The danger of runaway fires in South Africa and the complexities around forecasting the conditions which favour their development

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SAWS weather Alerts

- Severe Weather Watches/Warnings
- 1. Severe Thunderstorms
- 2. Heavy rainfall
- 3. Disruptive Snowfalls
- 4. High seas
- 5. Localized Urban Flooding
- 6. Gale Force Wind
- 7. Heavy rainfall leading to flash flooding



Special Weather Advisories: Category 1 & Category 2

- 1. Category 1:
- Widespread Adverse Cyclonic conditions
- 2. Category 2:
- Extremely Hot Conditions
- Heatwaves
- Reduced visibility
- Snowfalls
- High Discomfort
- Frost
- Strong wind over the interior



Specialised Collaborative Warnings

- 1. Fire Danger Rating
- 2. Tsunami
- 3. Storm Surge
- 4. Estuary flooding



Fire Danger Rating

- When the Fire Danger Index reaches 75 or greater
- Based on Surface temperature, dew Point temperature (humidity), wind & precipitation Lowveld Fire Danger Index Map (FDI)











😫 Follow

S/O to the brave men & women battling with the fire on the mountain. U guys are the real superheroes #CapeTownFire

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7:25 AM - 4 Mar 2015



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Outeniqua VWS Fire @VWSFire - 53m #CapeTownFire

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Muizenberg Fire in South Africa. Photo by Clint Sutton



Forecasting Process for Fires (Training perspective)

- Understand your country (Topography, geographic location, climatology, agricultural land use...)
- Have a very good grasp of the seasonal variation and effects of topography on the local climate
- Be knowledgeable about weather systems and weather patterns over your country/area of interest
- Be knowledgeable on satellite interpretation South African especially RGB interpretation RTC-PRE-126.1.1 Date of last revision: 11 April 2016

How to forecast Fire Danger

- Ascertain the expected maximum temperature
- Calculate the expected humidity during the driest part of the day
- Determine the wind speed during the driest part of the day
- Determine when last it rained and how much precipitation was recorded
- Calculate the FDI (Fire Danger Index)
- Use the following table to determine the risk



	BLUE	GREEN	YELLOW	ORANGE	RED	
FDR RATING	Insignificant	Low	Moderate	High	Extremely high	
FIRE BEHAVIOUR	Fires are not likely to start. If they start, they are likely to go out without aid from suppression forces. There is little flaming combustion. Flame lengths < 0.5 m and spread rates < 2 m/minute.	Fires will start but will spread slowly. Flame lengths typically < 1 m, and spread rates < 5 m/minute.	Fires fairly readily ignited and spread unaided, burning in the surface layers below trees. Flame lengths between 1 and 2 m, and spread rates between 5 and 25 m/minute, depending on fuel type.	Fires readily ignited and spread unaided, with local crowning and short-range spotting. Flame lengths between 2 and 5 m, and spread rates between 25 and 35 m/minute. Spotting occurs, increasing the rate of spread.	Any ignition source likely to initiate a fire. Fires will spread in the crowns of trees as well as in surface layers, and long-range spotting will occur. Spread rates can exceed 60 m/minute and flame lengths will be in the order of 5 – 15 m or more. Wide- spread spotting, greatly increases the rate of spread.	
FIRE CONTROL	No control necessary.	Fires can be approached on foot. Suppression is readily achieved by direct manual attack methods.	Fires not readily approachable on foot for more than very short periods. Best forms of control should combine water tankers and backfiring from prepared lines.	Fires cannot be approached at all. Backburning, combined with aerial water-bombing are the only effective ways to combat fires. Equipment such as water tankers should concentrate efforts on the protection of houses.	Any form of fire control not likely to be effective until weather changes. Backburning dangerous and best avoided.	
	BLUE	GREEN	YELLOW	ORANGE	RED	
RECOMMENDED ACTIONS	None	None, other than prudent care to ensure that any open-air fires do not escape. Prescribed burning permissible.	Open-air fires should only be permitted in authorised fireplaces. Prescribed burning should be conducted with care, and any prescribed fires should be extinguished should the forecast fire danger rating turn to high.	All efforts should be made to bring any fires under control. Areas should be put on standby for evacuation should the fire danger conditions be forecast to become worse.	Dangerous areas to be evacuated. Equipment such as water tankers should concentrate efforts on the protection of houses and other structures.	South African Weather Service
PRESCRIBED ACTIONS AND RESTRICTIONS	None	None	Any unplanned fires should be extinguished.	No outdoor fires permitted.	No outdoor fires permitted.	ISO 9001 Certified Organisation

http://www.daff.gov.za/doaDev/sideMenu/ForestryWeb/dwaf/cmsdocs/Elsa/Docs/Fire/Dev%20of%20Nat%20Fire%20Danger%20Rating%20System%202001.pdf

Most likely weather conditions to result in Fires

- During Winter/Spring (May October)
- 1. Passage of Cold front or Cut Off Low
- Strong pressure gradient between surface trough and High pressure east of South Africa





Most likely weather conditions to result in Fires

- During Summer/Autumn
- 1. Ridging high pressure system along the southern parts of South Africa
- Strong surface trough and high pressure system dominating over southern parts of South Africa





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Forecast evaluation and general vigilance regarding fires

- Eye witness reports of fires
- 1. Social Media
- 2. Confirming reports with local weather office
- Satellite imagery
- 1. Day Mirophysical RGB (2:4r:9)
- 2. Channel 4 (IR3.9)
- 3. HIRES VIS (cloud free area)

















Conclusion

- Not all fires have the risk of becoming uncontrolled
- Using satellite imagery will only show fires that are very intense and may already be out of control
- Best practice is to be bale warn the public and disaster management well in advance of conditions conducive to the risk of runaway fires