and sign that they are aware of the wildfire risks and mitigation measures in place once they become involved in the process.
- » Specific hazard-reduction measures must be considered (e.g. a building code requiring wooden decks in the WUI to be constructed from fire-resistant materials and metal braces placed underneath the decking and all wooden structures



The positioning of a home on a slope can have a dramatic impact on whether a home will be resilient to the possible damage of radiant heat and ember attack during a wildfire. Many homes in Knysna were built in incredibly vulnerable positions with little or no regard for risk reduction measures.





to not be directly connected to the main structure).

- » Wildfire specialists as well as representatives of the role-players should be consulted in this strategic phase.
 - » There should be a communication plan to launch the new bylaws. Communication must offer advice and guidance on the bylaws to enhance adoption and support of the regulations.
 - » The concept of giving incentive-driven rate rebates has been thought about by the Knysna Municipality. In various discussions with homeowners and landowners they feel this is a good strategy as opposed to fines and penalties. Incentives can be a good motivator versus enforcement. However, the incentive needs to be real, offering tangible benefits.
- Eden District Municipality needs to strategise and plan with their B Municipalities as to how each of them will motivate for financial support of the efforts required to get town planners, developers, builders, architects and landscapers to adopt wildfire risk-reduction measures. The municipalities must find a way, perhaps within Community Safety, Disaster Management or some other framework of the Integrated Development Plan (IDP), to motivate for finance that can be allocated to community wildfire risk-mitigation strategies.

- Eden District Municipality should develop a system to help all the B Municipalities to have an interlinked system of wildfire intelligence sharing, including risk-reduction and strategic-planning information sharing on an ongoing basis.



Top and above: Gas bottles that had been left exposed to the radiant heat and flame contact from the wildfires could be heard exploding and some became missiles flying through the air. These could have had lethal consequences. The above image shows the damage inflicted by one gas bottle that exploded, flew through the air and smashed through the roof of a home in Lake Brenton.



Above: When planning housing estates, or any structural build in the WUI environment, architects and developers should be required to submit signed plans to the Municipality detailing wildfire risk reduction planning for; building materials, evacuations, fuel hazard management, defensible spaces, access paths and roads that Fire Services can use, etc. These should also include considerations for a Community Safety Zone.



Communication

Introduction

Communication is both a system and a tool. It is an essential part of managing incidents effectively. It's an element that has the potential to contribute positively or negatively to the outcome of an incident. We have separated incident communication into different functions based on who is involved:

You would be surprised how many municipalities do not have a communication plan or policy
- Fran Kirsten, Knysna Municipality



Operational responders: These include emergency responders and personnel directly involved in the incident. Strategy, tactics, resource management and oversight are some of the processes which rely on effective and efficient communication. Communication is especially vital in rapidly escalating incidents, complex incidents and incidents covering a large geographic area. Challenges are often experienced with the various communication methods (e.g. handheld radios or cell phones) and there can also be barriers to effective communication such as incident stress, fatigue, not following briefing protocols, etc.

Public (involved in the incident): Communication can influence life-or-death decisions (e.g. evacuation orders and when and where to evacuate). Information can also serve to calm people down or cause panic. In order to stabilise an incident or direct certain actions of those affected, the use of targeted communication is essential.



Media and public (not involved): This powerful system can educate, inform and drive action. Media and public communication have evolved rapidly. The rise of social media challenges traditional communication methods such as radio, print and TV. Online media as well as social media are incredibly quick at disseminating information and reaching large audiences. Social media has created an expectation of instant information. Both media and the public will actively seek out information or create it if none exists. Incident Managers need to be very cognisant of this dynamic. If used correctly media and communication platforms can help keep people away from the incident area, reassure the public, provide warnings, rally and guide support for first responders and affected people, etc.

Below left: Ryan Heydenrych of Vulcan Wildfire Management during a media interview.

Below: Minister Bredell of the Western Cape Government makes an announcement.



INDUSTRY VIEWS

Summary of main points covered in a meeting on 3 November 2017 with Acting Communications Manager Fran Kirsten of the Knysna Municipality.

This type and scale of incident is unprecedented but we were very fortunate because prior to the incident the Knysna Municipality had already developed good social media channels (Facebook, Twitter, Knysna Municipality App) and there was also the ability to send out mass sms's. Along with their website, these communication devices worked well to assist in disseminating incident communication. Prior to the incident they had approximately 5000 followers on social media and are now sitting around 11000. The communication team took ownership of the incident's social media "terms" from very early on. Within the first couple of hours they had a white board up with all the hashtags they were going to use. These hash tags were trending the first day of the fire already.

Additionally, there is a WhatsApp Media Group, which also existed prior to the fire, which could be used for alerts, press releases as well as voice notes and short messages which was a great medium over and above emails and other social media channels. The group had local, national and even international contacts, which hugely added to the media coverage of the incident.

Post the Knysna Fires, they have a much larger and more accurate sms database, which has more functions so you can see who has read messages etc. Before the incident, people had not updated or given new numbers so most sms's just went into space. It is expensive however, with the costs being about R30 000 to send one sms to all residents.

It's noteworthy that the local radio station (Knysna FM) did not broadcast anything related to fire even though they were sent info and kept updated. When asked why this was the case, Kirsten speculated that this may have been over money. There was a meeting a couple of months prior to the fire to ask them to give the mayor a slot and get a quotation for that, as well as register on the database but they never got back to them. A Knysna resident, post fire, suggested that the radio station should have been taken over completely to broadcast as much information about the fire as possible. The radio coverage would have been useful to reach some areas, but the station signal does not reach all areas of Greater Knysna, such as Sedgfield.

Kirsten received the first call before 05:00 on 7th June to inform her that the Kruisfontein Fire had caused the N2 to be closed between Plettenberg Bay and Knysna. By 06:00 all SABC radio stations and Algoa FM were announcing the road had been closed, as a result of Kirsten communicating with them. Kirsten was a journalist by trade and as a result has made a lot of contacts in the media, which made it easier to get messages out.

The incident started to unfold and pick up momentum, especially with the evacuations that were occurring. Around 18:00 on the 7th June they lost communication for the first time. Kirsten highlighted the importance of the assistance they received from Graeme Huddy, from the IT Department, in the building next door. When phone line communication went down, they still had a data connection so they used Facebook to let everyone know that phone lines were down and requested that people "inbox them if they need help" (send a message online). They also let national emergency numbers know what had occurred so they could direct messages via Facebook message and also inform them of who need help. A little later a Skype number became operational and they had 3 different Skype computers set up to now receive emergency calls. What would occur was that residents would phone the national emergency number and then get patched through to the local Skype number so a local response could be organised.

A big challenge occurred with multiple reports and callers for the same emergency. This happened because people would inform friends and family of their situation but also send messages requesting help via Facebook and whatever communication channels and means they had. Their friends and family would also post messages on Facebook and Social Media. As a result, a large audience of people would pick up these messages and also call them in to emergency services. This resulted in numerous resources ending up being sent to the same incident

multiple times. Eventually they sent out media messages saying that if you did not personally receive the message from the person in danger, please don't send it on. Another problem was managing calls from concerned friends and family who had not heard from their loved ones were requesting that someone go check up on them. Remembering that they had limited communication lines the influx of these calls were extremely challenging. In terms of being able to respond to every call, especially the non-emergency calls to check up on people, there simply were not enough time and resources to do so.

The "Community" App developer, David (only first name mentioned), also offered assistance and help with distributing and setting up the app, even going out into the community to help people install it and use it so that they could get alerts. Several other municipalities, since the incident, have started using Community App. It can be installed on new as well as old phones.

After a few days in a further attempt to reach as many people as possible, Ward meetings started being set up and taking place. These meetings were also in response to hearing some messages that no one knew what was going on despite their best attempts at disseminating information since the incident began. In general, the Municipality only use loud hailers in poorer areas because people in more affluent areas complain about the noise. During active fire though, Kirsten sent out loud hailers to these areas as well.

During the 5 days of the fire when everyone feared for their lives, everyone was working together. Once things calmed down, the Post Traumatic Stress Disorder (PTSD) started setting in. The public sentiment turned to blame and anger and Kirsten and the Municipality were the perfect scapegoat in her opinion. In future, the municipality and especially the communication team is always going to be the scapegoat so it's important to just take it, knowing that you have done the best you can.

During this type of incident, it's very important to manage the message and the media. The media team was constantly trawling social media (not just their own) and the minute they came across misinformation they tried to correct it and direct people to their official communication channels. Another important lesson is to say "I don't know" if asked and unsure of information and being completely transparent is important.

Municipalities are highly regulated. Therefore, it is essential to remain compliant with legislation when communicating. The following legislation is applicable and must be adhered to in all communication with the media.

- Constitution of the Republic of South Africa Act, 1996 (Act 108 of 1996)
- Local Government: Municipal Structures Act, 1998 (Act 117 of 1998)
- The Municipal Systems Act, No 32 of 2000
- Promotion of Access to Information Act, 2002 (Act 14 of 2002)
- Intergovernmental Relations Framework Act, 2005 (Act 13 of 2005)

This all needs to be taken into account when writing a PR communications plan.

Kirsten reports that you would be surprised how many municipalities do not have a communication plan or policy. Nevertheless, this policy needs to have a PR strategy in place. It must also specify who your spokespeople are (e.g Mayor, Municipal Manager, Communications Manager). It has to state what is an emergency and what is a crisis. It is essential to stay connected continuously.



Kirsten's advice to someone handling an incident:

The Golden Hour of Communications:

- 01 – 15 min – Establish the facts.
- 01 – 15 min – Convene a team meeting. (Communication crisis team).
- 15 – 30 min – Confirm spokespersons.
- 15 – 30 min – Confirm message.
- 15 – 30 min – Draft holding media release. (Structured messages which are built on)
- 15 – 60 min – Monitor social media. (Deal with 'fake news')
- 30 – 45 min – Update draft media release.
- 50 – 60 min – Collect images and/or footage.
- Get it right the first time
- "No comment" is NOT an option

Have a draft media release. You need to have a template because there isn't time to redo everything each time the message is updated.

Monitor Social Media. Fake news was horrific but Kirsten had mainstream media on her side. Getting to know mainstream media and creating media lists is important. So are relationships, with the media, not just having their contact details. The municipality has a media breakfast at the beginning of the year as one way to build relationships.

Keeping team morale is important because sometimes things get ugly. During the incident, a councillor came to the Joint Operations Centre and told the communications team that they were the weakest link. This destroyed morale and has possibly contributed to the PTSD team members are experiencing.

Establish a communications team before an incident so that if there is a crisis you can call on them, and they also know what is expected of them. Choose a team of people that are selfless (there is no time for self-promotion in a crisis).

There really needs to be some form of post incident debrief or therapy. This was not provided.

Summary of main points covered in a meeting on 11 November 2017 with residents Ritchie Morris and Mary Jane Morris of the Elandskraal community.

The community response was proactive but the spreading of misinformation via a local WhatsApp Group caused many problems and confusion. For example, they heard their farm had burned down at least 5 times and that Teniqua Treetops had also burned down many times. In actual fact, they had not burned down but the messages on the group created undue panic and chaos.

Summary of main points covered in a meeting on 7 November 2017 with Environmental Planning Manager Pam Booth, Planning and Development Director Marlene Boyce and Town Planning and Building Control Manager Hennie Smit of the Knysna Municipality.

Communication was highlighted as the major issue. The municipality had never thought of putting a communication plan on paper before and conveying this to the communities. There needs to be a better way to communicate, especially with all the different types of technology available these days. It seemed the most effective form of communication was WhatsApp during the incident. This could be used to cascade messages from Ward Leaders to everyone in their Wards. This could be used for any form of incident i.e. flood, terrorism, etc.

Safe zones in Wards or residential areas need to be pre-determined and if communications go down then municipality can send people to the safe zones to convey information.

Summary of main points covered in a meeting on 4 November 2017 with representatives of the following Bitou Fire Management Units (FMUs): Plett South FMU, Harkerville Rural Protection, Fisantehoek FMU, Wittedrift FMU, Crags FMU and Associated FMUs.

Misinformation became a problem with members of the public calling in every small fire or smoke they saw, this often led to time being wasted investigating these calls.

The importance of a social media presence has been proven to be vital to the growth and continued existence of the FMU and volunteer groups. However, this should be correctly governed and only appropriate messages should be sent out by pre-determined people.

Summary of main points covered in a meeting on 13 November 2017 with Chairperson Chris Gould of the Knysna Heads Association.

Following the first day of the wildfire, Gould spent the next 5 days trying to get information and updates from his councillor, Mark Willemse who was situated in the Incident Command Post (ICP), also referred to as the Joint Operations Centre (JOC). However, Gould had to constantly initiate the process of acquiring information. He never received any information, no order to evacuate came, no instructions about where to evacuate if they had to. It felt like they were in a vacuum. Gould asked, "Is there a JOC? Who is in

charge here? Where is your disaster management plan?"

While Gould was aware of the difficulties being faced at the JOC, he still felt that there was no attempt to communicate to their community. This was especially annoying as 6 months beforehand he had contacted Richard Meyer (from Knysna Municipality) and informed him that he headed up the East Head Emergency WhatsApp group and should anything ever occur Richard should use Gould as the community liaison. He never heard from Richard at all throughout the incident.

Summary of main points covered in a meeting on 10 November 2017 with 13 residents of the Brenton and Belvidere communities.

Everyone had experienced and seen lots of inaccurate, panicked and fake messages going around on social media, which caused a lot of chaos and unnecessary panic. There was a case where a message to evacuate came on the day after the fire which was completely unnecessary and would have caused people to move into a dangerous area had they followed this message. Other messages said the "fire station was on fire", "the hospital was on fire" and even pictures of fires taken many years ago were put on groups.

False information also circulated about fires flaring up or starting elsewhere which would cause a response from residents going to try and help. They

would arrive and nothing was happening as reported, which was very frustrating and time consuming.

The community needs to be better prepared for communication during these types of disasters. The local radio station, instead of playing pre-recorded music should have been used to broadcast official information.

One resident from Brenton-on-Sea didn't have power for two weeks so could not access the internet. However, his daughter was looking for information on the Knysna Municipality website and found this very accurate. She reported this information to her father, which they found very useful.

Cell phone towers need to be better protected, as communication is so vital during disasters.

Summary of main points covered in a meeting on 14 November 2017 with Deon Van Zyl of the Rheenendal Fire Management Unit.

In the experiences of the Rheenendal FMU, Van Zyl reports that communication was an issue with misinformation being the root cause of confusion and panic during the initial incident and false alarms in the ensuing days. The misinformation spread via the WhatsApp group. People would tend to cut and paste and share information from and onto the Rheenendal Farm Watch Security WhatsApp group, which grew from 90 members to 2000. Lots of false alarms were reported in the days following



the initial stage of the fire. Van Zyl's response was to take the relevant people from the group and create a new one so that they could coordinate the relevant information and not waste time with responses.

Summary of main points covered in a meeting on 3 November 2017 with Information Technology Manager Graeme Huddy of the Knysna Municipality.

A big problem is that members of the public started doing things on their own if the municipality wasn't doing them. This led to lots of mixed communications. An example of this is 'shadow humanitarian relief'. A Facebook page ended up competing for donations with the official relief agencies and Municipality. There was a misunderstanding of where donation money was going to and who was managing the money.

Three to four days into the incident Huddy saw a Facebook group post saying the all the Joint Operations Centre phones are down and to please contact some random number. Huddy phoned them and asked why they had done this as it's creating unnecessary panic? It turns out they saw a tweet from Gerard Otto, Disaster Management that a tree had falling over and knocked out communications for the Joint Operations Centre. Only, Gerard Otto was referring to a JOC established in George for a different incident. This is just one such example of the misinformation and information taken out of context.

Summary of main points covered in a meeting on 8 November 2017 with Manager Gerhard Otto of Eden District Disaster Management and Richard Meyer of the Knysna Municipality.

Knysna at a certain stage had no communication networks in place due to destruction from the fire. What did work well was basic two way, Simplex radios in this situation. We need to look at an integrated two-way radio system, which is based on high sites.

Summary of main points covered in a meeting on 2 November 2017 with Crew Leader Thamsamqa Baleni of Working on Fire.

Communications were not good during the incident and resulted in teams being delayed leaving the line or arriving to new assignments.

DISCUSSION

For discussion purposes, we are going to follow the three categories of communication which were used to introduce the topic:

- Operational responders
- Public (involved in the incident)
- Media and public (not involved)

Operational Responders

- In general, across the Western Cape the District, Municipal, landowner and supporting resources make use of handheld two-way radios (primary) and cell phones (secondary) to communicate during wildfire incidents. A clear challenge often highlighted is the use of different types of radio systems, i.e. they are not compatible with one another. This creates communication problems, especially when different role-players work together on the same incident.
- Communication challenges existed during the 2017 Elandskraal and Kruisfontein wildfires.
 - » According to an interview with Clinton Manuel on 9 November 2017, the Knysna Municipality experienced radio communication difficulties from the outset (on 7 June 2017).
 - » Radio communication problems were experienced on all levels throughout the incident but especially highlighted by Divisional Supervisors (who are the link between the Operations Section Chief (OSC) and the resources on the ground).

INCIDENT ACTION PLAN COVER SHEET ALL HAZARD

1. INCIDENT NAME / NUMBER: Knysna Complex

2. INCIDENT TYPE: _____

3. DATE PREPARED: DATE: 15/06/2017 TIME: 20:00

4. OPERATIONAL PERIOD (DATE / TIME): FROM: _____ TO: _____

5. ICS FORMS INCLUDED IN THE IAP

ICS 201 INCIDENT BRIEFING FORMS	YES	NO
IAP INCLUDED	YES	NO
RESOURCES SUMMARY INCLUDED	YES	NO
ICS 202 INCIDENT OBJECTIVES	YES	NO
SAFETY MESSAGE INCLUDED	YES	NO
WEATHER SUMMARY INCLUDED	YES	NO
ICS 203 ORGANISATION ASSIGNMENT LIST	YES	NO
ICS 204 FIELD ASSIGNMENTS	YES	NO
SAFETY MESSAGE INCLUDED	YES	NO
ICS 205 RADIO COMMUNICATIONS PLAN	YES	NO
ICS 206 INCIDENT COMMUNICATIONS LIST (OPTIONAL)	YES	NO
SPECIAL MEDICAL EMERGENCY PROCEDURES AND PROTOCOLS INCLUDED	YES	NO
ICS 208 INCIDENT SITE SAFETY AND CONTROL PLAN (OPTIONAL)	YES	NO
IAP INCLUDED	YES	NO

7. REVIEWED BY NAME AND ICS POSITION: NAME: _____ DATE: _____ TIME: _____

8. REVIEWED BY NAME AND ICS POSITION: NAME: _____ DATE: _____ TIME: _____

9. REVIEWED BY NAME AND ICS POSITION: NAME: _____ DATE: _____ TIME: _____

10. PREPARED BY (PLANNING SECTION CHIEF): NAME: _____ DATE: _____ TIME: _____

IAP COVER SHEET

INCIDENT RADIO COMMUNICATIONS PLAN (RESET FORM ICS 205)

1. INCIDENT NAME / NUMBER: Knysna Complex

2. DATE PREPARED: DATE: 15/06/2017 TIME: 20:00

3. TIME LEADER / ICS POSITION: NAME: van Zyl (A/IC)

4. OPERATIONAL PERIOD (DATE / TIME): FROM: 15/06/17 @ 20:00 TO: 14/06/17 @ 20:00

5. RADIO SYSTEMS / SYSTEMS

NAME / IDENTIFIER	OWNER	FUNCTION	FREQUENCY / TONE	RADIO SYSTEM / CODE	REMARKS
OPV A					Thurhills
OPV D					Caash Station
OPV H					Elizabeth (2N)
OPV J					Edson Beacon
OPV K					Deon van Wyk
Knysna Group	Local PD				Knysna Fire Department
OPV P	Hebry Verhor				
OPV X	Hans Muller				PD Deon
Air Ops	Ground to air		129.18		
			129.35		
			129.36		

6. COMMENTS: Additional supervisors WhatsApp groups to be created. Precaution WhatsApp groups to be created to prevent unauthorized communications. Additional supervisors to provide operators with hourly situational updates.

7. REVIEWED BY (COMMUNICATIONS UNIT) (INCLUDE DATE & TIME): NAME: (Name van Zyl (A/IC)) DATE: 15/06/2017 TIME: 20:00

ICS 205

Above: Examples of the communication documentation that exists within the Incident Command System.



They could use their assigned radios to speak with the OSC but not with the crews under their command (who didn't have the same radios). If they could find the crews, direct personal communication or cell phones had to suffice, which wasn't always possible.

» Cell phones worked at times but were not always reliable. Signal problems due to wildfire-damaged infrastructure as well as battery limitations on the devices were the main challenges.

» WhatsApp groups were used successfully when there was a data connection. This was a great supporting communication tool during this incident. However, there were sometimes challenges, especially on community groups. Uncontrolled, generalised chatter and speculation created a long stream of communication which became a nightmare to navigate and was disturbing at times for everyone following the communication thread.

• During the June 2017 wildfires, it was reported that the Knysna and Plettenberg Bay Fire Stations' call centres very quickly became inundated with calls. Managing this was extremely challenging for the operators. When phone lines went down, national emergency call centres were used. This created a new challenge of attempting to dispatch resources while not knowing what resources were available.

Public (involved in the incident)

• Panicked, sometimes false, information was circulated by the public during the 7 June wildfire incidents. This can possibly be attributed to *official communication not being adequate (e.g. not enough being said, lack of relevant information, insufficient use of the appropriate communication channels or even delayed messages from official sources). *Official sources could include Eden District Fire Services, Eden Disaster Management, Knysna or Plettenberg Bay Municipalities and Fire Services or the Incident Management Team (when established).

• The Elandskraal and Kruisfontein wildfires were both rapidly developing in scale and complexity. Public information started early on 7 June with, for instance, road-closure information from the Kruisfontein wildfire being broadcast on radio stations. The real communication challenges began when suburbs and entire areas started being evacuated. It seems as though the public (involved in the incident) communication overwhelmed the official communication. This created panic and misinformation. Examples include:

» Incorrect home destruction news - Belvidere, Brenton and Buffels Bay were "totally destroyed" according to some reports. (Very inaccurate information.)

» Incorrect damage reports were circulated - "The Provincial Hospital had burned down", "the Petrol station in town was on fire". (Both completely false)

» Reportedly evacuation messages were circulating without instructions where to evacuate to.

» A few days after the main wildfire spread through the Brenton on Lake area, someone picked up on an old evacuation order and copied it to the local WhatsApp group saying everyone needed to evacuate. This was very unsettling for the community, which was already traumatised from the previous day's events.

Media and public (not involved)

• What did the media and public want to know as the 2017 Elandskraal and Kruisfontein wildfires unfolded?

» Where are the wildfires?

» What actions are being taken to deal with the wildfires?

» What areas are currently, and in the future, going to be affected?

» What can be done to prepare for the wildfire?

» What access routes are open or closed?

» What help is required?

» Is there a need to evacuate and to where?



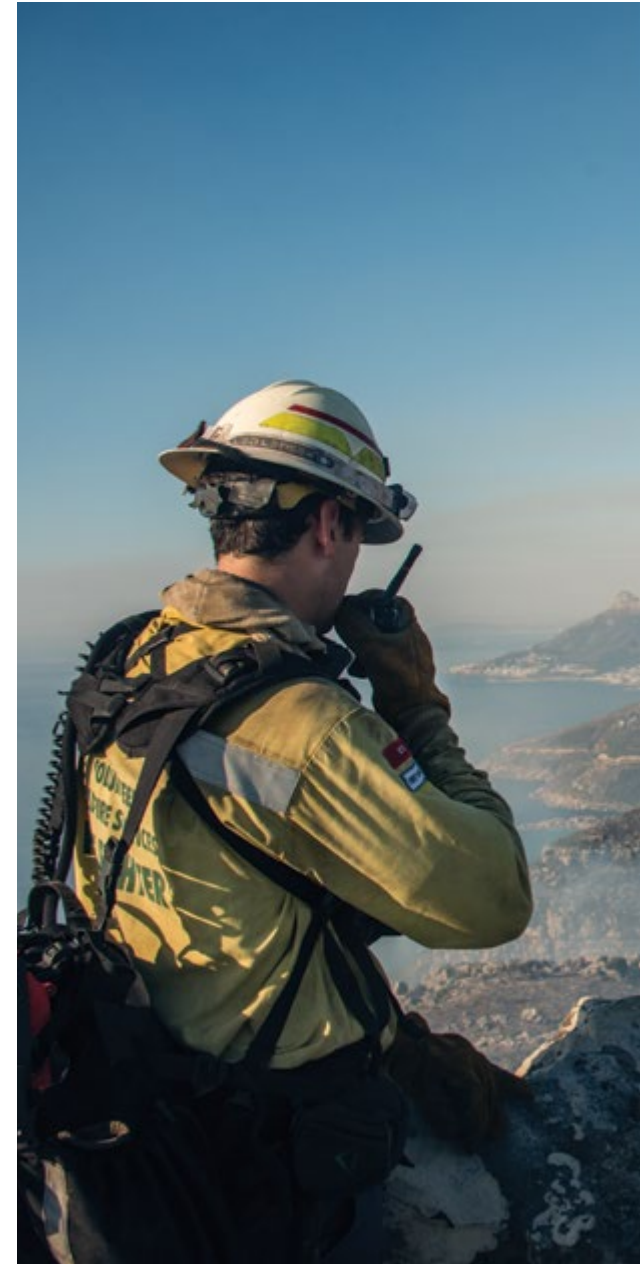
» What are the accurate details relating to lost lives?

» What are the accurate details pertaining to destroyed homes?

Local residents report that this type of information from official sources was limited and, as a result, that there was a lot of speculation and panic generated from unofficial sources. There was no sense of a predetermined communication strategy. The Knysna Municipality communication team reportedly did keep media and public up to date with regular press releases and briefings. Considering both sets of feedback, the residents' experience could either be a misconception or there was a real problem with the communication channels the Municipality team used. Perhaps they were sending out the information but, for some reason, it was not reaching the appropriate audience.

- With the Elandskraal and Kruisfontein wildfires being separate but significant wildfires occurring simultaneously, they were sometimes referred to as the same fire by the public. There were also different names given to the same fires which added further confusion. The relevance of a wildfire name is that; people keeping a watch for any specific information may miss vital information. With social media being such a strong and favourable communication method, hash tags are started and followed. Information on evacuation orders could be missed if someone was following the wrong hash tag or a different hash tag.

Right: Communication is a vital to ensure safe operations during a wildfire incident. In this example image (not from Knysna) a wildland firefighter is placed in an elevated lookout position during a wildfire so that he can relay information about any changing conditions to other personnel. It is vitally important that communications are maintained throughout incidents.



RECOMMENDATIONS

Operational responders

- The Western Cape Directorate Disaster Management and Fire & Rescue Services need to set up incident support equipment in the form of caches based at strategic locations within each of the Western Cape Districts to be used for interagency incidents where resources have incompatible radios.

- » radios, batteries, chargers, signal repeaters, etc. for interagency operations need to be included in the caches as a matter of priority to assist with the current interagency communication challenges.

- » material should be stored in easy-to-transport crates located at strategic locations.

- » specs and functionality of the radios must be discussed with all the Western Cape District Fire Services in order to find a radio solution to solve the identified problem.

- » all leadership positions from crew leader up to incident commander must be catered for.

- » the radios must enable all resources to speak with one another but also allow for specific private channels.

Note: Over recent years there has been investigation into having all emergency services using the same type of radio system. By all accounts this would be extremely expensive and complicated and no viable solutions have been determined.

- The Western Cape Directorate Disaster Management and Fire & Rescue Services need to set up communication standard operating procedures for all District and Municipal Fire Services in order to manage first responder and Incident Management Team (when established) communication. Included in these operating procedures must be instructions on how communication to the public and media should be handled. Having a consistent, standardised approach is advantageous in developing trusted and popular communication channels. Media and public will also be more receptive and understanding if the same approach is used on all incidents. Included in these protocols must be communication campaigns that occur before incidents. These campaigns, which will develop and enhance the communication channels, should focus on risk reduction. This is a high priority and it is advisable to seek partners from the wildfire, public relations and private industry (e.g. insurance) in developing these.

Public (involved in the incident)

- Eden District Fire Services, Eden Disaster Management and B Municipalities should establish contingencies if traditional communication warnings and alerts for the public are no longer possible due to power loss, cellular networks being down and infrastructure being damaged or destroyed by wildfires. These contingencies could include sirens, loud hailer, local radio announcements, community door-to-

door personnel, notice boards, or a combination of these.

- Eden District Fire Services, Eden Disaster Management and B Municipalities need to look at systems they can implement to scale up their ability to respond to a higher volume of emergency calls received at local levels, such as at Knysna Fire Station. This system needs to be integrated to allow for the local dispatch of emergency resources.

- The Western Cape Directorate Disaster Management and Fire & Rescue Services needs to investigate the feasibility of implementing an alert system similar to that which is used in the USA. "Wireless Emergency Alerts" allow officials to send messages that appear on cell phones as text messages. The alerts have a unique sound and vibration, as well as information contained in a text message. More information can be found at www.ready.gov/alerts.

- Community WhatsApp Groups were extremely useful to the Incident Management Team as well as the affected communities during all stages of the Elandskraal and Kruisfontein wildfires. However, there were challenges experienced on community groups and, based on these, it is recommended that any group administrator defines simple and clear rules to manage what gets posted and by whom.

- **Media and public (not involved)**

- Eden District Fire Services, with the help of the B Municipalities, needs to prioritise the creation of a strategy for:

- » The establishment of official, recognised and trusted communication channels across all media platforms, including social media.

- » Developing procedures for using all media platforms, on all incidents, to disseminate information in order to build a following. Developing a reputation as a reliable and up-to-date source of incident information is essential to this process.

- » Identifying communication 'influencers': i.e. members of the community with large numbers of followers who can share information and reach greater audiences, thereby boosting the Municipality's media platforms.

- » Building trust with the media and public over time.

- » Determining protocols to ensure that, from the time a wildfire and its location have been confirmed, communication must be released to ensure that the Municipality guides the flow of correct information.

- » Determining an official wildfire name and hashtag.

- Before establishing these strategies, it is recommended that Eden District Fire Services together with the B Municipalities consult communication professionals who specialise in emergency communication. Advice is needed on whether or not there will be a centralised Eden District strategy or if each B Municipality will have its own communication network. There are pros and cons for each, which must be considered by the various role-players.

- Large landowners in the Eden District should be encouraged by Eden District Fire Services and the B Municipalities to feed information into the same communication system strategies. This will ensure there is synergy in the way wildfire incident communication is handled.

- Eden District Fire Services and Disaster Management must source communication technical specialists who can be contracted to assist Incident Management Teams on large and complex incidents. If in-house experts are available, they will most likely need additional help with these specialist skills.

- Eden District Fire Services and Disaster Management must embark on a strategic approach to drive wildfire-risk awareness as a matter of priority. The impact they can have by harnessing awareness around wildfires post June 2017 can be maximised. This strategy needs to incorporate wildfire-responsibility awareness, tactical advice for different homeowners and landowners, advice

on Fire Danger Index warnings, the roles of the different Fire Services, etc. They must liaise with the Western Cape Directorate Disaster Management and Fire & Rescue Services to seek guidance on standardised content and approaches.




Above: The Western Cape Directorate Disaster Management and Fire & Rescue Services have developed a logo that will underline an awareness campaign in order to educate and inform people to the risks posed by wildfires and the actions one can take to reduce this risk. On the opposite page are examples of the type of information posters and leaflets that are being produced.




WILDFIRE READY: HOW HOMES BURN

Wildfires can spread long distances from the mountains and veld into built-up areas.




RADIANT HEAT

A wildfire can burn at between 800°C to 1200°C and generate enough radiant heat that any flammable material ahead of the fire becomes preheated. The fine fuels can then ignite carrying fire to heavier fuels. In this way a wildfire can spread rapidly across a landscape and into urban areas causing homes to ignite.



EMBER ATTACK


During a wildfire, burning matter such as bark, twigs, leaf litter etc can be lifted into the air by the convective updraft of a wildfire and carried great distances. These embers can then cause ignitions when entering structures through small gaps and igniting any dry and combustible materials.



STRUCTURE TO STRUCTURE

Once a structure, or a home, has ignited, the radiant heat given off is enough to cause the preheating of others close by. This can lead to further ignitions, spreading fire through the urban environment. One or two homes catching alight can cause a chain reaction which can destroy an entire block or suburb.

Protect your Property with Fire Resistant Materials and Defendable Space.



**Wildfire is Coming
Are you #WildfireReady?**

WILDFIRE READY: FIRE DANGER

Weather plays a major role in wildfire danger. Drought leads to extremely favourable conditions for wildfires and winds aid a wildfire's progress. It can make fighting the fire increasingly dangerous. There are three weather elements that can affect wildfires.



WIND SPEED

Strong winds can drive wildfires over long distances very quickly. These winds also provide oxygen that fuels the fire.



TEMPERATURE

High temperatures are a key ingredient in wildfire ignitions, allowing vegetation to ignite easily, burn quicker and more intensely.



HUMIDITY

Low moisture and incoming dry air masses decrease humidity, reduce rainfall and dry vegetation creating highly flammable fuel for fire.

THE FIRE DANGER INDEX (FDI)

The Fire Danger rating predicts how a fire would behave if one started, including how difficult it would be to control. The rating is your trigger to be prepared and act.

<p>SAFE</p> <p>Suppressing of Fires Ignitions not likely to occur. Rate of spread will be slow and fire may die out without suppression actions. Fire behaviour likely to be moderate with low intensity. Control possible with correct resources and tactics.</p> <p>Precautions Ensure open air fires are safely contained. If doing Prescribed Burning make sure you have a permit. Bush fires are allowed in designated areas only.</p>	<p>MODERATE</p> <p>Suppressing of Fires Ignitions can occur. Rate of spread will be moderate in dense and dry vegetation. Fire behaviour likely to be moderate. Control possible with correct resources and tactics.</p> <p>Precautions Ensure open air fires are safely contained. If doing Prescribed Burning make sure you have a permit. Bush fires are allowed in designated areas only.</p>	<p>DANGEROUS</p> <p>Suppressing of Fires Ignitions can easily occur. Rate of spread will be fast in dense and dry vegetation. Fire behaviour may be severe. Control will be difficult.</p> <p>Precautions Authorized open air fires only. If doing Prescribed Burning, extreme caution must be taken and make sure you have a permit. Bush fires are allowed in designated areas only.</p>	<p>VERY DANGEROUS</p> <p>Suppressing of Fires Ignitions can easily occur. Rate of spread will be fast in dense and dry vegetation. Fire behaviour will be severe. Control will be dangerous and may not be possible.</p> <p>Precautions No open air fires. No activity that can cause an ignition is allowed. Fighting resources to be ready to respond. If a fire occurs, evacuations may be necessary.</p>	<p>EXTREMELY DANGEROUS</p> <p>Suppressing of Fires Ignitions can easily occur. Rate of spread will be extremely fast for extended periods. Fire behaviour will be extremely severe and intense. Control will be extremely dangerous and may not be possible.</p> <p>Precautions No open air fires. No activity that can cause an ignition is allowed. Fighting resources to be ready to respond. If a fire occurs, evacuations may be necessary.</p>
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Stay Informed of the FDI. Contact your Local FPA.



**Wildfire is Coming
Are you #WildfireReady?**

WILDFIRE READY: EVACUATION PLAN

You should never wait and see what happens during a wildfire. When an evacuation is anticipated, follow these checklists to give you and your home the best chance of surviving a wildfire.

OUTSIDE

- Make sure your car is facing the exit route and your car windows are closed to avoid embers entering.
- Stay updated on fire information so you will know if the fire has come closer to you.
- Gather up flammable items from the exterior of the structure and bring inside or place them in your pool.
- Turn off the gas supply. Designate a safe place to store gas bottles, where they will not be exposed to radiant heat. A pool is a safe place.
- Wet down any area of the home that can ignite easily, e.g. wooden decks, plants, roofing etc.
- If time permits, block the downpipes and fill the gutters with water.
- Leave exterior lights on so your home is visible in the smoke or dark.
- Seal all attic and roof spaces to stop embers gaining access.
- Seal gaps in doors and windows with non-flammable material.

INSIDE

- Make sure you have your ID books, passports, birth certificates and any other important documents or files packed safely ready to go with you.
- Pack a WildfireReady Emergency Kit to take with you.
- Shut all windows and doors. Take down window shades or curtains as these can ignite from radiant heat.
- Move flammable furniture to the centre of the room, away from windows and doors.
- Shut off any gas to appliances.
- Turn off any air conditioning.

ANIMALS

- Locate your pets and any carry boxes, keep them nearby and ready to go.
- Prepare farm animals for transport and think about moving them to a safe location early.

Be Prepared, Be Aware.



**Wildfire is Coming
Are you #WildfireReady?**

Above: Examples of some of the flyers and posters that have been designed to form part of the awareness campaign in order to educate and inform people to the risks posed by wildfires .



Above: When the land lines went down, the only form of communication was by cell phones which worked at times but were not always reliable. Signal problems due to wildfire-damaged infrastructure as well as battery limitations on the devices were the main challenges.





Information Technology

Introduction



Information Technology (IT) staff are generally excellent problem solvers. The way in which they analyse and solve problems, as well as their expertise, means they are valuable technical specialists who can support Incident Management Teams (IMTs). Computers, servers, communication and operating systems help IMTs and emergency personnel to manage an incident in a more effective way. Especially on large incidents, such as the Knysna Fires, there is an enormous amount of information and data that needs to be received, processed and analysed. The IT professionals help to maintain, repair and even build systems based on what is required.

Graeme Huddy (Knysna Municipality's Information Technology (IT) Manager) was a real inspiration for what he was able to accomplish during the Knysna Fires incident. There are some great lessons to be taken from his experience and involvement.

INDUSTRY VIEWS

Summary of main points covered in a meeting on 3 November 2017 with Information Technology Manager Graeme Huddy of the Knysna Municipality.

From an IT perspective for this disaster, we were not prepared. An IT disaster was never declared by Knysna Municipality during the Knysna Fires incident. "All IT systems were 100% available throughout the disaster". The only thing that wasn't available was the telephones for a short period of time.

Huddy's Disaster Recovery (DR) site was in the building next door. There was a pre-existing plan to locate this elsewhere but before moving the DR site, Huddy was systematically going through a business process system, for each directorate, getting to know each one's disaster recovery requirements and how quickly each needed their systems back online. There are different strategies, which need to be considered and Huddy was in this process when the incident hit.

Huddy was actually planning to move his servers to the Telkom exchange up the road, because he believed flooding was the primary risk his facilities faced and the Telkom exchange was a little higher above sea level. Fortunately, Huddy hadn't moved there 'because the flames were licking the Telkom exchange during the fire incident'.

If Huddy had followed the existing Disaster Recovery best practice the Disaster Recovery site should be

more than 50km away, (and there are a whole lot of other criteria). One option for Graeme Huddy was Bitou, which could then use some data space at Knysna's centre and vice versa. During the fires, all the wireless high sites were burnt, so they would have lost communication connectivity. So that strategy wouldn't have worked. Option two for Huddy would have been to go with one of the major data centres in either Johannesburg or Cape Town where you connect to them over Fibre. However, on the Saturday of the fire at midnight, the fibre ring was cut affecting most of the Garden Route. On Saturday night, there was a downtime of all communication for approx. 6 hours. (To a degree this was planned for as Huddy did receive notice this would occur and he informed emergency services.). If Huddy had moved his data centre to Johannesburg or Cape Town, his primary site in Knysna municipality would have been fine but the Disaster Recovery site would have been affected. They would have had to shut down the municipalities financial systems for example.

In addition to DR site, Huddy has tape back-ups so even if they had lost everything; he could rebuild entire system (for the financial system). It would just take some time.

Going forward from a communications point of view, Huddy is installing a PABX (telephone switch) at Knysna municipal building, Knysna fire station and Sedgefield fire station. These three switches allow calls to come through to these locations even if the main phone lines go down. In future, they will also

put a GSM module at both fire stations so that if the ISDN goes down, they can use cell phone networks.

Huddy is not sure why this happened but for some reason there was one 10mb/s ADSL line that continued working (when the telephone lines went down on the 7th June 2017). At 7pm or so, Graeme Huddy suddenly had the idea to buy Skype numbers and Knysna Municipality posted these on social media. He admits that they didn't get a lot of phone calls through that channel, most were from sons and daughters who had emigrated and were phoning to check on parents.

At 8am the next morning, Huddy went and bought 5 cell phones and then published those numbers. This was a bit frustrating as most of the calls coming through to cell phones were people asking about when electricity would be coming back on. Once the landlines came back online, most emergency calls then went straight to fire station so they didn't deal with those. They used the SharePoint work flow tool. So, a phone operator could log a call, and someone in Joint Operations Centre who could dispatch emergency resources would read this. The IT team built this up from scratch on the fly so that all the calls for help they did receive they could patch into the emergency centre.





Above: Communication infrastructure in the WUI area of Knysna Heights.

“All IT systems were 100% available throughout the disaster”

— Graeme Huddy, Knysna Municipality

Huddy says the IT department was really innovative during the incident and this innovative thinking is still being applied to lessons learned for future incidents. A lot of research and development after the incident was around phones and connectivity. They are looking at a ‘Push to Talk’ function that requires the phone to have some connectivity but still works when the phone lines are not working. This system still needs investigation.

Huddy asked municipal staff how they would connect to his systems in a disaster and no-one knew. The problem was there was no documented Business Continuity plan for any type of disaster. They did partly plan but it wasn’t documented anywhere. The only reason the Joint Operations Centre formed in the municipal building was because they had a generator. The generator wasn’t even installed properly and they only tested it for the first time three months before the incident. They had only then started doing weekly start up tests. Interestingly, two weeks before the incident, the batteries were flat and the generator did not start. They had just bought a trickle charger before incident. A potential problem on the first night of the incident was diesel for the generator. They were worried they didn’t have enough to keep it going but eventually they got a fuel bowser to come top it up and by that point the electricity came back online.

This example all goes back to identifying a business continuity plan. Graeme Huddy never saw a plan that had a pre-determined location for the Joint Operations Centre (JOC) in the event of a disaster. He thinks that the Fire station might probably be determined to be the place for JOC.

The app “Community” was developed and is used by a few municipalities in the Western Cape including Knysna. It was in a development phase and Huddy made a decision to do a major upgrade of the app on evening of the 7th as he saw the benefit of the app in this incident. He had the foresight to block out the services function of the app e.g. for reporting faults, potholes, water leaks etc and only activated click-to-call emergency services as this was the most critical element. It also has the ability to push notifications to residents such as when power was going to be restored in Brenton for example to warn resident to disconnect generators. It also has a built-in function for relief services forming a bridge between aid providers and the victims. A survey went out to try and capture details of those who needed help and then these lists were then used to direct aid towards these people. This didn’t work too well because aid organisations weren’t using it properly (and he is yet to get direct feedback about why it wasn’t well received). A lot of organisations didn’t capture anything. There is still work required to further develop the app and more work needs to be done for users of the app. There are some other flaws in the system to be worked on.

DISCUSSION

- The Knysna Municipality and Emergency Services infrastructure and systems were critical to assisting and coping with the demands of having the Incident Command Post situated in their buildings within the town of Knysna.
- The chosen Incident Command Post (ICP) location worked well as a facility from which to run an incident, even though there were some challenges that the IT department needed to overcome. There were possible sources of IT vulnerability in the municipal buildings and more can be done to improve their resilience for potential future disasters.
- Difficult decisions focusing on disaster recovery strategies need to be made for Knysna Municipality. Considerations are dependent on the types of systems requiring protection and the types of incidents to be prepared for (not just wildfires). Always being in a state of readiness is essential.
- Knysna Municipality's IT personnel were able to build a system during the incident to deal with emergency calls, capture information and then dispatch resources. This type of problem-solving intervention highlights the importance of IT. However, it also exposes a weak area in as much as IT problem-solving should not be needed.

Right: Fire hoses indicate that protection efforts around the communications tower and generator were required.



RECOMMENDATIONS

- Eden District Fire Services and B Municipalities need to plan for Incident Command Post locations and facilities for future incidents. The state of readiness of these facilities must then form part of annual preparedness plans. The chosen locations must have systems that are protected and contingencies must be planned for.
- An IT technical expert should be considered a standard position on any Incident Management Team that is in command of an incident going into extended attack.
- Eden District and B Municipalities must investigate and embrace innovations and technology to assist with their current systems, communication and incident support infrastructure. It's vital that the IT department is supported by the municipality to purchase equipment and systems to help create a municipality that is more resilient to disasters.
- Knysna Municipality, as a priority, must develop a strategy and implementation plan for business continuity using insights gained from the June 2017 incident. In order to enhance this process, consultation with Western Cape Disaster Management, Eden District Disaster Management as well as hazard-specific (i.e. wildfire, storm, weather etc.) professionals is recommended. This process would be beneficial to other municipalities in similar situations. Once the process is completed, it is recommended that a case study be distributed to other municipalities.



Evacuations

Introduction

The Incident Command System (ICS) is a highly effective, standardised approach to the command, control, and coordination of incident response. An incident must have clear objectives and the approach to strategic objectives remains similar. The number-one objective (highest priority) is always the safety of first responders and the public.

In an interview with the Chief Fire Officer of Knysna, Clinton Manuel, on 9 November 2017, Chief Manuel said that at a certain point, due to the extreme nature of the wildfire bearing down on the town, he realised the only objective was the safety of first responders and the public. At this stage, he started to issue mandatory evacuation orders.

Many more lives would have been lost if the evacuations did not take place

— Clinton Manuel, Knysna Fire Services



Imagine for a moment being faced with the situation the Knysna and Plettenberg Bay residents went through as the wildfire raced towards them. In this situation, you start to ask:

- Do I have a plan for my household, my animals and my property?
- How will I safeguard my family and defend my property, before the fire reaches me?
- If there is a wildfire in my area, what is my trigger to evacuate?
- Where will I go?
- What route will I take?
- What is my alternative if the wildfire surrounds my area?
- What will I take with me, in the limited time I have to pack?
- What will I do for my pets or livestock?
- Who do I need to keep informed of my movements?
- Is there anyone else in my community who needs help or checking up on?
- How will I stay informed about further warnings and updates?
- What will I do if I get trapped by a wildfire?
- What is my backup plan?
- What do I do after the fire front passes?
- If I leave, will I have a home to come back to?

With the enormity of the sudden and harsh reality of this situation, homeowners and landowners understandably found themselves in extremely stressful situations. An evacuation procedure is a complex and dynamic undertaking at the best of times but, when you add the incident stress, it becomes even more challenging for everyone involved.

Evacuating people, who were emotionally driven not to lose their homes or return for pets, put firefighters in compromising positions

— Adriaan Swanepoel, Bitou Fire Services



Above: Panicked evacuations can result in accidents and that is just one of the reasons why planning for evacuations is essential. Here a vehicle in Belvidere had crashed when trying to flee the wildfire.



INDUSTRY VIEWS

Summary of main points covered in a meeting on 7 November 2017 with Environmental Planning Manager Pam Booth, Planning and Development Director Marlene Boyce and Town Planning and Building Control Manager Hennie Smit of the Knysna Municipality.

Boyce confirmed that post-incident, she discovered that the evacuation order was only picked up by the public via phone calls between each other and social media. There was no clear municipal communications strategy or intervention. Boyce was in the Joint Operations Centre during the incident, sending communications out and not realising that there was no 'back-end' to implement the instructions she was sending. Boyce sent information to one person who would then communicate this to the press; however she was under the assumption that the info was taken to a central place and then distributed via all media to the relevant people. Marlene felt this was a large gap that should be addressed and doesn't even know if another incident of the same nature hit tomorrow, whether Knysna would be prepared.

Summary of main points covered in a meeting on 3 November 2017 with Senior Firefighter Adriaan Swanepoel of the Bitou Municipality Fire and Rescue Services.

(Editor's Note: Swanepoel's account is of the Kruisfontein Fire)

Swanepoel had some close calls in the process of conducting evacuations of people from their homes. His evacuations were ultimately successful but he and his crew ran into challenges and obstacles. Evacuating people who were emotionally driven not to lose their homes or return for pets put firefighters in compromising positions. Firefighters in these cases had a hard time convincing some people that they needed to leave. Property access and egress was also often complicated by thick vegetation on the sides of the road and sometimes even growing over the road. Firefighters, who had insight into how extreme the wildfire was, took one look at some of the homes in which some people wanted to ride out the fire in and could clearly see the home would not survive given the fire conditions and state of the fuels surrounding the home. It was therefore clear to the firefighters that the homeowners needed to leave but the emotional state of the homeowners sometimes made motivating them to leave very difficult.

Summary of main points covered in a meeting on 13 November 2017 with Knysna Station Commander Jerome Simonis of the National Sea Rescue Institute.

Evacuations were carried out at Leeuwenbosch by vehicles and this was done in a private capacity as friends and family required assistance. While NSRI had not been requested to assist yet, the NSRI guys who did come to help had no training for this situation (all their training is for sea based rescue and evacuation). Seven of his members were trapped in Rheenendal by the fire during that first day. Simonis did not know who should take control or what exactly to do so he took charge of the people with him, as his role is that of Station Commander. However, he had no experience with wildfire and on what judgement calls to make with regards safety while helping with evacuations. The situation of trying to get people out who are trying to save their belongings with fire rapidly approaching was extremely tense. This wasn't helped by having lots of vehicles (which were there to help) resulting in the roads were becoming congested as they all tried to exit in thick smoke through one small gate.

Simonis first went to the Incident Command Post (Joint Operations Centre) the following morning as he had to evacuate his own house when his neighbourhood, Paradise/Westhill, was burning. He was aware that there was an Incident Command Post set up by 17:30/18:00 on the first evening of the fires. He did try and get another NSRI member to

attend the meeting that evening, but they were also busy. Three NSRI members lost their homes to the fire. He also feels that had the fire hit the town later that evening, say around 21:00 onwards, there would likely have been far more deaths.

Formal evacuations were requested and conducted by the NSRI across the lagoon, which was challenging. Visibility was a real problem; this was reduced to between 5 – 10 metres maximum visibility and the wind was blowing at around 100km, which added to the challenges. Members of the public wanted to launch their boats to help, but Simonis would only let a few who he knew were competent to assist, as there was a very real threat of two boats colliding in the lagoon. Overall, he felt the water-based evacuation went well but had it happened at night-time it would have been a very different story. NSRI brought the people from Belvidere to the Saint James Club at The Point as it has a jetty, and was considered safe and comfortable. They couldn't get under the train bridge due to the high tide. Little did they know that they would have to then evacuate the people from the St James Club later that afternoon. They evacuated 140 people from Belvidere. The SAPS Dive Unit assisted NSRI and Metro sent a vehicle to help as well.

A request was made for NSRI to evacuate people from the beach at Brenton-on-Sea, but Simonis refused this as it was starting to get dark and there were rough swell conditions, which meant he felt it was not safe to try and take people off a beach with the breaking waves. He also turned down a request

to drop off medical supplies in Buffels Bay the next day for the same reasons.

Simonis's advice to another Station Commander facing a similar situation is to make sure there is a jetty to pick people up off and disembark them onto. You cannot evacuate elderly, frail and fragile people through surf. Another problem is that there were no life jackets for the people being evacuated.

Summary of main points covered in a meeting on 8 November 2017 with Manager Gerhard Otto of Eden District Disaster Management and Richard Meyer of the Knysna Municipality.

At 19:15 on the 7th June, Otto received a phone call from Knysna Acting Municipal Manager, Johnny Douglas, requesting assistance to evacuate the Town of Knysna. With fire on both sides of the town and limited resources this was a big challenge.

Summary of main points covered in a meeting on 10 November 2017 with 13 residents of the Brenton and Belvidere communities.

At approximately 13:00 a Police van and a municipal bakkie were informing residents that they had to evacuate Lake Brenton to the Hotel at Brenton-on-Sea. The fire was near Belvidere at this stage. One of the Lake Brenton residents recounted how they had a discussion with the municipal bakkie ordering evacuations, explaining that the safest area was adjacent to the lagoon done by the slipway. There

is a grass patch and area safe for residents as well as their cars, which could be parked adjacent. The old caravan park has little or no vegetation under the trees and it was a good safe area in his opinion (which it turned out to be). The resident explained to the municipal representative that he was hesitant to go to Brenton-on-Sea because the fire had the potential to spread there and threaten their safety again. He remarked that this is what ultimately did happen with people being evacuated along the beach to Buffels Bay. There was also a comment that the evacuations were extremely panicked and there was no sense that it was co-ordinated effort.

In Belvidere, there was an early evacuation by some residents from Belvidere Park at around 12:00, which was orderly and not panicked. They went to the Brenton Community Hall, which they thought would be the safest place for them to go, never thinking the fire would reach there. Communicating via WhatsApp a couple of them took a co-ordinating role and moved people there. While at the hall they appointed a watch out and then they saw the fire come over the ridge. They realised that they needed to evacuate again, but with plenty of time available they simply moved again. They believe this was a good example of how an early evacuation worked really well.



Summary of main points covered in a meeting on 9 November 2017 with Chief Fire Officer Clinton Manuel of the Knysna Municipality Fire and Rescue Services.

When the fire was burning on the Brenton Road, (this being a one way in, one way out road) and with properties under threat, this was then when Manuel started to issue evacuation orders. Once it was realised that this fire was not going to be stopped, the primary objective became to save lives.

Manuel ordered mandatory evacuations for new and old Belvidere, Brenton-on-Lake and Brenton-on-Sea. Manuel admits to difficulty in announcing the evacuation to the public, with the only way they could do it being sending people into the area with loud hailers to spread the evacuation order. The police and Fire Services assisted with the process of getting people out of harm's way as best as possible.

NSRI were asked to assist with evacuating people from Belvidere and Belvidere Heights by boat across the lagoon to The Point. The people from Brenton-on-Lake and Brenton-on-Sea had to go to the hotel in Brenton-on-Sea. From there, SANParks and the 4x4 Club took the people from the hotel across the beach to Buffels Bay. The Go George buses were sent to Buffalo Bay to then assist with transporting people from there. The evacuation orders for these areas were given way before the fire hit them. Members of All Sound Security also crossed the railway bridge to help evacuate some people back across it towards The Point.

Manuel phoned Wayne Sternsdorf (Fire Officer) to inform him that he had received a phone call from someone having a heart attack in the Lake Brenton area but Sternsdorf said he could not get there to investigate. Sternsdorf eventually did make it through to meet the person who had the heart attack victim with them. Sternsdorf then instructed them and Wayne Kidd from SAPS to take the victim to Margaret's viewpoint, which did not have fire burning near it yet. (Tragically, the person had passed away by this stage.)

When the wildfire jumped the Red Bridge and threatened the Welbedacht area, Manuel and one of his officers went into the area to try and evacuate people as they were now in harm's way. All Sound Security as well as the Police were asked to assist with evacuating the community. Manuel believes they had 5-7 minutes to evacuate this area. With one way in and one way out, with high fuel loads surrounding the road, a canopy of vegetation going over the road, this was a very hazardous environment. There were two vehicles operating in this area but according to Manuel the objective was to save lives as even property could not be defended at this time. Resources were used to evacuate people rather than putting out house fires.

Following Welbedacht, further mandatory evacuations took place in Paradise, Eastford, Eastford Glen, Eastford Vale, Eastford Cove, Eastford Private Estate as the fire spread. Next was Green Pastures followed by Knysna Heights. Eventually as

the fire spread across the town and White Location as well as Rhobololo were also evacuated by order and then later Pezula was also evacuated.

Manuel, reflecting back on the events of the wildfire (particularly the first day) feels that many more lives would have been lost if the evacuations did not take place. Although, it was not at all straightforward by any means. There was good co-operation from most people to evacuate but there were also people who didn't follow police or Fire Services orders to evacuate. In Knysna Heights for example, there were multiple calls for help from people trapped in their homes after the main evacuation had taken place. This would require a firefighting vehicle to go back with limited resources, with other areas still to be impacted by the fire, and this put a major strain on the evacuation process. There was even a stage where the Provincial Hospital needed to be evacuated.

In total, just over 10,000 people were evacuated.

No location of where to evacuate to was given
— **John Noble, Knysna Resident**

Summary of main points covered in a meeting on 14 November 2017 with Deon van Zyl of the Rheenendal Fire Management Unit.

The area of greatest concern to the Rheenendal FMU during the 7th June fire was that of Rheenendal Village, which has:

- approximately 6000 people,
- no community hall, and
- is surrounded by plantations which are knee deep in slash and a big fire risk.

This was a major concern for Van Zyl and the FMU as they did not know where to evacuate the residents of Rheenendal Village to, should they have to be evacuated.

Summary of main points covered in a meeting on 3 November 2017 with Acting Communications Manager Fran Kirsten of the Knysna Municipality.

Kirsten didn't know if there was a pre-determined evacuation plan but believed the evacuations were conducted very well. They were told by the Chief Fire Officer that evacuations were taking place. Kirsten then pushed this out to the radio stations and all their communication channels.

Summary of main points covered in a meeting on 6 November 2017 with resident John Noble of Knysna.

In the early evening, Fran Kirsten (Knysna Municipality Acting Communications Manager) sent a message to evacuate the town, which Noble received via social media. No location of where to evacuate to was given. Noble took it upon himself to countermand this order and advised people to return to their homes as the town was filling with cars and he saw this as a safety risk. He then informed members of the public that they, the volunteers, would instead give an hour's notice of when to actually evacuate. During this time, there was also misinformation spreading via social media and word of mouth. The majority of evacuations they were involved in or heard about were self-evacuations by communities.

Summary of main points covered in a meeting on 9 November 2017 with Sedgefield Station Commander Wayne Sternsdorf of the Knysna Municipality Fire and Rescue Services.

During the main stage of the incident Sternsdorf acted as Division Supervisor in Division Juliet, which was from Brenton-on-Sea to Phantom Pass. The objective during this initial stage of the incident was to evacuate the public from harm's way. Sternsdorf believes that had the evacuation order not been given, many more lives would have been lost.

On reflection of the areas affected, Sternsdorf believes the most difficult area to suppress was the Knysna Heights area due to the topography, the heavy vegetation load surrounding the homes, and the actual make-up of the structures and homes (built of wood and on stilts). Sternsdorf says that no structure protection tactics were followed during this initial stage, with the focus being to save lives by evacuating people.

Summary of main points covered in a meeting on 4 December 2017 with National General Manager Shane Christian and National Spokesperson Linton Rensburg of Working on Fire.

Christian arrived around 21:30 in Knysna (7th June) and went to talk to Chief Fire Officer. They immediately started strategising moving forward. At that time, they were just focusing on the town and not looking at the fire that was moving towards the town from all directions. At 23:00 the Chief Fire Officer went home to rest. Christian with Richard Meyer (Knysna Municipality) decided to break the town into 6 priority sections. Their focus was on evacuation and not fire suppression. Most WoF vehicles and human resources were tasked with assisting evacuations. The next morning the IC started off and there were more people on board. WoF took up seat as an agency representative.



Summary of main points covered in a meeting on 13 November 2017 with Knysna Station Commander Jerome Simonis of the National Sea Rescue Institute.

Communication was really poor overall and surprisingly when Simonis did attend the meeting at the Incident Command Post, he was surprised that no one asked what the weather forecast for the day was. He then enquired and was told that it was actually a good question, however he felt that type of intelligence should not be coming from him. Surely, he felt, the weather would have an influence on what strategies are to be put in place? The other note of concern was over the evacuations, orders were given to evacuate, but there was no instruction of where to evacuate to.

Summary of main points covered in a meeting on 4 November 2017 with representatives of the following Bitou Fire Management Units (FMUs): Plett South FMU, Harkerville Rural Protection, Fisantehoek FMU, Wittedrift FMU, Craggs FMU and associated FMUs.

On one occasion, one of the call outs from a member of the community indirectly resulted in the FMU checking on the property next door. At this property, they fortunately found an elderly couple sheltering from the fire front in their water filled bath. At this time, their roof was alight and the home did not have long before it would become unsurvivable. What had happened was the couple's home was overrun by the

rapidly spreading fire and their driveway and road out was heavily vegetated and was deemed by the couple too dangerous to use at this late stage. They sheltered in their home, in the bath as a last resort survival option. The FMU crews, which found them were able to enter the property due to the vegetation having burned out.

Right: Overgrown roads made evacuations difficult and dangerous.



Above: In some cases it took minutes for homes to be fully engulfed in flames. Photo Source: Adriaan Swanepoel (2017)

DISCUSSION

- After the initial outbreak of the Kruisfontein and Elandskraal wildfires, with fire spreading towards homes and communities, the preservation of life became the focus of most, if not all, emergency first responders on 7, 8 and 9 June 2017.
- Knysna Municipality's Fire Services seemed to go into crisis-management mode when evacuations became necessary. This is based on the accounts from community members as well as accounts from Knysna Municipality's Fire Services. Communicating and coordinating the evacuation became a sudden emergency that had to be dealt with and there appeared to be no predetermined plan for evacuation.
- Knysna Municipality's Fire Services were supported in part by the police, local security companies, the NSRI and traffic services in evacuating the suburbs. Bitou Fire Services had assistance with evacuations from similar support resources in the Plettenberg Bay area, including the Bitou Fire Management Units.
- In Knysna, the evacuation orders were mostly conveyed by going door to door and driving through suburbs announcing that people needed to evacuate. Once evacuations started, members of the public began using social media to inform friends and fellow community members that evacuations were taking place.
- The Knysna Municipality communications team reportedly sent out evacuation orders over their various communication channels. These

messages went to media and official social media platforms. According to many residents, these messages were limited and sometimes lacked necessary detail (such as where to evacuate to).

- Some residents were told where to evacuate while others had no instructions other than to evacuate. There were also members of the community who claimed they never heard or received evacuation orders and took it upon themselves to evacuate.
- Firefighters were sometimes put in dangerous positions trying to urge residents to leave. Homeowners in a highly emotive state, who could not find their animals or were understandably worried about losing their homes, were hesitant to leave. Firefighters in these instances were required to motivate and convince them to get out of the area while the wildfire was bearing down on them. This left very little time to escape the path of the wildfire.
- **Referring to the industry views section and the account from the Bitou FMUs where they saved an elderly couple:** The events, as they described them, demonstrate that in some instances a home can be used as a last-resort survival option. There are some very important lessons from this story:
 - » A crucial lesson from this real-life situation was that the rescue was by chance. Had the FMU not checked this home, this situation could have turned out very

differently. If you are surrounded by a wildfire and you are taking refuge, you must inform someone of your situation. If you cannot get hold of Fire Services make sure you inform a family member or someone outside of the incident who can activate a rescue or monitor your situation.


- » A home can sometimes offer refuge to a passing wildfire front under certain conditions. The ignition potential of the home needs to be carefully considered before doing so.
- » Ignitions can start to take hold in the structure after the main wildfire has passed, as was the case in this example.
- » If, like this couple, your home has offered you protection from a wildfire, it is important to constantly reassess your situation. Ask yourself, has your home caught alight?
- » If your home is burning, can you then safely retreat to an already burned area outside? You must first consider that, after a wildfire, there will be super-heated air and smoke so you will need to assess the timing of this carefully.
- » Can you leave the area using the roads now that the fire has moved through? If yes, take care of reduced visibility and possible obstructions in the road.



- The Fire Danger Index (FDI) in South Africa rates the fire danger for a given day. This is based on specific variables and is specified for geographical areas. The Fire Danger Index has five fire danger levels:
- Vulcan Wildfire Management came across very few WUI residents who know about the FDI and no residents reported that they had any fire danger warnings leading up to the Elandskraal and Kruisfontein wildfires.

WILDFIRE READY: FIRE DANGER

Weather plays a major role in wildfire danger. Drought leads to extremely favourable conditions for wildfires and winds aid a wildfire's progress. It can make fighting the fire increasingly dangerous. There are three weather elements that can affect wildfires.



WIND SPEED

Strong winds can drive wildfires over long distances very quickly. These winds also provide oxygen that fuels the fire.



TEMPERATURE

High temperatures are a key ingredient in wildfire ignitions, allowing vegetation to ignite easily, burn quicker and more intensely.



HUMIDITY

Low moisture and incoming dry air masses decrease humidity, reduce rainfall and dry vegetation creating highly flammable fuel for fire.

THE FIRE DANGER INDEX (FDI)

The Fire Danger rating predicts how a fire would behave if one started, including how difficult it would be to control. The rating is your trigger to be prepared and act.

SAFE	MODERATE	DANGEROUS	VERY DANGEROUS	EXTREMELY DANGEROUS
<p>Suppressing of Fires Ignitions not likely to occur. Rate of spread will be slow and fire may die out without suppression actions. Fire behaviour likely to be moderate with low intensity. Control possible with correct resources and tactics.</p> <p>Precautions Ensure open air fires are safely contained. If doing Prescribed Burning make sure you have a permit. Braai fires are allowed in designated areas only.</p>	<p>Suppressing of Fires Ignitions can occur. Rate of spread will be moderate in dense and dry vegetation. Fire behaviour likely to be moderate. Control possible with correct resources and tactics.</p> <p>Precautions Ensure open air fires are safely contained. If doing Prescribed Burning make sure you have a permit. Braai fires are allowed in designated areas only.</p>	<p>Suppressing of Fires Ignitions can easily occur. Rate of spread will be fast in dense and dry vegetation. Fire behaviour may be severe at times. Control will be difficult.</p> <p>Precautions Authorized open air fires only. If doing Prescribed Burning, extreme caution must be taken and make sure you have a permit. Braai fires are allowed in designated areas only.</p>	<p>Suppressing of Fires Ignitions can easily occur. Rate of spread will be fast in dense and dry vegetation. Fire behaviour will be severe. Control will be dangerous and may not be possible.</p> <p>Precautions No open air fires. No activity that can cause an ignition is allowed. Firefighting resources to be ready to respond. If a fire occurs evacuations may be necessary.</p>	<p>Suppressing of Fires Ignitions can easily occur. Rate of spread will be extremely fast for extended periods. Fire behaviour will be extremely severe and intense. Control will be extremely dangerous and may not be possible.</p> <p>Precautions No open air fires. No activity that can cause an ignition is allowed. Firefighting resources to be ready to respond. If a fire occurs evacuations may be necessary.</p>

Stay Informed of the FDI. Contact your Local FPA.



Wildfire is Coming

Are you #WildfireReady?

Right: The Fire Danger Index (FDI) showing the five different fire danger levels. This poster from the Western Cape Government offers advice on where to find the FDI and how one should react to each fire danger level.

RECOMMENDATIONS

- Eden District Fire Services and B Municipalities need to develop predetermined evacuation strategies, processes and standard operating procedures. Planning for evacuations needs to incorporate strategies for different sets of circumstances and possible challenges and complications. It is advisable that community consultation is included in the process to ensure plans are understood and supported by the community. The plans must include:

- » Early warning detection systems with a system of alerts.

- » Predefined communication methods and channels that can be used to reach all segments of the community. Plans must include contingencies for no phone signal and power-outage situations.

- » Defined trigger points for when evacuations should occur must be established. These trigger points need to be determined based on local factors and conditions. Examples of trigger points could include:

- » when a wildfire reaches a specific geographic location

- » before the smoke from the wildfire starts to affect a community

- » at the outbreak of any fires in close proximity to people and homes, and

- » when the FDI is red, and a wildfire starts.

- » Different stages of evacuation, or waves, should be considered to prevent everyone evacuating at the last minute which can create panic and cause congestion. Strategies to consider include:

- » early voluntary evacuation of high-risk areas and the most vulnerable people

- » secondary voluntary evacuation (in wildfire-resilient communities, some residents leave and some stay to defend homes), and

- » mandatory evacuations – where conditions are so extreme that no one should remain in the area despite preparation and defensive measures.

- » Evacuation routes must be part of the plan, with this information included in the evacuation orders. Alternative strategies may be needed where vegetation loads are hazardous along roadways or access/egress is only via one road.

- » Transport options must be considered. Knowing what modes of transport will be used and will be required is vitally important.

- » Locations and facilities to support the evacuees need to be determined.

- » Safety and security considerations for the evacuated area. Note: there was a lot of looting reported during and after the Knysna Fires.

- » Rally Points and Community Safety Zones for evacuations need to be established.

- » Strategies for residents to check on their properties after the main fire has spread through the area need to be considered. Some structures burn slowly or ignite only after the main wildfire front has passed and homes can potentially be saved if action is taken to prevent the fire taking hold in the structure. It may be safe for homeowners to return and check on their homes at a certain point.

- » Planning for medical support and first aid during the evacuation process and at Community Safety Zones is essential.

- » Planning for animals, pets and livestock. There will need to be suitable facilities and support for people and their animals.

- » Once all the evacuation planning has been done, the greater community must then be made aware of what their part is in the plan.

- Eden District Fire Services and B Municipalities need to determine strategies for when evacuations are not necessary and under what circumstances (or which communities) remaining is better than evacuating. Evacuation of everybody is not always the safest or most practical solution.

- Eden District Fire Services and B Municipalities, with consultation with the Southern Cape FPA,





Above: There are many roads in the Knysna area which provide only one way in and out. This highlights the importance of a planned early evacuation before a wildfire affects an area or developing wildfire resilient communities who do not need to evacuate.

need to encourage and assist communities and suburbs to take steps towards becoming wildfire resilient. An area such as Brenton-on-Lake in Knysna is an example of a suburb that is easily cut off and isolated by wildfire but also has great potential to become a wildfire-resilient community if more work is done to make the area safe. This could mean that some people might plan to evacuate early but others will stay and defend their properties. Eden District Fire Services and B Municipalities must work to try and understand this dynamic and devise plans for different circumstances as this can save lives and, potentially, more homes if done correctly. It also frees up first responders to focus on other areas requiring resources.

- Community members and residents who choose to stay and defend their property:

- » Must carry out risk-reduction measures and lower the ignition probability of structures. Proactive planning and work around homes as well as wildfire-ready principles must be applied, such as creating defensible space, removing excess fuels, building with fire-resistant materials, having water capabilities and sprinklers, etc. There must be personal protective equipment for every person remaining in the area.

- » Must seek out guidance and advice from their FPA.

» Must openly communicate with Fire Services to seek out support and approval for their plans and ensure there is a plan of action to communicate with one another during an incident.

» Must understand and prepare for the risk and they must also be physically fit to do so.

» Must still be prepared to leave under extreme fire conditions, despite preparation.

• Eden District Fire Services and B Municipalities must conduct evacuation-scenario training exercises as part of annual preparedness training. Where possible these scenarios should include active involvement from community leaders and even residents where practical. These scenarios will test leadership of fire crews and emergency resources and help support decision-making during the intensity and pressure of a real incident.

• Official and approved Community Safety Zones can have significant benefits and should be encouraged. Eden District Fire Services and B Municipalities, in collaboration with communities, must devise a strategy where Community Safety Zones are viable. The benefits include:

» Multiple Community Safety Zones reduce the accumulation of too many people in one spot.

» Evacuation is more orderly as a central location allows community members to pre-plan and rehearse what actions they need to take before an incident.

» Support and outside aid have known geographic locations to interact with the affected community members.

» Community Safety Zones can be selectively chosen where there are facilities to support people's basic needs (e.g. water and toilets) or a plan should be in place to provide these.

» Being in close proximity to their homes, those who are willing and able can then go back to check on their homes after the fire front has passed (if safe to do so). This can possibly help prevent small ignitions taking hold on structures.

» An annual audit of the Community Safety Zones must be done by Eden District Fire Services and B Municipalities and must be signed off by the Chief Fire Officer of Eden District and the respective Municipality.



Above: Selecting Community Safety Zones such as the sports fields in the image above, is vital moving forward for any community living within the WUI and facing the risk of wildfire.





- The current Fire Danger Index (FDI) and warning system needs to undergo changes to be more accurate and applicable for different audiences. The following are recommendations which need to be looked into.

- » The Western Cape has many different microclimates which are not considered in the general ratings and alerts issued by South African Weather Service. More localised FDI ratings and alerts are required.

- » An additional index category is highly recommended to be added to the current ratings. A Catastrophic Warning Index, which demands more definitive actions, needs to be added.

- » FDI warning messages need to be customised for different audiences and there needs to be a communication strategy and system in place to issue and deliver warnings. This needs to be a multimedia strategy and take into account the different audience profiles.



Above: The green lawns in the newly constructed complex in the centre of the image show how effective a Wildfire Resilient community could be. The fire moved around this complex as water does around a barrier, no homes were damaged or lost in this complex due to the lack of dense vegetation within it or close to the homes. The homes were also more secure against ember attack being newly constructed. This occurred purely by chance but it does highlight how important building with wildfire risk in mind is and how this could affect any future mass evacuations such as that which took place in Knysna on the 7th June 2017.





Fatality Incidents

Introduction

The loss of any life in a wildfire incident is significant. The Elandskraal and Kruisfontein wildfires in June 2017 resulted in both public and firefighter fatalities. This is the most severe consequence of wildfires. The scale and destruction of the incident, but especially the fatalities, leaves an imprint that will last for generations on an entire community.

The events that transpired around each fatality are important to understand in order to guide actionable outcomes so that more lives are not lost in a similar manner. During the analysis of the fatalities, Vulcan Wildfire Management visited and documented the fatality or incident areas and spoke with people who were present or had insight into what had occurred. This was a basic analysis and not a formal investigation. Therefore, there were limitations in time, access to people and information available.

** Vulcan Wildfire Management did undertake to find more information about reported heart-attack fatalities, which were an indirect result of the wildfires. There was one confirmed case of Dawie van der Ryst. However, there are likely others which Vulcan Wildfire Management couldn't source conclusive information about despite attempts to do so. It's important to recognise that there were, potentially, other fatalities*

IN REMEMBRANCE OF

Madré Johnston , **Tony** Johnston , **Michael** Johnston
Catherine Nyirenda , **Enala** Manda
John Blaauw – Firefighter, **Bradley** Richards – Firefighter
Dawie van der Ryst
** Others*



The information in this section is specifically targeted at:

- People in positions of leadership and responsibility who can guide future risk reduction and preventative strategies.
- People who live, operate or work in environments where wildfire is an inevitability. They are encouraged to understand the risks they face, seek information, implement proactive measures, enhance safety, etc.
- All wildfire crews and supervisors are encouraged to look closely at what happened in order to enhance their understanding of where and how things can go wrong. Discussions in training and any fireline readiness occasion should include “lessons learned” incidents such as these.

Johnston Family

Madré Johnston (33), Tony Johnston (34) and Michael Johnston (3) were overcome by the Elandskraal wildfire in the early hours of 7 June 2017.

The incident

- The Johnston family lived in a rural area of Elandskraal. There was a narrow dirt road with thick vegetation leading to their home. Based on Google Earth imagery and limited video and photographic footage from before the wildfire, their home was surrounded by dense vegetation.

- It is assumed they were surprised by the wildfire which is thought to have moved rapidly up a slope below their home as well as being driven by strong wind.

- In the process of trying to flee they were overcome by fire, heat and smoke.

- Police and a concerned friend who went to search for them discovered the family outside their home, in their driveway area.

- They were likely outside due to their home and both vehicles being alight. Both cars were observed to be in a designated parking area outside their home and appeared not to have been moved. The one car door was found slightly ajar when Vulcan Wildfire Management visited the site on 15 June 2017, so it is plausible they might have attempted to get into one vehicle. Alternatively, this door was opened as a result of the car burning.

- Their home and vehicles were completely destroyed by the wildfire.

- The surrounding vegetation burned extremely hot. This can be deduced by the degree to which the fuels in the area had burned as well as the indication of extreme heat damage to the ground/soil.

- 7 June 2017 was Michael Johnston’s third birthday.

- Madré Johnston was eight months pregnant.

In the early hours of 7 June 2017 there was WhatsApp communication between Tony Johnston’s phone and a community member who lived nearby, Anton Du Plessis.

06:12

“More. Ons sien vanoggend n rooi gloed daar oorkant by Uschi. Lyk of die vuur aan die gang is. Dis nog te donker om die full extent te sien. Sal laat weet sodra ons kan sien.”

Roughly translated as: Morning. We see this morning a red glow from the other side by Uschi. Looks as if the fire is on the go. It’s still too dark to see the full extent. Will let you know as soon as we can see.

06:32

This was the last time WhatsApp showed Tony’s phone as active on WhatsApp. (As seen at the top of the image “last seen Wed at 6:32 AM”

It is thought that shortly after the communication at 06:12 the wildfire from “oorkant by Uschi” spotted (jumped) across the valley onto the Johnstons’ slope. Alternatively, there was already a spot fire that was unseen by the Johnstons’. Driven by strong wind and the slope, the fire must have picked up momentum and very quickly reached the Johnstons’ home before they could flee for safety.





Above: The sombre scene at the Johnston's home in Elandsdraal. The family vehicles still in their parked position with one of the doors slightly ajar.



Top left: The burned remains of the Johnstons' home they had built for themselves in the Elandskraal area. Top right: The moving memorial flowers at the entrance to the Johnstons' property. Above: Proximity of the Johnston home to the approximate wildfire area of origin. Possible fire spread from spotting across the slope as indicated.



Lessons learned

- Living in a remote rural area, surrounded by thick vegetation, there are extra precautions that should be taken to prepare for a wildfire. These precautions should prioritise life safety and look at aspects of home and asset protection.

- The potential of how a wildfire will burn, if one occurs, needs to be taken very seriously with regards to evacuation. Based on the Fire Danger Index (FDI) there will be certain actions you should take.

» Vulcan Wildfire Management recommends that the Fire Danger Index be updated to be more specific and therefore accurate for the Western Cape region.

» An additional index to the current FDI ratings is highly recommended. This should be a Catastrophic Warning Index which requires more definitive actions be taken.

» In addition to this, Vulcan Wildfire Management highly recommends different sets of instructions and warnings be developed for different agencies, homeowners and landowners. Under the proposed Catastrophic Index warning, for example, a rural homeowner is advised to move out of the danger area before a wildfire breaks out. If this is not possible they must be in a readiness state to evacuate immediately at any indication of a wildfire, which could be the smell of smoke, a glow in the distance or if a wildfire

is seen. With a car packed and ready to go, an evacuation along a planned escape route to a safe area should take place immediately.

» If the Johnstons had evacuated at the first sign of the fire, and immediately climbed into their vehicle and travelled along their exit road, Vulcan Wildfire Management calculated that, following this process, they would have reached a point of safety in 5-8 minutes.

- Homeowners and landowners living in rural areas must carry out risk-reduction planning and implement measures which enhance safety and reduce ignition probability of their homes. Homeowners living in this situation often remark that this is why they move to these areas, 'to be surrounded by the bush'. Choosing to live this way must come with the accepted responsibility for preparing for wildfires. It is still possible to live 'amongst nature' and to do so in a wildfire-resilient way. The following could help increase the wildfire resilience of a home:

» Defendable space around the home (fuel-reduction zone).

» Ignition-resistant building materials.

» Sprinkler systems or drencher systems.

» Planting fire-resistant plants around the home.

» Position home where it has reduced risk in terms of the slope and terrain.

» Strategically construct large soil berms

offering structural protection by deflecting radiant heat.

» Fuel breaks located strategically to slow the spread of wildfire on the property.

» Reduction of dry/dead organic matter and ladder fuels. Fuel thinning.

» Keeping structures well-maintained (varnished wood, well-painted etc.) and clear of fuel matter.

» Have an early warning system for wildfires. This could be a good communication network in the areas where all fires are reported on community communication groups.

» If possible install water tanks that can be used to wet the area with hoses and sprinklers. Have this system run with a petrol or diesel pump that is well-maintained and also protected from the fire if it is to be left on.

» Have multiple access and egress routes if possible. These will give you different evacuation options.

» Consult with your local FPA, Fire Services, wildfire consultants, etc. to ensure all elements of your preplanning defences are optimal and that you have thought of all eventualities.



Catherine and Enala - Mother and daughter

Vulcan Wildfire Management gathered information from the homeowners of the property where the incident occurred. They were not in Knysna at the time but they received some information from Enala's brother, Timothy Manda. He was there around the time of the incident. Enala's brother was still too traumatised to speak with Vulcan Wildfire Management.

The incident

- On 7 June 2017, Enala Manda (23) and her daughter Catherine Nyirenda (3) were visiting a home where Enala often visited her brother Timothy Manda and his wife.
- That day Enala was with Timothy's wife all morning.
- Enala and her daughter Catherine were approximately a 10-minute walk away from Timber Village where Blessings Nyirenda (Enala's husband and Catherine's father) was working at the time.
- When Enala realised that there was a wildfire approaching from the north-west and spreading towards them she reportedly became very anxious and wanted to get home to Blessings Nyirenda straight away.
- Timothy urged Enala to get into a car which was evacuating the area, but despite Timothy asking her not to, Enala chose to rather run down toward Timber village to be with her husband.
- While Enala and Catherine were making their way down the hill on foot towards Blessings

Nyirenda's location, Enala received a phone call from Blessings who said they must not come back as the wildfire was already there.

- It was at this point that Enala and Catherine must have turned around and gone back up the hill to the house they had just come from. The wildfire would have been racing up behind them and the smoke would have been thick.
- They got back to the house, beside which there is a small dam and a large pine tree. Enala's brother speculated that Enala set Catherine down by the tree and went to put a boat in the small dam on the property – Enala's shoes were found in the boat. Enala's plan could have been to put the boat in the water and then come back to fetch Catherine so they could both shelter in the dam.
- The fire must have burned extremely hot and fast with all the vegetation burning around the area. The home and buildings on the property were completely destroyed by the fire.
- After the wildfire had moved through the area, Enala's brother returned to the property not knowing what had happened to Enala and Catherine.
- Catherine Nyirenda's body was found next to the tree beside the dam.
- Enala Manda was found some time later, disorientated and walking in the direction of her home. She was extremely traumatised and severely burned. Enala Manda later died from her burn wounds after being transferred to Tygerberg hospital.



Above: Vulcan Wildfire Management interviewing the homeowners of the property where Catherine Nyirenda and Enala Manda were overcome by the smoke and heat of the fire. Catherine was found on the spot where the new smaller tree has been planted in memory of her.



Above: The view from the Timber Village direction of the hill that Enala Manda had attempted to travel down to reach her husband before having to turn back.





Above: The hilltop where the Narnia guesthouse was situated in the Estuary Heights area of Knysna. Catherine Nyrienda was sadly found below the pine tree on the edge of the pond, roughly where the red circle indicates.

Lessons learned

- When faced with the threat of a wildfire it is extremely important to assess its intensity, what direction it is spreading in and how quickly it is moving. This assessment should help determine and guide the appropriate response reaction.
- When evacuating from a wildfire, think clearly about where the fire is moving. This will enable you to determine the optimal escape route. Wildfires can have a rapid rate of spread and it's imperative to choose the safest, fastest and most reliable means of transport to a safe area.
- Enala Manda was most likely driven by an emotive response to seek the safety of her husband and her home. In hindsight, her decision not to evacuate with the others on the property was clearly the wrong decision. Fear and emotion can be very overpowering. If you identify someone experiencing a stressed state and you are in a position to do so, it's important that you try and help him or her.
- If you find yourself in a life-and-death situation and you don't know what to do, seek out assistance from people around you. If possible, call emergency services to alert them to your danger.
- Voluntary early evacuation by residents as well as early warnings and alerts issued by emergency services are incredibly important. This reduces the stress people and communities are placed under and it allows more time to get away.



Above: A view across the pond before the Knysna Fires occurred showing the garden area and the pine tree where Catherine Nyrienda was found. Photo Source: Narnia Guest House (2017).



Left: An aerial view of the hilltop before the fire as a comparison to the Vulcan Wildfire Management photograph on the previous page captured during their reconnaissance helicopter flight. Photo Source: Narnia Guest House (2017).

Below left and below right: The remains of the guest house and home that had stood on the hill. Photo Source: Narnia Guest House (2017).





Above: The view from the hilltop at Narnia Guest House down towards where Timber Village, indicated by the red circle, stood before the fire burned through. This photograph is included to show how close Timber Village appears to be from the hilltop. The speed that a wildfire can move when driven by wind and topography must be taken into account when determining a course of action.



**PROTECT
YOURSELF
FIRST**

Survive Being Trapped by Wildfire — In Your Home

Vulcan Wildfire Management has some last-resort survival suggestions if you have no means to escape a wildfire.

It is always best to evacuate early and avoid entrapment at all costs. However if you do find yourself in this situation, consider the following:

- Stay calm.
- Inform emergency services or someone of your situation immediately.
- Keep everyone together.
- Maintain visibility to know what is happening outside with the fire.
- Before the wildfire reaches your location improve the ignition resistance of the home by removing anything flammable; leaves in gutters, outside furniture, wood piles etc. which may compromise the home. Focus on improving ignition resistance.
- Fill sinks and tubs with water. Have buckets filled and ready to use.
- Keep doors and windows closed, but unlocked.
- Plan to have more than one way out in case the structure catches fire.
- Ensure everyone is inside before the wildfire smoke and heat affects your safety.
- Once inside, stay away from outside walls and windows.
 - » If the house catches fire while you are inside:
 - » Close the door to the room that is on fire.
 - » Move to the other end of the house, closing all the doors behind you.
 - » Do not get trapped in a room without an alternative exit.
 - » Move outside to burnt ground as soon as it is safe to do so.
 - » Drink water to prevent dehydration





**PROTECT
YOURSELF
FIRST**

Survive Being Trapped by Wildfire — While On Foot

Vulcan Wildfire Management has some last-resort survival suggestions if you have no means to escape a wildfire. It is always best to evacuate early and avoid entrapment at all costs. However if you do find yourself in this situation, consider the following:

- Stay calm.
- Inform emergency services or someone of your situation.
- Stay out of hazardous terrain. These include kloofs, valleys and chutes i.e. channels for wildfire).
- Use bodies of water that are more than 0.5m deep and wide enough from the radiant heat.
- In light fuels, you may be able to light an escape fire. In other fuels, you may be able to light a backfire. (Do not put others in danger by doing so).
- Cut and scatter fuels if there is time. i.e. reduce the fuels in your area.
- Use any available heat barriers such as large rocks, sand berms, a ditch or depression on level ground to hunker down in.
- Consider vehicle traffic hazards if you are on a road. (Also bear in mind that road width is normally not a sufficient size for safety).
- Structures and vehicles may be a better option for temporary refuge if you can access them.

John Blaauw – Firefighter

On 11 June 2017, John Blaauw (63) was overrun by fire in a Concordia Plantation near Knysna. He was a crew member and driver for the M&H Alien Plant Control Crew contracted by MTO Forestry. Vulcan Wildfire Management spoke with Henry Jansen (Owner: M&H Alien Plant Control Crew) shortly after the incident, on 15 June 2017, at the MTO office in Kruisfontein. On 14 November 2017 Vulcan Wildfire Management again met with Henry Jansen as well as Mziwakhe William Holi (firefighter and eye witness) at the Concordia Plantation where the incident occurred.

In addition to providing firefighting services, the M&H Alien Plant Control Crew prune and clear plantations and assist with other silviculture activities. Crew owner, Henry Jansen, has over 30 years' experience with wildfires and, in particular, plantation fires. On the day of the incident, he was not with the crew due to a shoulder injury.

Henry Jansen Remembers John:

“He was a hard worker. He took great pleasure in spending time with the crew and, even though he was older and the driver, he would still show the younger guys a thing or two about working hard. He was a nice guy, a guy that the crew members looked up to. He will be missed.”

The incident

Based on accounts by Mziwakhe William Holi, firefighter and eye witness (as well as discussions with Henry Jansen):

- On Saturday 11 June 2017, the crew was working on a fireline near to where the incident took place. Around late morning/midday, their assignment changed and John Blaauw transported them in their crew truck to where the incident would ultimately occur.
- In this area, the fire was burning in pine needles and pine slash with young pine trees above. The pine trees were still young and not fully-grown trees.
- The location of the fireline was in an area down slope of the road from where they disembarked from their truck.
- They were assigned to do direct and parallel attack on the fireline and attempt to contain the spread of the fire. Without considerable water resources this would be a slow and tedious task for a ground crew. They would need to reduce the fuels ahead of the fireline and separate burning and unburned fuels and then try and hold that fireline.
- It was reported that the fire had previously run through the area as a head fire and, when wind shifts had occurred, the fireline had become a flank.
- The region had been experiencing drought conditions and was affected by berg winds in the days leading up to the spread of the wildfires on 7 June 2017.

- From the outset of the wildfires, the fuels and weather conditions were making fire suppression activities very difficult.

- At the time, the crew headed down to the fireline, around midday, the wind conditions were still calm.

- John Blaauw, who is the driver of the crew generally “liked to be with guys while they were working”. On this day, he was close to them, approximately 25m above them on a road. (This was not the road where the vehicle was parked; it was a lower road. The vehicle was approximately 120m away on an upper road.)

- Mziwakhe William Holi said that, while they were working, the wind suddenly picked up. This caused the fire to jump from the ground and into the branches of the pines, creating a crowning fire which was now rapidly moving towards the crew.

- All the crew members turned and ran for safety. Some of them ran up the slope directly towards the upper road and the vehicle and some of them ran at a slightly different angle to the others but also up the slope.

- John Blaauw was on the lower road when the fire stood up. Blaauw ran up, not towards the vehicle, but toward a road above.





Above: John Blaauw fatality site. Photo Source: Google Earth (2017)

- This uphill run could not have been easy. Although a short distance, approximately 106m, it was steep and the footing of pine needles and slash would need to be navigated. A 35-year-old, fit member of the Vulcan Wildfire Management team did this run in approximately 47 seconds, which put him at his maximal aerobic capacity by the time he reached the top. If you consider days of fatigue from being on the fireline, a hot and smoky environment and the fact that John Blaauw was 63 years old, this run upslope would have been challenging and would have taken John much longer; probably around to 90-120 seconds.

- The rest of the crew members made it to safety on to the upper road and away from the fire chasing them.

- John Blaauw made it to the upper road but still had to cover approximately 40-60m to get to safety as his initial escape route was not directly towards the vehicle.

- At the upper road, he could have chosen to go left or right. He chose left which would have taken him back to his vehicle. Henry Jansen believes, “knowing John he would have wanted to get to the vehicle to make sure that it was safe.”

- When the crew members realised John Blaauw was not with them they informed their supervisor who then went to search for Blaauw once it was possible to do so. The last time a crew member had seen Blaauw was when he was slightly behind him on the upper road. Everyone had to keep moving with the fire chasing them. The crew truck had to be moved by someone else. The back canvas covering caught aflame when the fire came into contact with it. Everyone had to flee further up the road and there was no time to stop.

- John Blaauw was found lying with his hands over his face, in a prone position, on the side of the road furthest from the flames. He was in a slight ditch where he might have fallen or dropped to the ground to get away from the heat, smoke and flames. When John Blaauw was found, he was already dead.



Above: The hill that John Blaauw ran up to try and escape the blow up of the fire that occurred in the plantation. The fire crew were working on a fireline just below jeep track visible through the trees.





Above: John Blaauw was found lying with his hands over his face (it is presumed to try and protect himself from the heat and smoke) to the left of the white gravel in the jeep track.



Above: The view towards where M&H Alien Plant Control's truck was parked. The vehicle one can see parked through the trees is parked on approximately the same spot. It is believed that John Blaauw was trying to get back to the truck but was not able to due to the intense heat and smoke coming uphill from the left of the picture.

Discussion points:

- The M&H Alien Plant Control Crew policy was for the crew driver to stay with the vehicle, and not be on the fireline.
 - John Blaauw was 63-years-old (compared to his younger crew members who were able to get away). The length of time it took Blaauw to flee was just too long. John Blaauw's level of fitness is uncertain. All firefighters should undergo fitness evaluations. Drivers sometimes undergo an evaluation which is not as strenuous as firefighters but nevertheless they need to be at appropriate fitness levels.
 - The M&H Alien Plant Control Crew firefighters would have had protective clothing with them. It was thought that John Blaauw was not wearing a flash hood, goggles, helmet or gloves. This may have compromised his ability to move due to heat and smoke exposure compared to his crew members.
 - Henry Jansen thinks that when John Blaauw reached the upper road he turned left towards the vehicle because his objective would have been to save it. Henry thinks that if Blaauw had turned right and ran around the corner he may have reached a safe area and not have been overcome by the flames racing up the slope.
 - The conditions and time of day were a factor. With early afternoon becoming hotter and drier and an increase in wind speed forecast, the crew were in dangerous territory, especially given the fact that they had only an uphill escape route.
- It is plausible that the crew had tunnel vision and target fixation resulting in them not being aware to signs of the slowly changing conditions around them. Fatigue could have also played a role in their low situational awareness.
 - When speaking to Henry Jansen, he made an interesting comment about the change in approach to tactics on the fireline for plantation fires. Jansen has been in this line of work for approximately 30 years. He says that 'in the old days' they used to do a lot more indirect attack. It was safe and effective. They would pull back from the fire and do back-burn and burnout operations compared to more recent years where their tactics are now more focused on direct attack – in an attempt to save as much of the plantation as possible.
 - Henry Jansen also pointed out that 'in the old days' the foresters and supervisors would be more operational and in the field which allowed them to have a better sense of what was happening. As a result, Jansen feels those foresters had more experience and took the safety of firefighters seriously. He says, nowadays, it's mostly (but not always the case) receiving instructions from supervisors who then go off elsewhere and who don't adjust the tactics when necessary.

Wildland firefighters have a “safety code” which helps to guide them during operations. This is made up of the:

- Ten Standard Fire Orders. These are the rules of engagement on the fireline. They ALL need to be taken into account ALL the time.
- 18 Watch Out Situations. These are possible situations which operational personnel are likely to encounter which they have to “watch out” for. Unlike the Ten Standard Fire Orders, Watch Out Situations can be present during operations. However, the associated risks must be mitigated and tactics must be adjusted according to the risk.

Ten Standard Orders (Seemingly Not taken into account)

- Obtain current information and regular updates on fire status.
- Initiate all actions based on current and predicted fire behaviour.
- Determine escape routes and safety zones.
- Establish lookouts in potentially hazardous or dangerous situations.
- Remain in communication with your crew, your supervisor and all adjoining resources at all times.
- Fight fire aggressively having provided for safety first.

Ten Standard Orders (Possibly taken into account)

- Recognise current fire weather conditions and obtain forecasts.
- Stay alert, keep calm, think clearly and act decisively.
- Ensure that instructions are given, are clear and are understood.
- Remain in control of your resources at all times.

18 Watch Out Situations (Not mitigated)

- Safety zones and escape routes not identified.
- Terrain and fuels make escape routes difficult.
- Unfamiliar with weather and local factors affecting fire behaviour.
- Uninformed on strategy, tactics and hazards.
- Working a fireline downhill with fire below.
- Fire not scouted or sized up.
- Constructing or working on fireline without a safe anchor point.
- Cannot see the main fire and not in contact with anyone who can.
- Unburned fuel between yourself and the fireline.
- Weather getting hotter and drier.
- Wind increases and/or changes direction, also dust and/or fire whirls occurring.
- No communication link with crew members, supervisors or other resources.

18 Watch Out Situations (Not present or possibly mitigated)

- Instructions and assignments not clear.
- Frequent spot fires occurring over the fireline.
- Attempting a frontal assault on the fire.
- Working in an environment not seen in daylight.
- On a hillside where rolling material can ignite unburned fuel below.
- Sleeping near or on the fireline.



Lessons learned

- The Ten Standard Orders and the 18 Situations which Shout “Watch Out” can save your life but only if you are aware of them and how to apply them.
- Target fixation, tunnel vision and fatigue can lower your situational awareness and result in you overlooking your situation and tactics. Have a lookout and someone assessing the assignment and constantly ask “Are tactics right for current and forecast conditions?”
- Rules around wearing personal protective equipment and fireline roles have been created for a reason and must be adhered to at all times.
- Wildfire behaviour is difficult to read but special attention to fuel and weather conditions is imperative, especially in drought conditions. Your safety and life can depend on you reading all the conditions correctly.
- If you are given a fireline assignment that you feel is unsafe, you must raise your concerns. If the risks and concerns cannot be mitigated, you have the right to refuse an assignment.
- Life is worth more than trees, always.

Right: The Incident Response & Fireline Safety Pocket Guide showing the pages relating to Wildland Firefighter Safety on the fireline. This pocket guide has recently been produced by the Western Cape Government, Directorate Fire and Rescue Services for inclusion with fireline safety training.



Bradley Richards - Firefighter

Bradley Richards (24), a volunteer firefighter for the Plett South Fire Management Unit (FMU), tragically lost his life on 9 June due to burn injuries. Richards was caught in a burn-over situation, along with Ian Barnard (who also sustained serious injuries), on 7 June 2017 in the Harkerville Forest area (between Knysna and Plettenberg Bay). Richards and Barnard were part of a community volunteer firefighting unit (i.e. FMU) made up of enthusiastic, genuine and passionate people who are proactive about safeguarding the areas in which they live. In terms of organisational structure, the FMU sits under the Southern Cape Fire Protection Association. The Plett South FMU works closely with the Bitou Municipality Fire Services as an assisting resource on wildfires.

This was a complex incident. Vulcan Wildfire Management requested to speak with Ian Barnard through the Plett South FMU during a two-week period when in the Eden area, and unfortunately Barnard was away. The following process was followed by Vulcan Wildfire Management:

14 June 2017

- Visited and documented the site where Richards and Barnard were overrun by the wildfire.
- Interviewed Steve Ritky and Steve Myburgh from the Plett South FMU at this site.
- The site and area were documented with images and video.

3 November 2017

- Meeting with Hedley Venter, Chief Fire Officer, Bitou to discuss all aspects of the June 2017 wildfires including the incident with Richards and Barnard.

4 November 2017

- Met with the Bitou FMU representatives, including Steve Ritky and Steve Myburgh. However, the main focus of this meeting was on other aspects of their organisation (included in this report).
- Visited the incident location again, video/ images were taken and an area analysis done.

The Ten Standard Orders and the 18 Situations which shout “Watch Out” can save your life but only if you are aware of them and know how to apply them

— Vulcan Wildfire Management



Above: The petrol station on the N2 where Shaun De La Almedia and Riel Voss were expecting to be picked up by Ian Barnard and Bradley Richards. Ian Barnard did not stop as had been agreed and drove straight on past the petrol station and on into the Harkerville Forest.



Above: New, as well as salvageable parts of the buffel that was driven that day were used to rebuild the Plett South FMU buffel which now bears Bradley Richards name in his honour.





Above: The remains of the buffel in the Harkerville Forest, in the position it was found in when Bradley Richards and Ian Barnard were overrun by a flaming front of fire. They were met further up the road by Shaun De La Almieda and Riel Vos.

The incident

- According to Hedley Venter, there is no record in the JOC logs (Incident Command notes and times, etc.) of Bitou Municipal Fire Services requesting any type of fireline assignment from the Plett South FMU.
- It is assumed that Richards and Barnard had self-dispatched and didn't inform Bitou Municipal Fire Services or any formal Fire Services that they going to be operational on the fire.
- In the meeting with Steve Ritky and Steve Myburgh on 14 June, they said that they had heard that other FMU crew members, who had been assisting with the Kruisfontein Fire earlier that morning, were told a fire was spreading through Harkerville area and that they needed to go and investigate this. However, both Ritky and Myburgh were unsure of the validity of this statement.
- Barnard allegedly said that a landowner in the area, Andrew Hill, was in trouble and called for help, and that is why he and Richards were on their way to assist. In more recent times, when asked about this, Andrew Hill had reportedly claimed that he had never been in trouble.
- According to Hedley Venter, it has been difficult to understand from Ian Barnard exactly what transpired. Putting together everyone else's account of what happened lines up, with the exception of Barnard's account. Ian Barnard went through a traumatic event and is still recovering so perhaps with time and more

discussion, the events around the incident will become clearer.

- Ian Barnard (driver) and Bradley Richards (crew) travelled from Plettenberg Bay to Harkerville in their firefighting Buffel, which is an ex-military vehicle converted for firefighting. The vehicle is a work horse, powerful, but can be heavy and cumbersome.
- There were two other FMU volunteers, Shaun Lee De Almeida and Riel Vos, who had planned to meet up with Barnard and Richards at the Sasol garage on the N2 where all four of them were then going to head into Harkeville together on the Buffel.
- Ian Barnard, driving the Buffel, did not stop at the garage to pick up Shaun Lee De Almeida and Riel Vos as planned. After seeing the Buffel go by and after filling up with fuel, Shaun and Riel then had to drive after the Buffel in their own bakkie.
- Reports were coming throughout that day about extreme fire behaviour including spotting and rapid fire spread.
- After navigating their way through the unburned forest and a network of turns and roads Barnard and Richards headed towards an active area of fire.
- Shaun Lee De Almeida and Riel Vos, a little further behind the Buffel, sensed danger from the very active fireline, which was burning towards the road they were traveling down.

- At approximately 11:30 Barnard (with Richards on the vehicle) kept driving. At a point Barnard must have realised that they were about to be overrun by fire because there was an attempt to turn the Buffel around and flee.
- The Buffel was discovered in a half-turned position. It was later said that the vehicle had cut out and both Barnard and Richards had to run for safety.
- For what happened next we reference this post from the Facebook Page of Plett South FMU, @plettsouthfmu, June 26 2017; <https://www.facebook.com/plettsouthfmu/>

"An untold heroic story..."

So many did so much.... but there is a story out there which has not been shared, mainly due to the nature of the man involved. But, following a chat with Theresa Doyle earlier today, this effort needs to be publicly shared....

Certainly, most will be aware of the tragic consequences following the PSFMU Buffel moving into the plantation in Harkerville with Ian driving and Brad as crew. But there was a second vehicle directly behind the Buffel as the fire turned. The driver of that vehicle was Shaun Lee De Almeida, crew Riel Vos. Shaun recognised the looming problem, kept a level head and stopped his vehicle to assess the threat.

He saw the flames sweep over the Buffel and saw Bradley Richards jump off the vehicle with his arm and shoulder in flames and run down the slope away from the vehicles and the fire. He moved his



car 20m back from immediate danger towards an intersection. He then got out of his vehicle and RAN BACK to fire danger towards the last place he saw Brad. On seeing Brad and Ian almost at the road he returned to his vehicle, reversed to the intersection, turned it around and reversed BACK INTO the danger zone for pick up and rapid evac.

On seeing the state Brad was in, Riel covered him with his own protective gear. The heat of the fire was so intense that they threw off the spare fuel tanks before loading Brad and Ian onto the vehicle and sped them through to hospital.

Having been to the site and seen the devastation there, it is our firm belief that had Shaun not done exactly what he did, Brad would not have had time with his family nor would Ian be recovering well today.

He then spent the rest of that day, and many more after it, fighting fires. Along the way he was one of three crew who stood to protect his family home as another fire storm flew in at him. The house was saved but his workshop and tools used to earn a living were destroyed.

Shaun, the decisions which you made that day while staring huge personal injury in the face, are to be commended.

Huge respect”

- Bradley Richards passed away on 9 June 2017 aged 24 from severe burn wounds to approximately 70% of his body.
- Ian Barnard suffered severe burns to his face and hands. He has a long physical and emotional road to recovery.



Above: Bradley Richards and Ian Barnard burn over site. Photo Source: Google Earth (2017)

Discussion points

- There appeared to be no formal crew oversight or command of these FMU volunteers from Incident Command. No formal assignments or instructions were given.
- Perhaps the eagerness to help created a situation of tunnel vision and target fixation leading to low situational awareness. In hindsight, looking at the area it's very hard to understand why Barnard and Richards went down that road. There were no homes, people or structures in harm's way. The fire was moving rapidly and there was nothing a resource of that type (or any type) could have done to halt the spread of that fire. It was not a good point for a back-burn or burn-out operation as the road was close to the approaching wildfire, leaving no time to plan anything. This leads one to think of the possibility of them being so fixated on wanting to stop the fire they overlooked the obvious signs of danger that Shaun Lee De Almeida and Riel Vos were able to identify.
- A fatality can sometimes be traced back to long before the actual incident occurred. Perhaps there are a number of contributing factors which may have resulted in an environment where something like this could occur, such as:
 - » Insufficient training and refresher training.
 - » Lack of standard operating procedures.
 - » Lack of experience, strong leadership and oversight of crews.
 - » Incorrect or inadequate oversight in dispatch procedures and understanding

where the FMU sits under formal command and control.

- » No formal 'rules of engagement' between FMU and Municipality, District, FPA, etc.
 - » Possible character traits of individuals and indications of problematic behaviours.
 - » Low priority of fitness standards and health to ensure suitability for active duty.
- Was the Buffel the right vehicle for scouting the fireline before determining exact tactics? It's slow to manoeuvre, turn around and has no closed area for the driver and crew. No vehicle should ever be put in a burn-over position. However, if Barnard and Richards were in a closed vehicle which was more manoeuvrable, would the outcome have been different?
 - The driver sits behind a "fighter pilot" style window which would have deflected a lot of the heat as the vehicle stopped in a position facing the oncoming fire. This is possibly why Barnard suffered less harm as he was momentarily sheltered from the heat and flames before jumping out and running for safety. (The driver's cockpit is open above, behind and on the sides). Richards would have been much more exposed in his position with no protection and this is possibly why he suffered greater injury than Barnard.

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Ten Standard Orders (Seemingly Not taken into account)

- Initiate all actions based on current and predicted fire behaviour.
- Determine escape routes and safety zones.
- Establish lookouts in potentially hazardous or dangerous situations.
- Stay alert, keep calm, think clearly and act decisively.
- Remain in communication with your crew, your supervisor and all adjoining resources at all times.
- Ensure that instructions are given, are clear and are understood.



- Remain in control of your resources at all times.
- Fight fire aggressively having provided for safety first.

Ten Standard Orders (Possibly taken into account)

- Recognise current fire weather conditions and obtain forecasts.
- Obtain current information and regular updates on fire status.

18 Watch Out Situations (Not mitigated)

- Safety zones and escape routes not identified.
- Terrain and fuels make escape routes difficult.
- Unfamiliar with weather and local factors affecting fire behaviour.
- Frequent spot fires occurring over the fireline.
- Uninformed on strategy, tactics and hazards.
- Instructions and assignments not clear.
- Fire not scouted or sized up.
- Constructing or working on fireline without a safe anchor point.
- Unburned fuel between yourself and the fireline.
- Weather getting hotter and drier.
- Wind increases and/or changes direction, also dust and/or fire whirls occurring.
- No communication link with crew members, supervisors or other resources.

18 Watch Out Situations (Not present or possibly mitigated)

- Working a fireline downhill with fire below.
- Cannot see the main fire and not in contact with anyone who can.
- Attempting a frontal assault on the fire.
- Working in an environment not seen in daylight.
- On a hillside where rolling material can ignite unburned fuel below.
- Sleeping near or on the fireline.

Lessons learned

- General organisational lessons
 - It is imperative that any volunteer organisation involved in wildfire operations has recruiting, training, standard operating procedures and “Rules of Engagement” policies in place to ensure that their resources have a safe grounding before engaging in operations.
 - Documented and signed agreements, memorandums of understandings, etc. with District and Municipality Fire Services, large landowners, Fire Protections Association or any entity/organisation that the volunteers plan on assisting must be in place. This would determine procedures and protocols for how volunteer resources will be called, deployed, supervised and demobilised.

- Any resource reporting to a wildfire must report in to the Incident Management Team or the Initial Attack Incident Commander. Being signed in and accounted for will ensure designation of assignments and supervision/oversight.
- Within volunteer firefighting units, there must be an organisational structure with leadership positions – both in terms of the governance of the organisation but also in terms of operational leadership. In more remote areas and in initial attack phases, it is plausible that the FMU volunteer resources might be the first responders to a wildfire incident. They need to ensure they have their own internal leadership structure to guide crews and personnel with less experience.
- Fire Protection Associations need to have systems and structures in place to ensure that FMU volunteers are up to code in terms of compliance to safety as well as operational procedures.

General fireline lessons

- The Ten Standard Orders and the 18 Watch Out Situations can save firefighters lives but only if they are aware and apply them. With the benefit of hindsight, if Barnard and Richards applied the 10 and the 18, there should have been a point where they paused, assessed their situation and set the appropriate tactics. This incident highlights the importance of allowing time to size up the situation and maintaining situational awareness, not rushing headlong into operations.



- Target fixation and tunnel vision can be factors leading to decreased situational awareness and result in overlooking the situation and tactics. Perhaps this played into why Barnard and Richards rushed into a seemingly dangerous situation without due care. Had they stopped to speak to other resources in the nearby area, already on scene, or spent time gathering incident information, the end result would have been very different.
- It is vital that tactics and objectives have a purpose and that they are achievable. The experience of the crew, having the right equipment for the task, etc. should also be factored in to what the most appropriate tactics are. No amount of vegetation/plantation lost is worth a loss of life.
- The incident organisation and supervision of resources is incredibly important. Having a structure ensures all arriving resources to an incident are assigned supervision. The supervisor should then provide the resource with their assignment and briefing. Briefings from supervisors need to be detailed and thorough and cover topics such as: Situation, Mission, Communications, Resources/Support, Risk Mitigation and Questions. Barnard and Richards did not seem to have any assigned supervision. Having a Division Supervisor could have prevented a disaster if all resources entering this area had to check in with the Division Supervisor before going anywhere near the fireline. (This could also have been a Strike Team Leader or a Task Force Leader for that matter.)

- It is very exciting and exhilarating to be involved in a wildfire incident as well as to be seen as helping the community. This excitement and eagerness must however be kept in check in order to approach operations with a level head. Generally speaking, this factor is especially important for volunteer firefighters who can be more excitable compared to seasoned professionals.
- There is no amount of training, skill, resources and experience that can prepare you for every wildfire situation. Every wildfire is unique in some way and you have to be humble and respect that wildfire is very fluid, dynamic and can surprise you. As a result, you always need to be switched on but especially when you are arriving on scene. You need to allow some time to absorb everything that is going on around you.

*“I want to fill my calling and to give
the best in me,
to guard my every neighbour and
protect their property”*

Excerpt: A Firefighters Prayer. (A.W. “Smokey” Linn, n.d.)





Above: Bullard wildland firefighting helmet, radio and cell phone found on the Bradley Richards and Ian Barnard burn over site.



Above: This picture taken during a helicopter reconnaissance flight gives a good perspective on the terrain with the red circle indicating where the Plett South FMU buffer is standing in the Hakerville Forest Plantation. This image also clearly shows how the fire burned through various different vegetation types and crossed deep valleys and kloofs.





Debriefs

Introduction

An incident debrief or 'After Action Review' is an incredibly important process. Everything that worked or didn't work should get discussed in a constructive environment by all those who worked on the incident. It facilitates understanding and, importantly, allows incident personnel to learn from others' experiences. For example, on large incidents some functions or geographic areas may have performed completely differently to other areas. A debrief offers an opportunity for role-players to get a more holistic insight into the incident as one person's experience of an incident can differ completely from someone else's.



The sooner debriefs are completed, the better to ensure everything remains fresh and easy to recall. For large incidents such as the 2017 Knysna Fires, different levels of debriefs could be done at selected times. Ground crews coming off the fireline could debrief before the crew ended its shift and head home. A debrief among all the role-players and leadership roles will take more time to plan and organise. Ideally it should happen no longer than two weeks after the incident.

The 2017 Knysna Fires were a landmark event in the history of the Eden District, Western Cape and South Africa. There are important lessons that could be learned regarding: operations, command, logistics and the various strategies and tactics. The fact that there was no formal debrief involving all the role-players is a cause for concern. It perhaps supports a more strategic perspective or view of the industry in which there needs to be better systems of shared responsibility. Under a good working system, a debrief should have happened.

AFTER ACTION REVIEW

It is important to remember that the environment of an After Action Review (AAR) must be one in which the participants openly and honestly discuss what occurred. This should be carried out in sufficient detail and clarity so that everyone understands what did, and didn't, occur and why.

Most importantly, participants should leave with a will to improve their proficiency.

Guidelines for an AAR

- An AAR is performed immediately after, or as soon after as is realistically possible, the event or incident by the personnel involved.
- The leader's role is to ensure skilled facilitation of the AAR and that they follow the principles of honesty and integrity.
- Reinforce that respectful disagreement is alright, however always remain focused on the what, not the who.
- Ensure everyone participates.
- Offer guidance on actions or attitude that had negative outcomes.
- Offer encouragement on actions or attitude that had positive outcomes.
- End the AAR on a positive note.

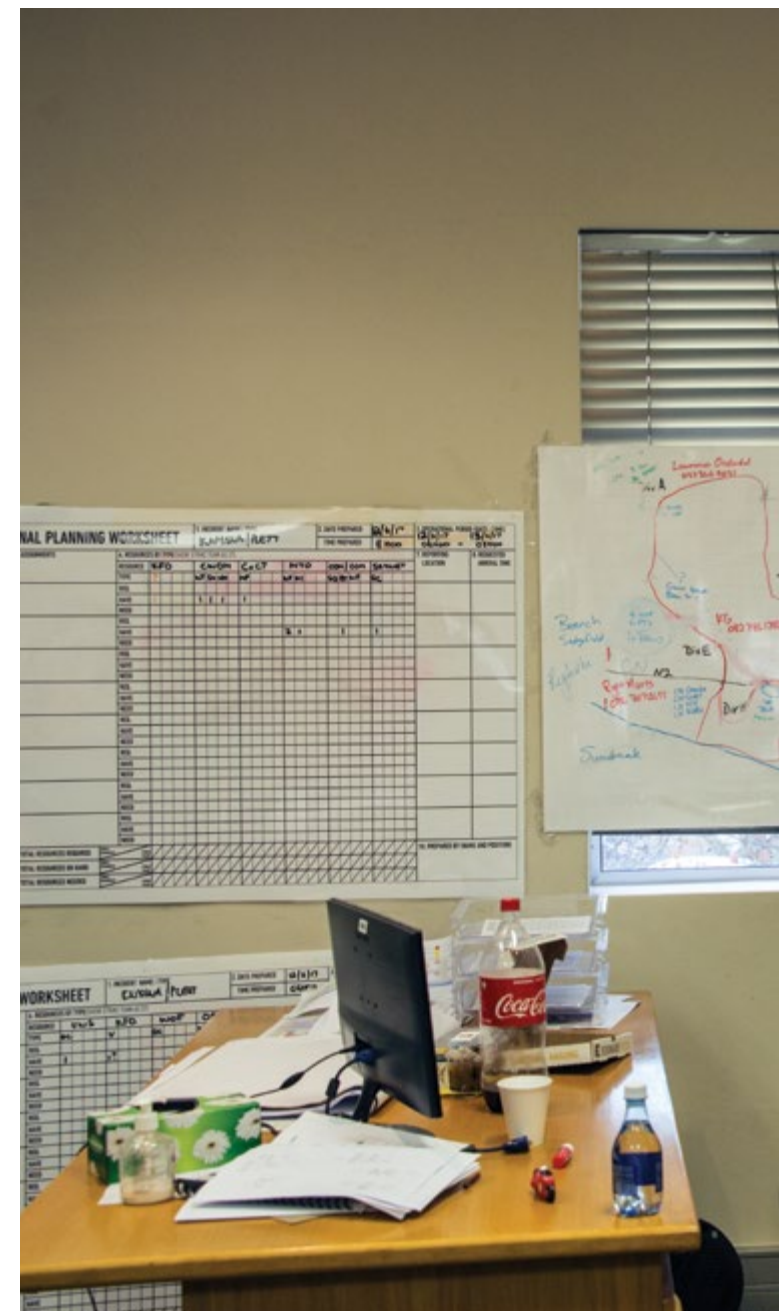
Topics to be covered in an AAR

- What was planned?
- What actually happened?
- Why did it happen?
- What can we do next time?

Incident Response & Fireline Safety Pocket Guide 2017 Designed by Patrick Ryan of Vulcan Wildfire Management (Pty) Ltd. email: info@vulcanwildfire.co.za

VULCAN
WILDFIRE MANAGEMENT

“The fact that there was no formal debrief involving all the role-players is a cause for concern”
— Vulcan Wildfire Management





INDUSTRY VIEWS

Summary of main points covered in a meeting on 8 November 2017 with Manager Gerhard Otto of Eden District Disaster Management and Richard Meyer of the Knysna Municipality.

Typically, the debriefing process of all the different wildfire incidents looks at how the response to the wildfire occurred. We should be looking at how well we were prepared and more focus should be on preparation vs. response.

Summary of main points covered in a meeting on 13 November 2017 with Managing Director Paul Gerber and Eastern Region Manager Dirk Smit of the Southern Cape Fire Protection Association.

Gerber emphasises the fact there has been no official debrief for the fire and this must be addressed.

Summary of main points covered in a meeting on 13 November 2017 with Knysna Station Commander Jerome Simonis of the National Sea Rescue Institute.

While there is a Disaster Management meeting once a year (December) where all the role-players get together and discuss their respective seasonal plans, he feels that these alone are not adequate. There are not enough simulations and therefore the role-players actually do not know each other, what their resources are actually capable of and are not used to working together. He feels that there should

have been a debrief, led by Clinton Manuel (Chief Fire Officer of Knysna Fire Services) where all the role-players could discuss the lessons learned from each organisation's perspective and how things can be improved. He also felt that Knysna Municipality should have got an independent investigator to do the investigation into the cause and origin. Simonis also questioned why water was not taken from the lagoon. Water was crucial and only one municipal hydrant seemed to be working, which had queues of vehicles waiting to fill up.

Summary of main points covered in a meeting on 26 October 2017 with Deputy Director (responsible for Fire and Rescue oversight) Etienne du Toit of the Western Cape Government.

Du Toit says he not been involved in any structured or formal debrief of the incident and as far as he is aware, it never occurred. Du Toit says it needs to happen at both a strategic and an operational level. The question of why a formal debrief has never taken place is an important question? Perhaps the scale of the incident and the post incident fatigue played a role in the debrief not happening. Ultimately Du Toit would have liked to see the Eden District leading the formal debrief but then including all the role-players involved.

DISCUSSION

There are many different areas which require debriefing. A possible reason for a lack of debrief could be:

- Many role-players who took part in the Knysna incident came from all over the Western Cape and South Africa, which would make it difficult to get everyone together.
- The incident duration went on for a long time and into an extended recovery phase. There was no clear “end” to the incident.
- There were so many aspects of the incident it’s hard to know what needed debriefing and it adds to the complexity of trying to arrange a debrief:
 - » operations
 - » logistics
 - » planning
 - » finances
 - » Incident Command System
 - » donations
 - » volunteers
 - » fatalities
 - » evacuations
 - » Wildland Urban Interface
 - » Fire Behaviour and suppression strategy and tactics, and
 - » aerial operations.

The reasons for delaying a debrief session can be understood given the complexity around organising one, but it should ultimately happen. Vulcan Wildfire Management was unable to determine the exact reason why a formal incident debrief did not take place.

RECOMMENDATIONS

- Eden District Fire Services need to be mandated to conduct debriefs with all role-players involved in extended attack wildfires within a reasonable time frame of incidents occurring. This should especially be the case where loss of life and/or property occurred. The process should be built into standard operating procedures and the lessons learned should be formally documented.
- As a recommendation, the Western Cape Directorate Disaster Management and Fire & Rescue Services should look into a system which can be used by all District Fire Services which requires leadership roles on the incident to submit a written ‘after action review’ before being stood down from the incident. During busy fire seasons it may not be possible to debrief all wildfires in a timely manner. However these brief, written after-action reviews could be used to compile a log of information which is then referenced when a seasonal debrief is conducted.
- Eden District Fire Services, on smaller initial attack incidents, are recommended to develop a culture of conducting after-action reviews with all crews involved, including supporting resources and volunteer crews. This process needs to be written in to memorandums of understanding with supporting resource organisations.





Wildfire Specialist Services

Introduction

The ‘wildfire challenge’ has become significantly more problematic in the Eden District (and across South Africa) over the last decade, with terrible loss of life to both civilians and firefighters. Lives as well as property, commercial farms, plantations, tourism and the environment have all felt the impact. There exists the social, environmental and financial need to manage the wildfire challenge.

Investing in people and developing capability and capacity must become a priority within the entire Eden District. Productivity and the ability to be resilient in difficult times come down having the right people in place who run good working systems. The systems for managing risk, preventing disasters, sharing knowledge, reacting to incidents and creating synergy among role-players require knowledgeable, motivated, innovative and hard-working people in order to run optimally. Attracting, retaining and offering a development pathway for people within the Eden wildfire industry must become a focus and a priority. Out of a disaster arises opportunity to understand the challenges and work towards a better outcome.



“All that is valuable in human society depends upon the opportunity for development accorded the individual.”

— Albert Einstein



INDUSTRY VIEWS

Summary of main points covered in a meeting on 7 November 2017 with Environmental Planning Manager Pam Booth, Planning and Development Director Marlene Boyce and Town Planning and Building Control Manager Hennie Smit of the Knysna Municipality.

Booth highlighted the problem of the loss of integrated fire management knowledge from the wildfire industry as the old foresters leave and retire and that there seems to be no formal transfer of these skills to those taking over. Very often areas of land are taken over by SANParks and CapeNature, who don't have the same approach or entrenched knowledge base of the vegetation risk that forestry used to have. Could the "no burning" policy that SANParks had until recently also have added to the fire risk?

Summary of main points covered in a meeting on 2 November 2017 with Forestry and Veldfire Management Programme Co-ordinator Tiaan Pool of the Nelson Mandela Metropolitan University.

Pool says that 90% of uncontrolled wildfires are a symptom of something that has gone wrong. This can be applied to wildfires in general as well as the Knysna Fires, if you unpack the causes of the destruction. Pool believes that there is essentially a lack of education and understanding of holistic fire management at the higher strategic, decision-making levels of authority. If those who are to drive policy and make

strategic decisions on land management (from national through district and municipal levels) are not educated in fire management practices, how can they support the landowners who physically have to manage the land? Are the tried and tested ways of fire management keeping up with the increased risk as our climate changes and is the knowledge that fire behaviour has and will continue to increase in intensity and severity getting through to the right people?

Summary of main points covered in a meeting on 3 November 2017 with Senior Firefighter Adriaan Swanepoel of the Bitou Municipality Fire and Rescue Services.

Another main problem that faces Bitou Fire Services is the lack of training available to the firefighters. In terms of refresher training and ongoing skills development, there is very little if any training that is taking place. The City of Cape Town Fire & Rescue Services 'CTFRS' receive so much more training compared to other services. Swanepoel makes that point that someone entering CTFRS receives more training than he has had in his whole career. Swanepoel makes the further point that refresher training and even short courses could really help to enhance their knowledge, grow their skill base and strategic capabilities.

Summary of main points covered in a meeting on 9 November 2017 with Chief Fire Officer Clinton Manuel of the Knysna Municipality Fire and Rescue Services.

When Manuel arrived in 2015, around 70% of his staff did not have proper training, which was in contravention of the OHSA. With his background at the City of Cape Town Fire & Rescue Services (and being in the Training Academy) he has been addressing this failing by increasing the training courses that his firefighters are attending, this includes Firefighter 1. The problem with catching up on training like this is that you then lose the use of the firefighter for up to three months to do the full-length course. This training also has cost implications with one course of for one Firefighter 1 costing around R100 000. The problem with Firefighter 1 is that it is not about putting fires out, it is purely about functioning safely and further training is actually required to cover other aspects.

This lack of training in B Municipalities is a problem across the Eden district. There is also an issue with training not being done in the B Municipalities themselves as the locations that the training takes place at needs to be accredited as well. This severely limits the ability to train in a more cost-effective way (i.e. training at a local facility). Manuel is looking at running 'Challenge Courses' which may be a work-around of the LG SETA requirement for a training centre to be accredited. The Senior Firefighters who would become accredited instructors would run



these training courses for the other firefighters in both Knysna and George. The assessments only can then be done at PetroSA, which has an accredited Training Centre.

Manuel wants to include a wildland firefighting course into the training and says they will accommodate the District firefighters on this. He makes the point that they should be trained in this already and why is the focus of their training on courses like Firefighter 1, when their main focus and mandate is on wildfires?

These are the questions and answers taken from an email, which Chief Fire Officer Freddy Thavar of the Eden District Fire and Rescue Services responded to on 30 November 2017.

Question: What wildfire specific training do District Fire Services crews receive?

a) What wildfire training is done at the different crew levels?

- Answer: "None"

Question: b) Is wildfire training done on a continuous basis or only at certain stages of employment with the District Fire Services?

- Answer: "Only at certain stages of employment"

Question: c) Does wildfire training also cover preparedness, risk reduction and other integrated fire management concepts?

- Answer: "Unknown"

Question: Are there any limitations to wildfire training which you face as a District and what training improvements would you suggest (if any)?

- Answer: "None"

Question: What Incident Command System specific training do District Fire Services crews receive at different levels?

- Answer: "None but is attended when presented"

Question: How well do you feel the District Crews are

a) physically prepared for wildfires, (given that wildfires are typically a challenging endurance type of activity)?

- Answer: "Well prepared"

Question: b) mentally prepared for wildfires, (given that wildfires are extremely dynamic)?

- Answer: "Well prepared"



Above: A Wildland Firefighter clearing fuel ahead of an advancing fireline.

Lack of training available to firefighters — Hedley Venter, Bitou Fire Services

DISCUSSION

- The potential to develop specialists is being overlooked and more attention and budget needs to be applied to the most vital resource in combating wildfires – people. This report has highlighted the need for an optimised system of shared responsibility. People make systems work. They must have the required skills, but these can also be continuously developed throughout their careers. In the Eden District for example, a current Senior Firefighter from Bitou Municipality Fire Services, who is given incredible responsibility, and has proven his commitment to the Fire Service, has very little training and development available to him due to extremely tight budgets. While this is just one such example, if you had to analyse the focus and attention currently afforded to developing wildfire specialists within all Eden fire organisations, not just the Municipality Fire Services, it would be hard to find wildfire skills development programmes.
- By definition the District Fire Services are wildfire professionals and must be recognised as such. There are also other wildfire professionals in Municipal Fire Services and within landowners, nature conservation organisations and contract crew organisations. When this section refers to the development, or lack of ‘wildfire specialists’, this is in reference to particular specialist areas where there are gaps. If the wildfire industry in Eden would like to enhance capabilities, there needs to be a focused effort on a clear development pathway

to develop full-time specialist capacity in these and other functions.

- » Integrated Fire Management crews and leadership
- » Wildfire Risk Reduction specialist in WUI and Rural environments
- » Division/Group Supervisors
- » Strike Team and Task Force Leaders
- » Specialist Ground Crew Leadership and Crews
- » WUI Specialist Leadership and Crews, and
- » Prescribed Burn Operation Leaders and Crews

- If someone finished school today with the motivation to become a wildfire career professional they could possibly seek employment with Eden District Fire Services, Forestry or Nature Conservation. However, this would most likely not be a specialist wildfire position. There are also less-skilled paths in contract wildfire crews or the Expanded Public Works Programme.

- There needs to be a shift in mindset as well as a structural shift in the employment opportunities the wildfire industry creates in the Eden District. Wildfire is a speciality. However, the specialists that currently exist are small in number. In terms of creating opportunities, Eden wildfire industry role-players need to not only develop talent within their existing systems but also

look at projects and initiatives that can grow and nurture new talent. In terms of broader social and economic targets for the country, this is an industry that can provide more jobs as well as limit financial losses caused by wildfires.

- Training and annual simulation training are incredibly important for developing existing personnel, which should be a focus in the Eden District. Training should be ongoing. Simulation training helps to fine-tune procedures, enhance skills and promote a sense of teamwork, but it also keeps the knowledge gained from more formal training and education fresh and relevant.

- The Eden District and B Municipality crews are vehicle-based crews. To a greater extent, private and Expanded Public Works ground crews are brought in to deal with remote-area wildland firefighting. Large landowners and conservation organisations mostly adopt a similar approach. If you analyse the existing ground-crew resources, the standard of these crews is generally low and the wildfire career path offered is extremely limited. There is very little scope for development, with crews receiving very little training, low salaries, very basic equipment and the work is predominantly seasonal. Although it is not a municipal or landowner resource, this work is incredibly important in preparing for and dealing with wildfires. Yet crews are outsourced on very limited budgets. They therefore can only enter the market and operate at a low standard





Above All: Wildfire Specialists have vital roles to play both in the reactionary side of wildland firefighting and the more preventative measures that make up integrated wildfire management.

because the payment rate set for them is very low. If remote-area wildfire preparation and reaction are ever going to improve, the approach to the people involved requires investment and development.

- In the Eden District and around the Western Cape where employment and skills development are such important goals, there is a massive opportunity to create a thriving industry supporting these goals. The biggest challenge that could roadblock developing ground-crew capabilities will most likely be finance. When considering the costs of a crew, it's important to consider the benefit of the services the crew provides and also compare ground-crew costs in relation to other types of resources (e.g. aerial resources). There are innovative solutions to the financial challenges if a crew-development strategy is seriously considered.
- The wildfire industry in Eden District does not have any top-level, wildfire-focused and specialist firefighting ground crews with full-time leadership. In particular, it does not have crews that can have a consistently high, positive impact in complex strategic operations. The Eden District has an urgent need for different wildfire skill sets and types of crews, especially given the challenging environments and wildfires they face.
- Any specialist crew, in order to build its skill set, needs some full-time employment positions (there are many tasks in wildfire preparation,

planning and risk mitigation that require expertise). As part of the strategic development plan for these crews there must be plans for how they will be used all year. There are international models for how crews are funded and managed. These could be assessed for local viability. For example, some crews of 20 retain seven full-time leadership positions to maintain skills and develop strong leadership while the remaining 13 crew members are brought in seasonally.

- There are extremely talented and passionate scientists and fire engineers in the Western Cape. The wildfire industry needs to bring them into strategic-planning projects and give them the ability to help drive innovation in the industry. International wildfire industries-- Australia for example, where scientific approaches are utilised - have seen great results in risk-reduction interventions which have made a significant impact.

There is the problem of the loss of integrated fire management knowledge from the wildfire industry as the old foresters leave and retire and that there seems to be no formal transfer of these skills to those taking over

— Pam Booth, Knysna Municipality





RECOMMENDATIONS

Wildfire education and specialist training

- The Eden District wildfire industry, specifically Eden District Fire Service and B Municipality Fire Services, require:
 - » increased focus on wildfire training in specialist areas
 - » the training and education prerequisites for important wildfire positions, especially those which have a mandates and responsibility for wildfire prevention and reaction, need to be improved, and
 - » vital leadership positions, in charge of wildfire prevention and reaction, must have requirements for wildfire experience, knowledge and education, specifically focused on the specialist field of wildfire.
- Eden District Fire Services need to develop, or provide to plan for, an accredited training facility for all the Fire Services in the Eden District. This training facility should focus on basic training as well as the areas of specialist wildfire training which have been highlighted. If Eden District Fire Services are unable to develop this training academy themselves then they must appoint a service provider to do so.

Left: Remote area firefighting is a dangerous action and should only be attempted by well trained personnel and crews.

- The Western Cape Directorate Disaster Management and Fire & Rescue Services needs to hold a training symposium with representatives from all major wildfire industry role-players, training and education providers and, if possible, include international wildfire training experts from countries who have a holistic approach to wildfire, to:

- » determine what training is required to cover the current shortfalls
- » determine a strategy to bridge the shortfalls
- » gain support from all wildfire role-players to help develop and support this strategy.

The symposium will need to look into strategies to address the problem with the availability of quality wildfire-focused training in the Western Cape. The current courses available through the SETAs, for example, are outdated and new training options need to be looked at. These include:

- » Education and Training in Fire Management Practices
- » Wildland Firefighting for Ground Crews and Engine Crews
- » Advanced Wildland Firefighting Strategy and Tactics
- » Advanced Remote Area Strategy and Tactics
- » Wildfire Behaviour, Strategy and Tactics

- » Fireline Safety for Leadership
- » Fireline Safety for Line-going Personnel
- » Initial Attack Incident Command
- » Division Group Supervisor integrating Wildfire Behaviour, Strategy and Tactics
- » WUI Incident Preparation, Operations and Leadership
- » WUI Incident Wildfire Behaviour, Advanced Strategy and Tactics
- » Structure Protection Group, Strategy and Tactics
- » Leadership for Wildland Supervisors, and
- » Further ICS Training in identified areas.

Creating opportunities for career specialists in operational capacities

- Eden District Fire Services together with assistance and guidance from the Western Cape Directorate Disaster Management and Fire & Rescue Services need to develop enhanced wildfire crew specialist roles and crews:

- » Full time Wildfire Specialist Ground Crews
- » WUI Specialist Crews and Leadership
- » Remote Area Crews (Lightning-strike specialists), and
- » Incident Management Teams.

Supporting wildfire scientists

- Eden District Fire Services together with assistance and guidance from the Western Cape Directorate Disaster Management and Fire & Rescue Services need to engage with fire engineers. Projects could include:

- » determining how to best safeguard the types of buildings, infrastructure and assets found in the Eden District from the threat of wildfires, radiant heat and embers
- » determining how to build new buildings and infrastructure with this in mind, and
- » determining how to increase the survivability of a burn-over in a vehicle for Fire Services and the public.

- The Western Cape Directorate Disaster Management and Fire & Rescue Services need to engage with relevant scientists to develop and enhance the current Fire Danger Index (FDI) and introduce a new Catastrophic category. Suitable detection/warning systems (and established actions for role-players to take based on these) are essential.





Section C: Legal Framework — Wildfire Responsibility

Introduction

There are several Acts and laws that create the framework for wildfire responsibility in the Eden District and South Africa. The aim of this section is to provide background and insight into these.



NATIONAL VELD AND FOREST FIRE ACT NO.101 OF 1998

Excerpt from DAFF (2005d)

Purpose

- (1) The purpose of this Act is to prevent and combat veld, forest and mountain fires throughout the Republic.
- (2) The Act provides for a variety of institutions, methods and practices for achieving the purpose.

Excerpt from DAFF (2005e)

Chapter 4 places a duty on owners to prepare and maintain firebreaks. The procedure in this regard and the role of adjoining owners and the fire protection association are dealt with. Provision is also made for the making of firebreaks on the international boundary of the Republic. The Minister is given the power to exempt any owner from making a firebreak for good reason.

Duty to prepare and maintain firebreaks

- (1) Every owner on whose land a veldfire may start or burn or from whose land it may spread must prepare and maintain a firebreak on his or her side of the boundary between his or her land and any adjoining land.
- (7) Owners of adjoining land may agree to position a common firebreak away from the boundary.

Requirements for firebreaks

13. An owner who is obliged to prepare and maintain a firebreak must ensure that, with due regard to the weather, climate, terrain and vegetation of the area -

- it is wide enough and long enough to have a reasonable chance of preventing a veldfire from spreading to or from neighbouring land;
- it does not cause soil erosion; and
- it is reasonably free of inflammable material capable of carrying a veldfire across it.

[Section 13 came into effect on 2 July 1999]



NATIONAL VELD AND FOREST FIRE ACT NO.101 OF 1998

Excerpt from DAFF (2005f)

Chapter 5 places a duty on all owners to acquire equipment and have available personnel to fight fires. Certain persons and officials are given the power to enter land and fight fires in an emergency. It provides for agreements to be entered into between the Minister and fire protection associations, or between such associations, to assist each other in the case of a fire.

Readiness for firefighting

17. (1) Every owner on whose land a veldfire may start or burn or from whose land it may spread must -

(a) have such equipment, protective clothing and trained personnel for extinguishing fires as are -

(i) prescribed; or

(ii) in the absence of prescribed requirements, reasonably required in the circumstances;

(b) ensure that in his or her absence responsible persons are present on or near his or her land who, in the event of fire, will -

(i) extinguish the fire or assist in doing so; and

(ii) take all reasonable steps to alert the owners of adjoining land and the relevant fire protection association, if any.

(2) An owner may appoint an agent to do all that he or she is required to do in terms of this section.

Actions to fight fires

18. (1) Any owner who has reason to believe that a fire on his or her land or the land of an adjoining owner may endanger life, property or the environment, must immediately -

(a) take all reasonable steps to notify -

(i) the fire protection officer or, failing him or her, any member of the executive committee of the fire protection association, if one exists for the area; and

(ii) the owners of adjoining land; and

(b) do everything in his or her power to stop the spread of the fire.

(2) Any person who has reason to believe that a fire on any land may endanger life, property or the environment, may, together with any other person under his or her control, enter that land or land to which the fire can spread in order to prevent that fire from spreading or to extinguish it.



NATIONAL VELD AND FOREST FIRE ACT NO.101 OF 1998

Excerpt from DAFF (2005g)

Chapter 7: Offences and penalties. *This Chapter sets out the relevant offences in terms of the Act and the penalties applicable.*

Offences

25.(3) Any person who -

(a) fails to prepare a firebreak when obliged to do so in terms of section 12(1) or 14;

(4) Any person who -

(a) fails to meet the standards of readiness for firefighting referred to in section 17(1);

(b) fails to notify the persons referred to in section 18(1)(a);

(c) refuses to assist a fire protection officer or a forest officer in terms of section 18(3)(b) or 18(4)(b); or

(d) hinders or obstructs any person referred to in section 18(2) or any fire protection officer referred to in section 18(3) or any forest officer referred to in section 18(4), is guilty of a second category offence.

(5) Any owner, occupier or person in control of land on which a fire occurs who fails to take reasonable steps to extinguish the fire or to confine it to that land or to prevent it from causing damage to property on adjoining land, is guilty of a first category offence.

(7) Negligence amounts to fault for the purposes of an offence in terms of this section.

Excerpt from DAFF (2005h)

Chapter 8: Enforcement. *This Chapter sets out the powers of registered fire protection officers to police the provisions of this Act effectively.*

Implementation of this Chapter

26. (1) A fire protection officer has the power to enforce the Act in terms of this Chapter only if he or she is registered in terms of section 6(6).

(2) (a) A forest officer, a police officer, and an officer appointed in terms of section 5 or 6 of the Fire Brigade Services Act, 1987 (Act No. 99 of 1987), have the power to enforce the Act in terms of this Chapter.



Apart from the National Veld and Forest Fire Act No. 101 of 1998 there are other statutes to consider. This is explained in the following excerpt by the Department of Agriculture, Forestry and Fisheries (DAFF).

NATIONAL VELD AND FOREST FIRE ACT NO.101 OF 1998

Relationship between the National Veld And Forest Fire Act and other statutes DAFF (2005i).

- The Constitution of the Republic of South Africa
- Forest Act No.122 of 1984
- Fire Brigade Services Act No. 99 of 1987
 - » The Fire Brigade Services Act provides for the establishment, co-ordination and standardisation of fire brigade services.
- The Disaster Management Act, No. 57 of 2002
- The Conservation of Agricultural Resources Act No. 43 of 1983 (CARA)
- The Mountain Catchment Areas Act No. 63 of 1970
- The Atmospheric Pollution Prevention Act No. 45 of 1965
- The National Environmental Management Act No.107 of 1998
- Compensation for Occupational Injuries and Diseases Act No. 130 of 1993
- Occupational Health and Safety Act No. 85 of 1993
- Criminal Procedure Act No. 51 of 1977
- Local authority legislation

Additionally, we have included a portion of the Local Government Municipal Structures Act 117 of 1998.
General Laws (Loss of Membership of National Assembly, Provincial Legislature or Municipal Council) Amendment Act 55 of 2008.

NATIONAL VELD AND FOREST FIRE ACT NO.101 OF 1998

An extract from the Municipal Structures Act 117 Of 1998 (Government Gazette, 1998, pg58):

84 Division of functions and powers between district and local municipalities

(1) A district municipality has the following functions and powers:

(j) Fire fighting services serving the area of the district municipality as a whole, which includes-

(i) planning, co-ordination and regulation of fire services;

(ii) specialised fire fighting services such as mountain, veld and chemical fire services;

(iii) co-ordination of the standardisation of infrastructure, vehicles, equipment and procedures;

(iv) training of fire officers.



INDUSTRY VIEWS

Subsection I: Feedback related to Acts and Wildfire Responsibility Framework

Summary of main points covered in a meeting on 2 November 2017 with Forestry and Veldfire Management Programme Co-ordinator Tiaan Pool of the Nelson Mandela Metropolitan University.

The issue of governance and lack of legislative enforcement must be highlighted and the question asked, whether there is enough pressure on the right people to change attitudes, approach and accountability when it comes to wildfire? In the Eden District, there is a disconnect and level of distrust between farmers (who have always managed their own land and fire regimes) and the authorities (such as the Fire Services and the FPA), which are viewed as too big and out of touch with the smaller landowners. While farmers do see the value of the FPA, there exists a negative sentiment towards them as well as towards the Fire Services. This negative sentiment stems from the perceived lack of wildfire experience of the brigades, coupled with the power they are given via the Fire Brigades Act. The Fire Brigades Act gives the Fire Services the power to manage the incident on a farmer's land, despite the ultimate responsibility and liability sitting with the farmer – the brigade is indemnified by the Fire Brigades Act (e.g. a counter fire done by inexperienced Fire Services that goes wrong will still result in the landowner being liable).

According to the National Veld and Forest Fire Act No. 101 of 1998 the responsibility for wildfires and the first line of defence is the District Municipality. In most cases it is viewed that Eden District steps back, preferring the Southern Cape FPA to take charge. However, Paul Gerber of the Southern Cape FPA has been very active in trying to put pressure on local authorities and municipalities to become more involved. At a higher level this is great, but what happens when the leadership or knowledge in the Fire Management Units (FMUs) is not strong? Another factor to be considered in this regard is that the government is also a landowner and therefore they should be leading by example with regards invasive alien clearing and risk reduction.

Summary of main points covered in a meeting on 4 November 2017 with representatives of the following Bitou Fire Management Units (FMUs): Plett South FMU, Harkerville Rural Protection, Fisantehoek FMU, Wittedrift FMU, Craggs FMU and associated FMUs.

There is a real problem within the rural environment. Landowners are not becoming compliant with the National Veld and Forest Fire Act No. 101 of 1998 due to the lack of enforcement. Landowners also appear to be largely unaware that they are still at risk from wildfires spreading from their non-compliant neighbours, even if the landowners are themselves compliant.

One of the main requirements is the enforcement of the existing laws. The resulting question would then be: who would actually enforce the regulations? Possibly, either a representative or an enforcement officer from the Municipality or the Fire Services would be the most suitable enforcer.

Summary of main points covered in a meeting on 13 November 2017 with Chairperson Chris Gould of the Knysna Heads Association.

Gould met with the Municipal Manager of Knysna in September 2017. In this meeting, the Municipal Manager reportedly said that:

- 1) smouldering fires must be dealt with by the landowner, or
- 2) the landowner must pay someone to come in and put the fire out.

Gould raised his concern that most people 'out there' are not able to afford such an expensive service. The Municipal Manager then allegedly responded:

- 3) Eden District must be called in to do deal with it.

It seems that Eden District Fire Services and Knysna Municipality Fire Services are always fighting about who is responsible for veld and forest fires.

Another point raised by Gould is that rates and taxes are being paid for public functions, one being fire suppression. As with so much else in society now, the responsibility is being pushed on to the landowners

and homeowners, which he feels is not right.

What course of action can a homeowner or Residents Association take to be more wildfire ready? There is difficulty in trying to conceive how a Residents Association fits into an FPA as this organisation sits under the National Veld and Forest Fires Act No. 101 of 1998, which is not designed for a community (living within a local municipality) such as the Knysna Heads community.

Homeowners in this Wildland Urban Interface (WUI) area (the areas which saw the most homes lost in the Knysna and Plettenberg Bay area's) currently only have the option of joining a Homeowners Association. There are some concerns regarding how a Homeowner's Association can sit within an FPA (if that were possible) especially in terms of liability, legal ramifications and libel actions. The National Veld and Forest Fires Act No. 101 of 1998 is not written for a Homeowners Association on the urban edge. This leaves homeowners in the Wildland Urban Interface unsure of what to do regarding wildfire preparedness.

A possible work around could be for each homeowner to join the FPA independently of the Homeowners Association (if that were possible). Provisions need to be added to the National Veld and Forest Fires Act, which cater for Homeowners Associations that exist on the urban edge (i.e. the Wildland Urban Interface) who are currently not 'landowners' in the greater meaning of the word.

If a homeowner did join an FPA it would logically have to have different sets of guidelines (e.g. how can a homeowner meet the requirements of the firebreak regulations?).

Essentially the act should be rewritten or have an addition, that would apply to the residential areas existing in the Wildland Urban Interface (those that border on the veld and forest).

Summary of main points covered in a meeting on 9 November 2017 with Chief Fire Officer Clinton Manuel of the Knysna Municipality Fire and Rescue Services.

Drought, topography (valleys, ridges, gullies), fuel load (plantations, alien vegetation), low humidity, winds etc. all combined to create devastating fire conditions. Of these factors, the only 'control' we have is over the fuel load element. Manuel remembers coming to Knysna in 2015, as the newly appointed Chief Fire Officer, and having the daunting task of trying to work on how to improve the fuel load conditions. In 2016, he and the Municipality brought in by-laws using the National Veld and Forest Fire Act No. 101 of 1998 to focus on alien vegetation reduction and the creation of fire breaks.



Summary of main points covered in a meeting on 7 November 2017 with Environmental Planning Manager Pam Booth, Planning and Development Director Marlene Boyce and Town Planning and Building Control Manager Hennie Smit of the Knysna Municipality.

Structurally and at a policy level, there isn't a Mountain Catchment Areas Act anymore. The vegetation load has now become so great that burning control blocks is deemed too risky. This is a concern.

Summary of main points covered in a meeting on 4 December 2017 with National General Manager Shane Christian and National Spokesperson Linton Rensburg of Working on Fire.

Christian points to the conflicts between the Veld and Forest Fire Act, the Brigades Act as well as the Municipal Structures Act. It is Christian's opinion that the interpretation of the acts is the problem. It leads to a problem of understanding whose responsibility a wildfire is and therefore who should pay the accounts. WoF is under partner management so they get caught in the middle of the disputes.

The West Coast has shown excellent relationships between Local and District Municipalities. This is because the Chief Fire Officer has also become the Fire Protection Officer (FPO). Similarly, Ian Schnetler is fulfilling his role really well in the City of Cape Town, even though he delegates some of his responsibility

to SANParks. Reinard (Overberg District Chief Fire Officer) is also fulfilling the role of FPO and it is working. The FPO in Eden District is non-existent.

These are the questions and answers taken from an email, which Chief Fire Officer Freddy Thavar of the Eden District Fire and Rescue Services responded to on 30 November 2017.

Question: Please can you explain the role of the Eden District Fire Services? (Please include how you fit in with the Municipal Fire Services, Disaster Management, Landowners, FPAs etc. and also specify what your mandate is?)

- Answer: "District Mandate. In terms of the Local Government: Municipal Structures Act 117 of 1998.
- 84. Division of functions and powers between district and local municipalities
- (1) A district municipality has the following functions and powers:
 - » (j) Fire fighting services serving the area of the district municipality as a whole, which includes-
 - » (i) planning, co-ordination and regulation of fire services;
 - » (ii) specialised fire fighting services such as mountain, veld and chemical fire services;

» (iii) co-ordination of the standardisation of infrastructure, vehicles, equipment and procedures;

» (iv) training of fire officers.

Disaster Management is a municipal function and there is a relationship of "complementarity". Landowners belong to the FPA and in terms of the National Veld and Forest Fire Act No. 101 of 1998 have to satisfy the requirements as stipulated in the act. Landowners also are ratepayers and as such have to receive a service from the municipality to where the rates are paid."

Question: There seems to be conflict around mandates and responsibility for wildfires (veld fires) and as a result the billing of wildfires.

a) What is your take on the mandates and responsibility?

- Answer: "I am guided by the legal opinion of Advocate PBJ Farlam who was commissioned by the Western Cape Government, Department of Local Government with particular reference to sections 39 to 46.
- I am also guided and instructed by the mandate given to me by the Council of the Eden District Municipality"

Question: b) What is your take on the billing aspect?

- Answer: "The Eden District Municipality has a tariff of charges for services rendered"

Question: c) What impact do both these factors have on response and management of wildfires in general within the Eden District?

- Answer: "This question is very vague"

Question: d) What impact did both these factors above have on the Knysna (Elandskraal) and Plettenberg Bay (Dam se Bos) fires?

- Answer: "I was not present during the Knysna fires and cannot comment on them"





Subsection II: The institutionalised relationships between the Eden District Municipality, the B Municipalities and the Fire Protection Associations

Summary of main points covered in a meeting on 3 November 2017 with Chief Fire Officer Hedley Venter of the Bitou Municipality Fire and Rescue Services.

In more recent years there has been a steady breakdown in the previously well working relationship and sharing of resources between Bitou Fire Services and the Eden District Fire Services. In the last three years Eden District Fire Services have only attended around 10% of wildfires in the Bitou area, despite the District Fire Services having the primary mandate for responding and dealing with wildfires. The majority of wildfires are being handled by Bitou Fire Services whose mandated responsibility is actually structural fires.

The issue around the responsibility of who attends which fire... Eden District or the B Municipality ... has too many views and opinions, which are unnecessary if you look at the legal opinions given. There have been two court judgments where the District Fire Services has been determined to be responsible for bush, veld and mountain fires. Historically the relationship between the District and B Municipality Fire services was one of support, however in recent years that has

eroded and become a poor relationship. The sense of the purpose of the Eden District Fire Services seems to have been lost and unfortunately this is filtering down into some operational elements - with standards slipping. Basic wildfire firefighting skills are being lost. Eden District Fire Services crews do well in fittest firefighter competition training; however this is different to being fit for wildfire operations. There also seems to be a bravado attitude with not wearing PPE properly while operational.

There is also difficulty with the ordering of aerial resources. It always becomes a question of finance, which slows the entire process down. Bitou Fire Service are faced with situations where aerial support is required in instances where:

- Life and property are threatened.
- Aerial resources are going to be most effective (e.g. a wildfire has started and has a high spread potential or access to fireline is remote/difficult).
- Time is an important component, usually during the initial stages of a fire where this resource can be most effective to contain the fire before it becomes too large to deal with.

It has proven difficult for Bitou Fire Services to motivate for a helicopter resource due to:

1. The time it would take the Eden District Fire Services to approve the aerial resource (the time delay becomes a major issue as it allows the fire to build in size and intensity).
2. the unlikely chance of Eden District Fire Services covering the cost of the aerial resource.

An aerial resource is most effective in the initial stages, or where access to the fire is difficult by ground. To be arguing this during an incident is wrong. This complicates the matter, especially when one is heading up fire operations and looking at saving lives and property.

The deployment of aircraft is currently required to go through the Eden District Fire Services who insists these requests must go through official channels. However often decisions are made out in the field and a phone call is the only way this can be achieved within the practical time frame. There is often no response from Eden District Fire Services. This has led Bitou Fire Services having to bypass Eden District Fire Services and request aerial support directly from Province. The Bitou Municipal Fire Services are now looking to tender for aerial support that can be controlled by them directly. This is a necessary measure as the existing process causes delays, which can lead to fires spreading uncontrollably in their initial stages.

Summary of main points covered in a meeting on 8 November 2017 with Manager Gerhard Otto of Eden District Disaster Management and Richard Meyer of the Knysna Municipality.

One of the major concerns not only in the Eden District but also around the Western Cape, is the division of function between B and C Municipalities. The split of function is implemented differently in the different districts. In the Eden District, the challenge posed by this split has raised a question of “who is responsible for the fire? Whose fire is it?” The Eden District Fire Services takes the stance that all fires are the responsibility of the “local B Municipality” until they cannot manage it and then they must call Eden District Fire Services for assistance. “The Minister had to make a determination for the Eden District that bush and veld fires were indeed, as per the legal responsibilities, the responsibility of the District Fire Services”. On the 24000 square kilometres Eden District covers this means all bush and veld fires are Eden District’s responsibility. It was then questioned - what is considered a veld fire? The answer Eden received “based on the last High Court case we had... with the outcome that court indicated that, if it’s not cultivated land, then it is veld”.

In the different levels of Eden District fire fraternity there is a strain on relationships largely due to the arguments about who is responsible for what, and following the incident, who picks up the account? “At this stage it leads to a working relationship which is very sour.”



There are currently no formal mutual aid agreements between municipalities in Eden District for mutual aid assistance in times of wildfire incidents. Mutual assistance sometimes takes place but it is largely based in personal relationships, which have been developed. For continuity and a more effective system, especially where resources are limited, it would be preferable to have more formalised mutual aid agreements in place. This assistance could be in the form of human resources, equipment or anything that could be shared in times of need across the Municipalities.

Summary of main points covered in a meeting on 9 November 2017 with Chief Fire Officer Clinton Manuel of the Knysna Municipality Fire and Rescue Services.

It is important to build relationships and iron out difficulties as well as try to make it clear what each other's functions are. Manuel has a great relationship with Deon van Wyk, Deputy Chief of Eden District Fire Services and says that Deon van Wyk has a good understanding of what the role and functions are of the Eden District Fire Services. Therefore, Manuel's dealings with Van Wyk are an example of a good working relationship. However, the relationship in general, between the Eden District Fire Services and the Knysna Municipal Fire Services is not all rosy and there are problems which exist - since before the fires on the 7th June, and ongoing.

In Manuel's view, Eden District Fire Services:

- Need to decide as soon as possible what they will be doing with their Fire Services.

» There is talk that they will retain their operational function. If they want the Fire Service to sit with them, they need to fulfil their function and they need to foster relationships with the B Municipalities in order to do so effectively.

» There is also talk that they will perform an oversight function. Manuel argues that the oversight function is that of "Provincial Government" and warns that they must be careful if they are going to try and follow that route.

- The B Municipalities are responding to veld fires because they are in a position to respond faster than Eden District Fire Services, which is logical given geographic distances and logistics. The Eden District Fire Services however, is saying that District will assist with these veld fires but they will bill the B Municipality for this service. In terms of mandates, Manuel argues that this is completely wrong. The B Municipalities should respond initially to veld fires, due to their closer proximity and better chance of suppressing the fire while it is small. However, the command and responsibility should be handed over to the Eden District Fire Services when they arrive. In this way, the B Municipality is actually assisting the District Fire Services in what is meant to be

their function and the B Municipality should bill the District. This whole situation has caused a lot of confusion and tension between the different role-players.

- Manuel says that he has requested Eden District Fire Services resources before and he has been told that Eden District have none available - only to find out later that there actually were resources available.

- Eden District Fire Service resources are not evenly spread in terms of covering Knysna and Bitou areas. Manuel has offered to accommodate a crew and vehicle at Knysna Fire Station. This would greatly improve District response times to these areas so it's unfortunate he has never been taken up on this.

- There needs to be a much better relationship between the B and C Municipalities.

- Manuel suggests that the District could facilitate MOUs between the Municipalities so that there is formal process where the B Municipalities can easily assist one another when one is struggling and the other can free up some of their resources to assist. These kinds of relationships will help manage incidents across the Eden District.

- It seems as though Eden District Fire Services want to retain control over all aerial resources. Manuel argues that he doesn't mind who he has to call, as long as he can order and receive this resource timeously, in order for it to be effective. To a degree this has also caused issues. An



example of this was that during a wildfire that was spreading towards an informal settlement near Sedgfield, Manuel phoned Eden District Fire Services to request a helicopter as the fire was deemed inaccessible to his crews. The fire was running right on top of the ridge and they needed a helicopter to cut it off. Being a veld fire this was an Eden District Fire Services responsibility but the Knysna Municipality was the only resource in attendance. Eden District Fire Services reported that they could not assist as the District were busy fighting a fire outside Mossel Bay. Manuel asked how their helicopter was currently assigned (what firefighting activity) and it was reported by Eden District Fire Services as “dampening down fireline”. Manuel then reiterated that he was on scene at Sedgfield and he had a fire running towards an informal settlement (i.e. it was a high priority). Eden District Fire Services allegedly continued to claim that the helicopter resource was not available.

Summary of main points covered in a meeting on 13 November 2017 with Managing Director Paul Gerber and Eastern Region Manager Dirk Smit of the Southern Cape Fire Protection Association.

There is a major problem around responsibility for wildfires within the Eden District. The Eden District Fire Services created chaos when they declared that wildfires are not the District responsibility but rather they are the responsibility of the B Municipalities.

It took a high court ruling to state that the District Fire Service is indeed legally responsible, but this situation created a lot of confusion and eroded relationship. It's also not practical to expect the local B Municipalities to take on wildfire operations for long durations or on a consistent basis without wildfire specific equipment, vehicles and suitably trained personnel. There are wildfire specific tactics, such as back burning, which require skill and expertise. Another important consideration is that if the Eden District Fire Services is responsible for wildfires, they should be doing more work in wildfire awareness and prevention. If they cannot fulfill this function they should work with partners to achieve this objective. One such partnership should be between the Eden District Fire Services and the FPA.

Summary of main points covered in a meeting on 4 December 2017 with National General Manager Shane Christian and National Spokesperson Linton Rensburg of Working on Fire.

Christian reported that WoF has healthy relationships with all their partners in the Eden District. However, they have had challenges for the past 6 month with the Eden District Municipality. Not the District itself but rather the Eden District Fire Services. We have had various meetings trying to turn it around. Problems started last year August (2016) and it doesn't seem to be getting fixed. Last December 2016 for example, the Eden District Fire Services kept demobilising WoF resources too early, only to have to call them

back to the fire the next day. It is a big challenge that it has spilt over into politics as well. WoF are trying to stay away from the politics. Christian discussed further that the poor relationship is affecting them financially. In the Southern Cape District alone, they are owed in excess of R800 000 for their services.

These are the questions and answers taken from an email, which Chief Fire Officer Freddy Thavar of the Eden District Fire and Rescue Services responded to on 30 November 2017.

Question: Based on interviews with key role-players within the Eden District it seems as though the relationship between the District Fire Services and other major role-players is strained. Is this a fair assessment of the situation? What are the relationship challenges you are facing and how can they be overcome?

- Answer: “The relationship with key role-player is open to perception. Memorandums of Understanding (MOU) exist with certain role-players and the relationship is based on the content of the documents and professionalism. In the absence of a MOU, a request for assistance is received and normal protocols are observed.”



Question: With your communities, suburbs, private citizens etc.

a) What is your relationship like with these sectors and how often do you engage with members of the public?

- *Answer: “The local municipalities have made it clear that the community interaction is the mandate of the local municipality and that the district is not to engage the public”*

Question: b) What wildfire risk and awareness initiatives does the District get involved with or initiate?

- *Answer: “Please take note of the previous answer and that the district requires a fire season awareness campaign to be conducted”*

Question: c) What strategies do you have in place to help homeowners and landowners reduce their wildfire risk and are better prepared for wildfires?

- *Answer: “We do not interact with private landowners prior to a fire”*

Question: d) What penalties do you have in place if homeowners and landowners do not comply with wildfire risk measures?

- *Answer: “We do not enforce any by-laws”*



Above: A wildland firefighter assists a landowner with a stack burn operation.

DISCUSSION

Acts and the wildfire responsibility framework

- Despite having Acts and laws, which should determine the structure and environment for wildfire management (also known as Integrated Fire Management) to occur at different levels, there are challenges within the system. The Elandskraal and Kruisfontein wildfires of 2017, and other fires that have occurred over the last ten years around the Western Cape, have highlighted that there are problems with some of the role-players in doing their part in sharing responsibility for preparing and reacting to wildfires. The role-players in the context of wildfire risk and responsibility range from the Fire Services, large landowner organisations, farmers, the owners of smallholdings right down to the individual home owner living within the Wildland Urban Interface.
- Effective wildfire risk reduction needs to be a shared responsibility. While this concept is very simple, the reality and implementation is extremely complex. The Acts and laws place a large amount of responsibility for wildfires on landowners but they also set out the framework for the responsibility of Government and Municipalities (as noted in the following excerpt from Teie (2009, pg 472 - 473)).

UNDERLYING POLICY

There are four categories of underlying policy which inform the Act: (National Veld and Forest Fire Act No. 101 of 1998)

- A) Decentralisation and Integration**
- B) Individual Responsibility With Minimum Standards**
- C) Co-operation and Co-ordination**
- D) State's Responsibility**

A) Decentralisation and Integration

Decentralisation means that affairs of governance have to be managed locally whenever appropriate and possible. Integration means a linking together of all the local plans, regulations and initiatives into one policy.

The purpose of the act is to prevent and combat veld, forest and mountain fires throughout the republic. The Act is designed to promote the most effective way for achieving this purpose, which is by organizing at a local level to prevent and combat veld fires.

- In the Eden District, there are reportedly very few formal agreements, integrated plans, mutual-aid agreements and policies linking the major role-players. This creates an environment where Eden District Fire Services, B Municipality Fire Services, FPAs and landowners are isolated and systemically independent of each other. The challenges that exist could be fundamentally improved through institutionalised relationships, which cement best practice.

- There is confusion in the Eden District about who is responsible for wildfires. This confusion exists around who performs which function and how responsibility for mitigation work and suppression activities is shared between all of the role-players. In the Eden District this has led to a climate of misunderstanding, resulting in a breakdown in trust, not only between the District B Municipalities, but also among the landowners. The Southern Cape FPA and its FMUs should be available to advise landowners. However, it must be remembered that not all landowners are FPA members. In some instances where landowners turn to their Fire Services for assistance, they claim to be sent back and forth between their B Municipality and the Eden District Fire Service.



Excerpt from Teie (2009, pg473)

B) Individual Responsibility With Minimum Standards

...the act places an individual duty on every landowner where there is risk of a veld fire, to take certain minimum precautions to prevent and combat veld fires. The landowner must therefore:

- Prepare boundary fire breaks where there is risk of fire
- Have equipment, trained personnel and protective clothing
- Fight fires in his/her own and on adjoining land where the fires threaten life, property or the environment
- Under the Fire Danger Rating System, no individual, whether a landowner or not, may light fire in the open air when the danger rating is high.

• According to The National Veld and Forest Fire Act No. 101 of 1998 the landowner must “do everything in his or her power to stop the spread of the fire.” This framework is clear but the reality of the situation can be more complex:

» At what stage does the FPA, or District Fire Services or Municipal Fire Services assist the landowner with the wildfire?

» What is considered reasonable action by a landowner?

» What if the landowner has everything in place as required by the Act but is still overwhelmed by the complexity of the situation?

» Is it fair to place responsibility for wildfires solely on landowners considering the challenge wildfires pose?

• There needs to be recognition that wildfire is a complex element and requires a specialised field of expertise. Should landowners not have better access to Fire Service expertise in order to help with decision-making on wildfires and, if needs be, have assistance with resources to suppress or contain the wildfire? As an example, in a city or urban environment, people pay rates and taxes and the Fire Service is expected to assist with structural fires. It would not be reasonable to expect all homeowners to have the equipment and expertise to deal with a fire in their own home. Landowners must share responsibility, especially around risk reduction

(e.g. management of fuel loads, eradicating alien vegetation, creating firebreaks and defensible spaces around homes and buildings). When it comes to resources and, importantly, the expertise for combating difficult wildfires, it becomes a more challenging issue.

• The effectiveness of suppression efforts and reaction to fires by landowners is often related to the type, quality and quantity of resources at their disposal. This is often constrained by available knowledge and finances. The National Veld and Forest Fire Act No. 101 of 1998 also does not specify any standards in this regard. This can lead to ineffective suppression and reaction to wildfires, which is especially important for high-complexity wildfires, such as wildfires in remote areas.

» Is it realistic for the responsibility of reacting to the outbreak of wildfires to sit solely with the small private landowner for example?

» Furthermore, when lives and property are at risk, is it right to leave this in the hands of a landowner with limited resources and limited wildfire understanding?

» Who makes the decision as to when a wildfire is considered as being a potential threat to life, property and infrastructure?



» When does wildfire responsibility shift from the landowner to the Eden District Municipality and Fire Protection Officer (FPO)?

- The FPA is available to guide and assist landowners; it is not a firefighting service. FPAs are a support mechanism for landowners who are members.

Excerpt from DAFF (2005c)

6. (1) The fire protection officer must -
- (c) take control of any fire fighting in the area for which the fire protection association has been formed, if -
- (i) the veldfire is a threat to life or property; and
- (ii) he or she is reasonably able to do so;
- (d) enforce the rules of the association;
- (2) Where -
- (a) a municipality is a member and has a service, or where a designated service is a member, the chief fire officer is the fire protection officer unless he or she declines the position;
- (b) a fire protection association has as members more than one entity having a chief fire officer willing to assume the powers and duties of the fire protection officer, the fire protection officer must be appointed from among those chief fire officers.

- In the Eden District, landowners who are making an attempt to “take certain minimum precautions to prevent and combat veld fires” in terms of the National Veld and Forest Fire Act No. 101 of 1998 are running into problems even when trying to do the right thing. An example is where landowners in the Knysna Municipality area have a great deal of difficulty in obtaining burn permits and gaining permission to conduct burn operations.

» Some landowners claim the authority issuing the burn permits does not fully understand wildfire risk and how an area should be prepared for burning.

» Landowners are often not given permission to burn on a given day, even though the conditions at the burn site are ideal.

Landowners feel they are trying to conduct fuel management and uphold their responsibility in terms of the National Veld and Forest Fire Act No. 101 of 1998. However, they keep running into a brick wall and are not being allowed to carry out as much burning as they require. This has created friction in the relationship between these landowners and the authorities.

- If you look at the Eden District Fire Service and B Municipalities responsibility, in terms of the “Division of Functions”, set out in the Municipal Structures Act 117 of 1998, it is very clear that the Eden District Fire Services have the responsibility for wildfires.



An extract from the Municipal Structures Act 117 Of 1998 (Government Gazette, 1998, pg58)

84 Division of functions and powers between district and local municipalities

- (1) A district municipality has the following functions and powers:
- (j) fire fighting services serving the area of the district municipality as a whole, which includes -
 - (i) planning, co-ordination and regulation of fire services;
 - (ii) specialised fire fighting services such as mountain, veld and chemical fire services;
 - (iii) co-ordination of the standardisation of infrastructure, vehicles, equipment and procedures;
 - (iv) training of fire officers.

- Issues around how Eden District Fire Service and B Municipalities respond to veld fires (wildfires) are a cause of concern in the Eden District. There exists an environment where the Eden District Fire Services put greater emphasis on the B Municipalities dealing with wildfires which has been a source of friction and confusion.

Excerpt from Teie (2009, pg474-476)

C) Co-operation and Co-ordination

This policy is evident through a number of ways and can be achieved by:

- The establishment of Fire Protection Associations (FPAs)
- Co-operative governance with local government
- Co-ordination with Disaster Management Centres established under the Disaster Management Act
- Co-ordination with municipal fire service
- Co-ordination with existing statutes and by-laws

Local Government

The local Government is structured in the following manner:

- Big city Metropolises are category A Municipalities.
- Local Municipalities refers to municipalities of towns and are referred to as category B Municipalities.
- Category C municipalities contain several Local Municipalities/category B municipalities and are referred to as District Municipalities
- FPAs can usefully correspond with one or more local municipalities in order to promote co-ordination as fire fighting services is an area of local government competence. This means local government must be involved in veld fire prevention and management under the Act.

- The finances for veld fire fighting and management will come from local government budgets through IDP's (integrated development plans), FPA members' fees, additional contributions for FPAs e.g. donations, bank loans, funding granted by the Minister.
- ... An IDP is a plan aimed at the integrated management of a municipal area.... The financial plan and annual budget for a local government depends on its IDP being approved by the Minister. Without an IDP, no money can be transferred to a local government by the province. Therefore, if the requirements for veld fire management haven't been integrated into the IDP, there won't be an amount in the local government budget and financial plan to help finance veld fire management and prevention.

Disaster Management

The Disaster Management System deals with disasters, which are natural or human-caused events, with or without warning, causing or threatening death, injury or disease, damage to property, infrastructure or the environment. These disasters exceed the ability of the affected society to cope with using only its resources. The emphasis is not only on relief and recovery efforts; it is also on preventative strategies to avoid losses and environmental degradation. DAFF and the Department of Provincial and Local Government are promoting congruence between veld fire management strategies of FPAs and the veld

fire elements of local and national disaster management plans.

The veld fire management strategy of FPAs will therefore at the same time be the veld plan within the disaster management plan required for each District Municipality or Metropole by the Disaster Management Act. The Disaster Management Act also requires local disaster management plans to conform to the requirements of the Integrated Development Plan (IDP) for the area.

Fire Services

The Fire Brigade Services Act allows municipalities to establish fire brigade services that will operate within the area of the municipality. The purposes of the fire brigade services are to prevent the outbreak or spread of fires, fight or extinguish fires and to protect and rescue life or property against a fire or other threatening danger.

Where an FPA is formed, the municipal fire service or designated service in that area must become a member of the FPA.

Existing statutes and by-laws

The by-laws on veld fires passed by the local municipality will bind non-members of the FPA. They should be consistent with the FPAs rules

- With finances for wildfire management and suppression in the Eden District coming from the local government's budgets through Integrated Development Plans (IDPs), a question around whether or not wildfire concerns are being motivated for through the IDP must be asked. If wildfires are featuring in IDPs, are local municipalities recognising and applying budgets accordingly for wildfire-risk reduction or just response (reactionary) measures?

- Fire Protection Associations (FPAs) guide and coordinate landowners' efforts to prevent and react to wildfires at a local level. The way they are set up means they are responsible to their membership only.

» Not all landowners are members of an FPA, nor are they required to be members.

» FPAs don't always have the capacity to actively engage with all their members.

» FPAs depend on their Fire Management Units (FMUs) to be a strong link to their members on the ground. However, finding good FMU leaders can be difficult. Many FMUs focus on reaction only and lack the 'know how' or support to actively plan and implement preventative measures.



Excerpt from Teie (2009, pg477)

D) State's Responsibility

Through the Act the State provides for FPA's methods (e.g. veld fire management strategies) and practices (e.g. fire breaks) for achieving effective fire management.

The State also takes responsibility for the national fire danger rating system, which will be an early warning system.

The State provides an enabling, facilitatory framework for veld fire management, but also sets minimum standards (e.g. all landowners must prepare fire breaks).

The Act also provides a regulatory framework through the chapters on enforcement (Chapter 8) and offences and penalties (Chapter 7), which will be implemented by the State.

- » FPAs and FMUs need to be the friends of the landowner – to encourage them and motivate them to take steps to prevent, prepare and react to wildfires. This means it is difficult or inadvisable for FPAs and FMUs to impose regulations on their members.
- The concept of FPAs is great but the actual system/structure has its shortfalls.
 - » There are many FPAs doing great work, but if you consider the role they play and the responsibility they have to so many landowners, they lack the capacity to conduct all the work that is truly required of them.
 - » They need support in growing their membership base. Penalties for not being compliant with the National Veld and Forest Fire Act No. 101 of 1998 should be better enforced, compelling more landowners to join FPAs.
 - » Landowners need points of contact with wildfire expertise to consult around how they can go about wildfire management. This does happen sporadically, but it needs to happen on a larger scale and more often. Landowners need to be able to troubleshoot challenges, seek guidance or clarification on certain topics, validate work plans, etc.
- » FPAs need to look at additional ways to fund themselves. They collect membership fees but, of the total landowners and property owners in an area, not everyone is a member. The total pool from which they can draw finances from memberships is usually quite small.
- In terms of Disaster Management, could more be done to implement preventative wildfire strategies? Eden and Provincial Disaster Management responded very well to support the Knysna Fire incident. Proactive wildfire-risk planning will identify other high-risk areas, which have the potential for similar wildfire disasters. To avoid loss and destruction, how can Disaster Management play a role in preventing wildfire disasters?
- Responsibility for wildfire management needs to be shared between landowners, homeowners, Fire Services, municipalities, town planners, Disaster Management, etc. However, the State also has a responsibility.



- Wildfire risk should ideally be a shared concern. Risk mitigation and effective reaction relies on all landowners having completed work or taken set actions. One, two or a number of non-compliant landowners expose all the other landowners in the same area to greater risk, resulting in those who are compliant becoming frustrated. There is currently no action being taken to improve this situation.
- Existing wildfire laws and regulations need to be enforced. Currently there is very little enforcement and, as a result, there are no repercussions for those who are non-compliant. The Local B Municipalities are probably the most suitable authorities to enforce regulations. However, they often lack the capacity and support to do so.

Homeowners in the Wildland Urban Interface (WUI)

- The Wildland Urban Interface (WUI) is a 'forgotten' component in the National Veld and Forest Fire Act No. 101 of 1998. Landowners are the focus of the Act but, if you look at the Knysna Fires incident, the majority of homes and financial loss occurred within the WUI. What requirements are there for a home in the WUI to be wildfire compliant and what support mechanisms are in place to assist these homeowners in becoming compliant?

- A common misconception of the homeowners in the WUI is that, as part of their municipal services, their home will have a fire engine parked outside to protect them during a wildfire incident. During a large incident, with resources being required in many different areas, there is a strong likelihood that the Fire Services will not be able to protect all the homes. Can we blame homeowners for this expectation when no one is making them aware of their risks?

Eden District Fire Services, the B Municipalities and the Fire Protection Association

- In the Eden District, the District Fire Services have reportedly taken the stance that wildfires are the primary responsibility of the B Municipalities, with Eden District having oversight and responding only when the B Municipalities request assistance. The B Municipalities say that this is contrary to the Municipal Structures Act 117 of 1998. This relationship dilemma has created a non-collaborative approach to wildfires and has resulted in a relationship breakdown. Apart from the Acts and regulations there are reportedly no institutionalised agreements in place to guide this interaction.
- B Municipalities recognise their role and the importance in responding to wildfires because they will often reach the wildfire location first (Eden District resources are not placed in every municipality). In the opinion of at least two of the

B Municipalities, if the incident is ongoing, Eden District Services should take control of the incident. At the moment, the support from Eden District Fire Services is reportedly not always forthcoming and the responsibility of a wildfire and the associated costs are being attributed to the B Municipality. If the B Municipality is working to assist Eden District Fire Services with wildfires beyond the B Municipality's mandate, which is how it needs to be to ensure rapid response, then an argument could be made that Eden District Fire Services should cover the cost for this service and not the other way around.

- For the benefit of all, the B Municipalities and the Eden District Services should complement one another and not be at odds. When a wildfire disaster strikes, you want to be sure that you are optimally prepared to deal with it. Having good cooperation and coordination among all role-players is vital and the landowners in the Eden District find themselves in the middle of a system which is difficult to navigate, not knowing which Fire Service they can rely on for wildfire support. If one has to imagine a well-functioning system, all Municipal Fire Services in Eden should be working together with synergy as well as having a close working relationship with the Southern Cape FPA and FMUs. (Through the FPA they then have a link with the landowners.)



RECOMMENDATIONS

- The risk of fire spread should always be strategically considered (based on current and forecast conditions). No matter how small or what state a fire is in, the potential of the fire must be evaluated and this must then guide the appropriate actions. The wildfire industry is constrained by the unique limitations that each role-player has but, as a collective, there is much greater potential for successful response and prevention work. It has to be factored in that both Eden District Fire Services and B Municipality Fire Services operate with very limited wildfire resources in terms of personnel, vehicles and equipment. At times, there are not nearly enough resources to cover all the wildfires, especially during busy periods with high numbers of ignitions. This is why it is so fundamentally important that both Eden District and B Municipal Fire Services look to other role-players to develop good working relationships and a sharing of resources.

Right: An example of how Defendable Space can aid the survival of a home, whether through the reduction of vegetation around the home, being able to withstand the onslaught of an ember attack or have firefighters able to safely enter and defend the area.



- It is highly recommended that Eden District Fire Services hold a symposium in 2018 involving all wildfire role-players in the Eden District (especially landowners), to seek solutions to the current challenges. The National Veld and Forest Fire Act No. 101 of 1998 places responsibility on landowners to prevent wildfire spread but also sets out the responsibilities of the State (local government) to create a conducive environment for this to occur. The existing framework for this to happen exists. However, it is not always clear, and there are issues in the system which are hindering matters further.

» This symposium would encourage and facilitate a more collaborative environment for dealing with wildfire risk.

» Fire Services from around the Western Cape, especially the District Fire Services, should be invited to help guide solutions and offer insights into ways of overcoming challenges.

» Landowners must be represented as they are the ones experiencing problems on the ground. If the symposium purely involves FPA Managers, Fire Services, DAFF, etc. then it will lack the insight that could be gathered from those who sit with the actual problems.

- Before the symposium, it is recommended that Eden District Fire Services, together with the B Municipalities and the Southern Cape FPA, hold a strategic meeting or series of meetings to work on strengthening their own relationships. They should also work out ways in which they can assist in building the capabilities of large and small landowners. Aspects they need to look into include:

- » Ensuring that there is a system for sharing advice and information with landowners. There should be a database, which is accessible on different media platforms, on which information topics such as fuel management, preparation, defensible space, fire-resistant building materials, planning, warnings, protective actions, evacuation, defending your home and last-resort survival are discussed. It is essential that this information is customised to target different audiences.

- » How to apply strategic wildfire risk-based land management and planning and make this information publicly available so it can be taken down to the local FPA level of planning.

- » Create organisational and institutionalised partnerships to help build landowner and community capability and capacity.

- » Play a supportive function to individuals, landowners and communities when they

are actively taking steps to improve, but may need outside help. For example, Eden District Fire Services may assist a landowner with a prescribed burn or conduct training with landowner resources to help them advance their skill set.

- » Play a supportive function in helping communities to recover from wildfires.

- » Ensure an effective, well-coordinated response to wildfires that incorporates formal interagency response agreements and planning.

- » A system to provide incident information feedback to a community during a wildfire.

- » Document wildfire incident information and lessons learned in order to help learn from wildfires and create a central database open to the public.

- » Have an operational wing which ensures wildfire compliance, as well as an incentive-based system for landowners. For example, fines, increased taxes for non-compliance or tax rebates for investment in risk reduction.

- » Set the example on State-owned land. If private landowners are required to be 'wildfire compliant' State land, reserves and suburbs should lead the way in showing what wildfire resilience is all about.

- » Undertake wildfire risk-reduction projects for informal settlements and vulnerable communities that cannot conduct the work themselves.

- DAFF needs to look at financial support to help build capability and capacity in the Southern Cape FPA (and all FPAs in the Western Cape). According to the National Veld and Forest Fire Act No. 101 of 1998 DAFF can provide this financial support for FPAs.

- The Western Cape Umbrella Fire Protection Association, together with the B Municipalities of the Western Cape, should investigate the viability of a wildfire levy as well as a system of fines which can be issued against non-compliant landowners. The finance generated from this would need to be ring-fenced for FPAs. There is international precedent for such an initiative:



In Australia, landowners pay a Fire Services Property Levy (FSPL) which is collected by councils, and the State Government. (Fire Services Property Levy, 2013).

“The FSPL is collected in accordance with the Fire Services Property Levy Act 2012, which legislates that all Victorian property owners are liable for a financial contribution (via the FSPL included on their annual council rates notice charge) to the State’s fire services.”

“Councils list the FSPL as a separate item on the rates notice for rateable properties. You are able to pay the FSPL in the same manner as your rates.”

“All property owners, including businesses and households, now contribute to the levy when they pay their council rates.”

- However, tied into this system must be an incentive-based system for landowners (e.g. an incentive to landowners who invest in fuel-load management):

- » To conduct this work there can be considerable costs to landowners.

- » Property value is likely to increase if there are no alien plants and fuels have been reduced.

- » If property value increases the landowner will pay higher rates and, on top of this, they would have had the expense of clearing their land.

- » An incentive could be offered to freeze rates based on the property value pre-fuel load removal. The landowner will therefore invest money to clear their land, but ‘receive it back’ in their increased property value, without the ‘penalty’ of increased rates and taxes.

- » There are possibly other innovative ways in which this can be done, and this topic must be explored further.

- DAFF and the Western Cape Directorate Disaster Management and Fire & Rescue Services, as custodians of the National Veld and Forest Fire Act No. 101 of 1998, need to look at ways in which the WUI areas can be looked after, in a manner similar to the way an FPA needs to ‘look after’ a landowner. This needs to happen in 2018 – as a matter of priority – as the WUI environments are under significant threat, especially given current climatic conditions.

- The Western Cape Directorate Disaster Management and Fire & Rescue Services needs to urgently prioritise (in 2018) guidance and assistance to Eden District Fire Services on how to create organisational and institutionalised partnerships between the Eden District Municipality and the B Municipalities and the Southern Cape Fire Protection Association. This will help set the environment for improved working relationships and better cooperation. A further recommendation would be to look to other District Fire Services in the Western Cape that have managed to develop good institutional relationships.

- The relationship status between role-players should form part of an annual performance review in order to identify possible problem areas and revise documented relationships agreements. It should also serve as a reminder that relationships, no matter what kind, need to be constantly developed.

- Eden District Fire Services, together with the B Municipalities and the Southern Cape FPA, need to hold a strategic meeting to discuss systems that can be used to help homeowners and landowners adopt good wildfire risk-reduction behaviours that:

1. motivate them
2. apply the right amount of pressure, and
3. create an environment for success.

- These are some basic principles which could be explored further:

The issue of governance and lack of legislative enforcement must be highlighted

— Tiaan Pool, Nelson Mandela University

• Motivate homeowners and landowners:

- » Provide access to programmes and information that highlight risks and responsibility.
- » Provide access to wildfire education and training that helps with understanding roles and responsibility.
- » Recognition for good work done by landowners could be provided by means of a simple letter of recognition.

• Create an environment for it to happen: (Make it easier to comply)

- » Create easy-to-follow incentive systems which offer real value.
- » Introduce rates and taxes which generate further financial resources and develop capacity, which can then be used to help landowners and homeowners.
- » Share specialist advice and lessons learned on a database open to all.

• Social pressure (Create the pressure to act)

- » Introduce a wildfire risk rating for properties and homes. Display all compliant homes on an online map. This will allow neighbours to find out who is compliant and who is not – creating social pressure to comply.
- » Create a system to allow for compliance certificates for homes and landowners.
- » Municipalities should set the example to the rest of the community for wildfire risk-management practices by conducting local fire-prevention and preparedness programmes on their land.





Conclusion

The process

This analysis sought input from a representative sample of people within the Eden District who were either affected by or involved with the Knysna Fires. They represent a sample of the same communities and organisations that are going to be the key users of the future systems that will improve wildfire resilience. It was therefore imperative to give them a voice and to consider their experiences.

There are different philosophies and approaches to the wildfire problem amongst the role-players in the Eden District. The focus going forward must not be on the differences but rather on a shared common objective, which can bring the role-players together. This report cannot ensure synergy but it aims to initiate the journey toward shared wildfire responsibility. By enhancing collaboration, planning, preparation and the response for wildfire incidents, the Eden District can become truly wildfire resilient.



No single agency can successfully prepare and defend against the challenge of wildfires or be effective in safeguarding people, homes, businesses, infrastructure and the natural environment. The only successful strategy incorporates shared responsibility and synergy
— Vulcan Wildfire Management

Taking the first step to enhanced resilience

For this analysis to have an impact, the respective industry leaders must take charge and work towards developing/improving people and systems. There are recommendations provided in the report, which concern the role-players in the Eden District and the Western Cape. There are also ideas and concepts which may appeal to a broader audience.

For there to be progress, there needs to be a call to action. The first step is usually the hardest and the most important. After reading this report, what is your next step?

The path ahead - is a process

Enhanced Understanding	In order to progress it's important to understand the challenges. Engage with others. Make an effort to understand from their perspective and be accepting of differences. Seek insight in order to enhance future action.
Beginning of a Dialogue	Create an environment where sharing ideas and working on challenges together can happen. The first stage in enhancing relationships with external role-payers is a healthy dialogue. Ensure there are sufficient, regular occasions for this to happen.
Internal Systems Analysis	Conduct an unbiased audit of your own strengths and weaknesses.
Empowering People	Recognise that people drive processes. Developing and empowering people in your environment will enhance the ability to tackle your own challenges.
External Systems Analysis and Building Relationships	Conduct an unbiased audit of the strengths and weaknesses in your relationships with external role-players. If you can achieve more together, continue to develop those relationships. Initiate new relationships with those role-players you have neglected.
Institutionalising Relationships	Ensure you update and set up new institutionalised relationships with partners and role-players. Prioritise this process. Personal and informal relationships take longer to develop.
Resilient about Challenges	Resistance and barriers to change are to be expected and can often derail and demotivate progressive ideas or projects. It's important to be able to plan for future challenges and build resilience in this regard. Be innovative and stay positive.
Recognising Success	It's very important to celebrate and recognise success along the path to your end goal. Keep up levels of motivation by rewarding and celebrating good behaviour and the little wins.



Never forget

Above all other loss and destruction experienced during the Knysna Fires, the loss of life was the most significant. If positive actions and strategies are adopted, which can prevent future fatalities from occurring, this would then be a step towards honouring the fallen. This report is in memory of:

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

Limitations of the analysis

Project Timeline:

In an ideal situation, an analysis of this nature should be initiated as soon as possible to time of the incident (during the incident would be preferable). Any delays affect the field analyses as well as the reliability of the information gathered from the people involved. Due to factors beyond the control of Vulcan Wildfire Management, the go ahead to initiate this analysis was only received at the end of September 2017. As a result of the delays, the analysis took place during the Western Cape's fire season, which made it challenging to engage with the various Fire Services and industry experts. Furthermore, this analysis was constrained by a short timeline and tight deadline, limiting the depth of the analysis.

Budget:

In addition to the project timeline limitations, budget constraints did not allow for in-depth technical/scientific analyses. This would have been extremely useful in understanding and making recommendations on key issues such as fire dynamics and risk reduction measures in the Wildland Urban Interface.

Other Disasters:

There is currently much focus on the drought in the Western Cape and the release of this report may be overshadowed by the ongoing water crisis. The wildfire problem in the Western Cape is a major concern and action is required from all role-players. Lives and communities are severely threatened.

Acknowledge all who answered the call

This analysis largely focused on areas where improvements could be made after the Knysna Fires. This unintentionally and unfairly puts a microscope on key role-players involved with the Knysna Fires. It is important to state that this incident was unprecedented in the Western Cape and possibly in South African in terms of complexity and difficulty. The dedication, hard work and coming together at a time of need was remarkable and everyone involved with the incident should be extremely proud of the assistance they provided.

The legacy of the Knysna Fires must be how the industry responded, how everyone came together during the incident and how they are continuing to work in synergy towards shared responsibility and the development of wildfire resilient communities.

**“When you make a mistake, there are only three things you should ever do about it.
Admit it, learn from it, and don’t repeat it.”**

— Paul “Bear” Bryant, legendary American Football coach, n.d.



Above left and right: Images captured during a helicopter reconnaissance flight during the Knysna Fires incident. The image on the left is of the Eastford Country Estate area of Knysna and shows the devastation caused as the fires spread through this WUI. The image on the right is from the same flight, but from an area outside of Plettenberg Bay that fortunately hadn't been impacted by the fires. This highlights the lack of awareness of wildfire risk that exists, while the image on the left shows the very real consequences of ignoring or not reducing that risk.





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 Wallace Vosloo - Elandskraal Resident

The members of the Belvidere, Brenton-on-Sea and Brenton-on-Lake communities.
 The members of the Bitou Fire Management Units

Additional photographic footage supplied by:
 Justin Sullivan.
 David Morris



Adriaan Swanepoel — Senior Firefighter,
 Bitou Municipality Fire and Rescue Services



Chris Gould — Chair of the Knysna Heads Residents
 Association



Residents of Belvidere, Brenton-on-Lake and
 Brenton-on-Sea



Bitou FMUs members



Christian Smit, Jeff Taylor and Gideon Van Lill —
 MTO





Clinton Manuel — Chief Fire Officer, Knysna Municipality



Etienne Du Toit — Deputy Director, Fire and Rescue Services, Western Cape Government



Richard Meyer — Head of Disaster Management, Knysna Municipality



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Hedley Venter — Chief Fire Officer, Bitou Fire and Rescue Services



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Gerard Otto — Head of Disaster Management, Eden District



Mawande — Community Leader, Concordia

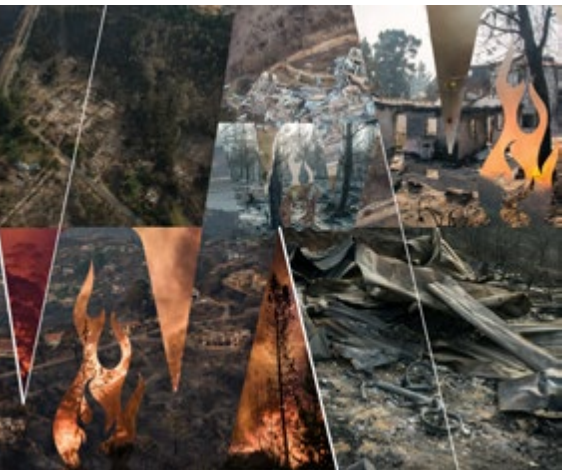


Wallace Vosloo — Elandskraal Resident



The goal is for relationships, systems and strategies
to be adopted and improved in order to positively
change the outcome of future wildfire incidents
- Vulcan Wildfire Management





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