

# Case Study of an Effective Fire Protection Association in South Africa

Duncan Ballantyne

[duncan.ballantyne@mweb.co.za](mailto:duncan.ballantyne@mweb.co.za)

Andre Scheepers

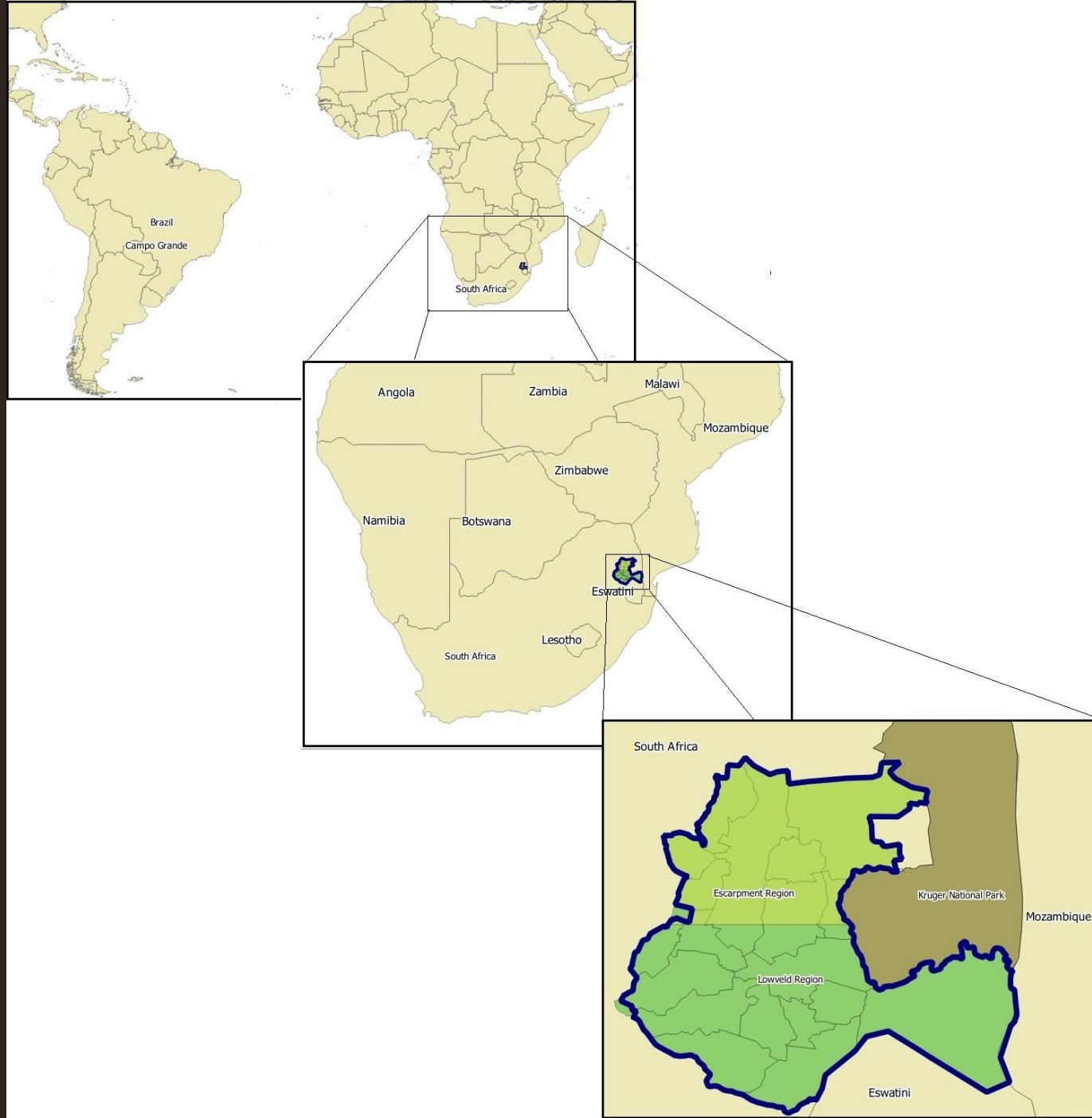
[manager@lefpa.co.za](mailto:manager@lefpa.co.za)



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# A spatio-temporal analysis of fires in South Africa

The prevalence and history of fires in Africa has led to the continent being named 'the fire continent'. Fires are common on the continent and lead to a high number of annual fire disasters which result in many human fatalities and considerable financial loss. Increased population growth and concentrated settlement planning increase the probability of fire disasters and the associated loss of human life and financial loss when disasters occur. In order to better understand the spatial and temporal variations and characteristics of fires in South Africa, an 11-year data set of MODIS-derived Active Fire Hotspots was analysed using an open source geographic information system. The study included the mapping of national fire frequency over the 11-year period. Results indicate that the highest fire frequency occurred in the northeastern regions of South Africa, in particular the mountainous regions of KwaZulu-Natal and Mpumalanga, and in the Western Cape. Increasing trends in provincial fire frequency were observed in eight of the nine provinces of South Africa, with Mpumalanga the only province for which a decrease in annual fire frequency was observed. Temporally, fires were observed in all months for all provinces, although distinct fire seasons were observed and were largely driven by rainfall seasons. The southwestern regions of South Africa (winter-rainfall regions) experienced higher fire frequencies during the summer months and the rest of the country (summer-rainfall regions) during the winter months. Certain regions – those which experienced bimodal rainfall seasons – did not display distinct fire seasons because of the complex wet and dry seasons. Investigation into the likely effects of climate change on South African fire frequency revealed that increased air temperatures and events such as La Niña have a marked effect on fire activity.

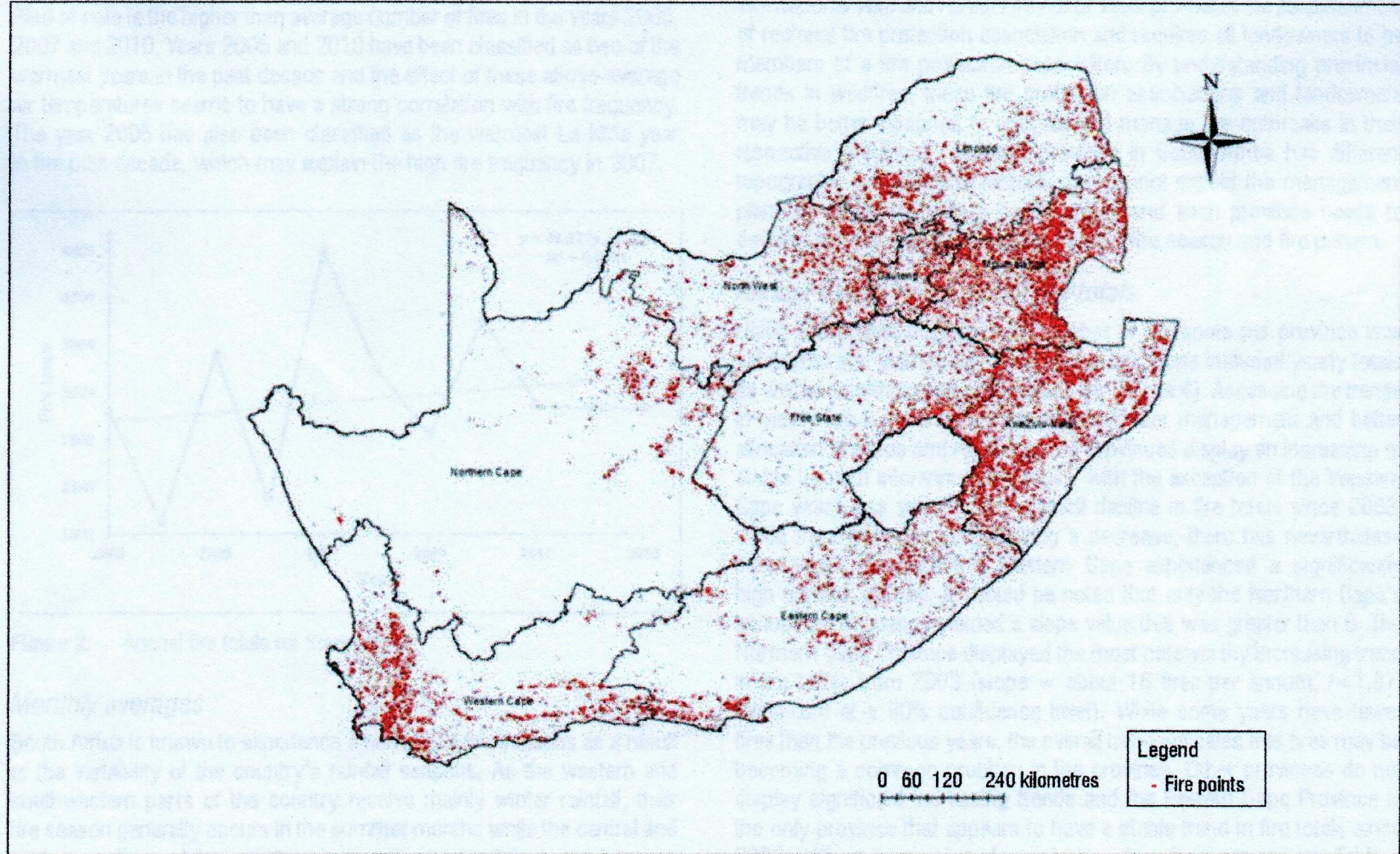
## **Significance:**

- Fires have played a significant role in the morphology of the African continent.
- Fires provide a number of environmental services.
- Fires were observed in all months in all provinces in South Africa, although distinct fire seasons were observed and were largely driven by rainfall seasons.
- Global climate change will result in an increase in the frequency of fires.

Authors:

Michael Savage &  
Sheldon Strydom

University of  
KwaZulu-Natal



**Figure 1:** Fire distribution in South Africa between 2003 and 2013.

As previously stated, all provinces (with the exception of Mpumalanga) displayed a stable or increasing trend in fire activity between 2003 and 2013. As seen in Figure 1, Mpumalanga has displayed a high incidence of fire activity over the past 11 years, despite the decreasing trend and has been identified as the province most prone to fire activity. The decline in Mpumalanga's fire activity since 2008 may be, in part, a result of increased awareness of the dangers of fires and the better management and mitigation of fires by local fire protection associations under the Mpumalanga Umbrella Fire Protection Agency.

## FIRE HISTORY EFFECTIVENESS

The last catastrophic fires were in 2007 and 2008 and the past 11 years have been characterised by a significant reduction in both number and size of runaway fires.

## AREA OF JURISDICTION

LEFPA has:

- ❑ 1.9 million hectares under its jurisdiction
- ❑ more than 600 paid-up members
- ❑ owning more than 950,000 hectares
- ❑ four municipalities
- ❑ 1.7 million people
- ❑ largest concentration of high-risk forestry plantations in the country
- ❑ borders with two countries; Swaziland and Mozambique

## LEGAL FRAMEWORK

- ❑ The South African National Veld and Forest Fire Act, 1998, provides for establishing voluntary fire protection associations



- ❑ The Lowveld and Escarpment Fire Protection Association (LEFPA), founded in 2000, is 19 years old

# TOPOGRAPHY AND VEGETATION

Its terrain and vegetation are diverse:

- ❑ ranging from high-lying grassland areas down through a fragmented escarpment to low-lying bushveld savannah areas
- ❑ As a result, it has four separate weather forecasting regions within it

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## MEMBERSHIP

- ❑ Four categories:
  - ❑ forestry plantations
  - ❑ agricultural areas
  - ❑ conservation areas
  - ❑ residential areas
- ❑ Apart from state-owned land, which is required by law to belong and contribute financially, all other landowner membership is voluntary

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May 2014



1:150,000

#### Legend

- Serviceable Airfield
- Unserviceable Airfield
- HSV Forwarding Point
- Ground Force Teams
- Plantations
- Towns
- CVS Camera Sites
- Isom National Line
- Frequency Line NST Ops Area
- Frequency Line Glaskoo Ops Area
- Frequency Line Warburton Ops Area
- Frequency Line Swanland Ops Area
- LEFPA Boundary
- Farm Portions
- Aerial LEFPA Member
- Basic LEFPA Member
- Hex
- MTFA
- Sugar cane groves
- Tribal Authorities
- DAM
- Deed Rock
- Self Id
- Soil
- Komatland Foresty
- Ducatus
- Ville Sahia has
- TinR 24
- Kop
- Yolk Imensi

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## ORGANISATION

LEFPA has:

- ❑ seven salaried staff
- ❑ supported and guided by an unpaid board of directors, elected by members

## LEVIES AND OPERATING COSTS

Levies are raised to cover:

- ❑ operating costs
- ❑ standing fees of aircraft.

Annual cost increases have been successfully contained every year to within the inflation index.

WHY EFFECTIVE?

Eight reasons



## WHY EFFECTIVE?

Reason 1

- ❑ Good and stable management

## WHY EFFECTIVE?

### Reason 2

- ❑ Fire awareness programmes

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## WHY EFFECTIVE?

### Reason 3

- ❑ Reliable and accurate weather forecasting provided to members
- ❑ based on 24 automatic weather stations

## 10H00 ACTUALS AND FORECAST FOR WEDNESDAY 13TH OF SEPTEMBER 2017

LEFPA Escarpment										
No.	Station Location	Km/h	Dir	Temp	Hum	Baro mb	10am Rmm	PF/C 10H	PF/C 14H	FDI DR
1.	Endahwin EVS 08 Lefpa	27	NNW	24.9°C	15%	1012.3	0.00	-	-	72
2.	Goedgeloof EVS 42	-	-	-	-	-	-	-	-	-
3.	Graskop WOF Lefpa	29	N	27.2°C	10%	1022.2	0.00	59	62	76
4.	Highlands LEFPA CWV97	5	NNE	28.9°C	17%	1021.4	0.00	62	71	60
5.	Kolbos EVS 41	-	-	-	-	-	-	-	-	-
6.	Nelshoogte WOF Lefpa cw107	26	N	24.9°C	21%	1023.4	0.00	60	64	69
7.	Renosterhoek York Timbers CW354	11	N	28.4°C	13%	1024.8	0.00	59	62	66
8.	Sabie York LEFPA CW101	14	N	30.8°C	16%	1025.7	0.00	60	63	67
9.	Satico LEFPA CW102	21	WNW	26.0°C	26%	1022.1	0.00	63	72	64
Region Averages:		19	N	27.3°C	17%	1021.7	0.00			68
5 Day 14h00 Forecast										
		Today		Thur	Frid	Sat	Sun	M		
F.D.I.:		68		54	44	58	52			
Wind Direction:		WNW		E	SSW	SE	E			
Windspeed (km/h):		13		12	11	12	13			
Temperature:		30°C		26°C	25°C	31°C	27°C	2		
Humidity:		15%		35%	37%	16%	36%	2		

\* Station has been excluded in the regions FDI average.

LEFPA Highveld										
No.	Station Location	Km/h	Dir	Temp	Hum	Baro mb	10am Rmm	PF/C 10H	PF/C 14H	FDI DR
1.	637 EVS 02	-	-	-	-	-	-	-	-	-
2.	Bambi EVS 03	16	N	23.1°C	19%	1021.2	0.00	-	-	58 *
3.	Belvue EVS	13	NNE	23.5°C	19%	1021.7	0.00	-	-	59 *
4.	Dullstroom PAFPA CW98	13	SW	22.1°C	18%	1034.1	0.00	61	65	58
5.	Elandshoogte WOF Lefpa	24	WNW	21.9°C	24%	1025.4	0.00	59	64	60
6.	Lydenburg LEFPA CW96	-	-	-	-	-	-	61	65	-
7.	Machadodorp PAFPA CW207	18	N	24.1°C	18%	1026.3	0.00	58	63	65
8.	Sjonajona EVS 06	2	SSW	24.0°C	19%	1020.4	0.00	-	-	54 *
9.	Torburnlea EVS 05	10	NW	22.4°C	18%	1022.8	0.00	-	-	58 *
10.	Uitkyk Sawmill EVS 40	-	-	-	-	-	-	-	-	-
Region Averages:		18	WNW	22.7°C	20%	1028.6	0.00			61
5 Day 14h00 Forecast										
		Today		Thur	Frid	Sat	Sun	Mon		
F.D.I.:		66		58	55	63	56	1		
Wind Direction:		WNW		NE	SSW	W	E	N		

## WHY EFFECTIVE?

### Reason 4

- ❑ The issuing of more than 9,000 burning permits per year for controlled burns

## WHY EFFECTIVE?

### Reason 5

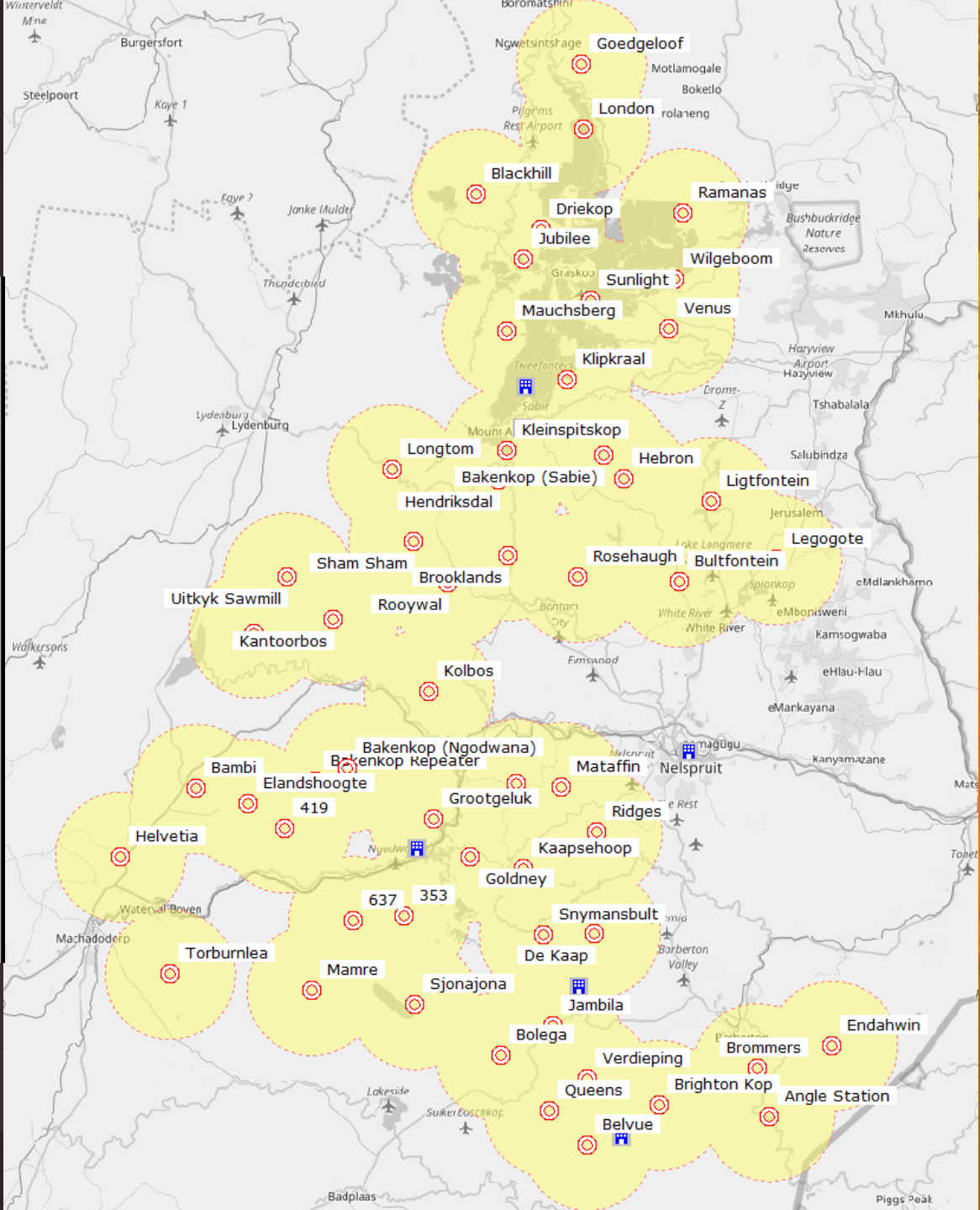
- ❑ 58 high definition fire detection cameras
- ❑ feeding into two detection centres
- ❑ detecting more than 24,000 fires per year

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## WHY EFFECTIVE?

Reason 6

- ❑ One dispatch centre

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## WHY EFFECTIVE?

### Reason 7

- ❑ The supply of thirteen aerial firefighting aircraft
- ❑ operating out of two air bases
- ❑ 14 private runways

## WHY EFFECTIVE?

- ❑ LEFPA has just contracted the first Blackhawk firefighting helicopter in Africa

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## WHY EFFECTIVE?

Reason 8

- ❑ Three ground crews with vehicles

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Obrigado

Thank you

