NDMC

SEASONAL HAZARD PROFILE

Spring 2025

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Seasonal Profile noted and approved/APPROVED……….

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1. SUMMARY STATEMENT

The NDMC seasonal hazard profile serves to provide disaster management stakeholders at all levels of government with guidance and information through a medium-term (three-month) forecast on various hazards across South Africa.

Each seasonal hazard profile will aim to highlight, at a national level, a spatial pattern related to hazards for the given period. Indicative hazard profiles have been conceived for the most prevalent hazards in South Africa and include fires, floods, drought, windstorms, and snow. Recent partnerships with strategic entities with intrinsic hazard and risk knowledge have resulted in NDMC producing a more scientific and relevant national product.

Many hazards in South Africa are weather related and it is important to note that viewing the hazard profiles should be done in conjunction with the included 3-month weather forecasts (Sourced and consulted on with the South African Weather Services (SAWS)) as conditions may directly impact the prevalence of the hazard (the seasonal hazard profile is static and does not include dynamic weather variability).

The envisioned audience for the seasonal profile includes all national, provincial, district and municipal disaster management stakeholders involved with medium term planning and disaster operations.

This product will be released according to the South African seasonal calendar as follows:

a) End November for Summer (December, January and February)
b) End February for Autumn (March, April, May)
c) End May for Winter (June, July, August)
d) End August for Spring (September, October, November)

Note: The product presents a national perspective and is not intended for deriving precise parameter values for specific local areas. Spatial details on maps are frequently generated using simulation models, which tend to smooth out local effects and dampen outlier values. *It is therefore advisable to interpret values at a given point in relative terms rather than as absolutes.*

2. SEASONAL HAZARD PROFILE – SPRING 2025

The specific goals of the seasonal profiles are to:

(a) Provide insights into the spatial and temporal nature of hazards throughout South Africa.
(b) Create awareness around potential and current conditions (situational awareness) to augment short –term early warning systems.
(c) Guide medium term operational and tactical planning to mitigate identified risk.
(d) Identify target areas for disaster risk reduction initiatives.

2.1 Hazard Profiles

2.1.1 Fire

Fires are one of South Africa’s most devastating hazards that cause loss of lives and incur billions of rands in damage to agriculture and infrastructure. Fires in South Africa have a strong seasonal nature with the summer fire season in the western parts of the country moving towards the eastern provinces in winter and spring.

The indicative hazard profile in South Africa considers the historical spatial distribution of fire observations, burn scars, fire danger ratings, the veldfire ecology, and recorded fire related deaths. These outline the characteristics of the hazard as it relates to the hazard components of likelihood, frequency, predictability, and magnitude.

Following winter, the spring fire hazard profile (Figure 1) indicates heightened fire risk across the eastern regions of South Africa. The areas most affected include western **KwaZulu-Natal** (Amajuba, Harry Gwala, uMgungundlovu, uThukela, and Zululand), **Mpumalanga** (Ehlanzeni, Gert Sibande, and Nkangala), the northern **Eastern Cape** (Alfred Nzo, Chris Hani, and Joe Gqabi), the northeastern **Free State** (Thabo Mofutsanyane), as well as large parts of the **North West Province** (Bojanala) and **Limpopo** (Sekhukhune and Waterberg).

This increased fire hazard is driven by several factors: above-normal biomass levels (Figure 7), frost-induced drying of vegetation, an elevated probability of above-normal maximum temperatures (Figure 9), and higher wind hazard ratings (Figure 3).

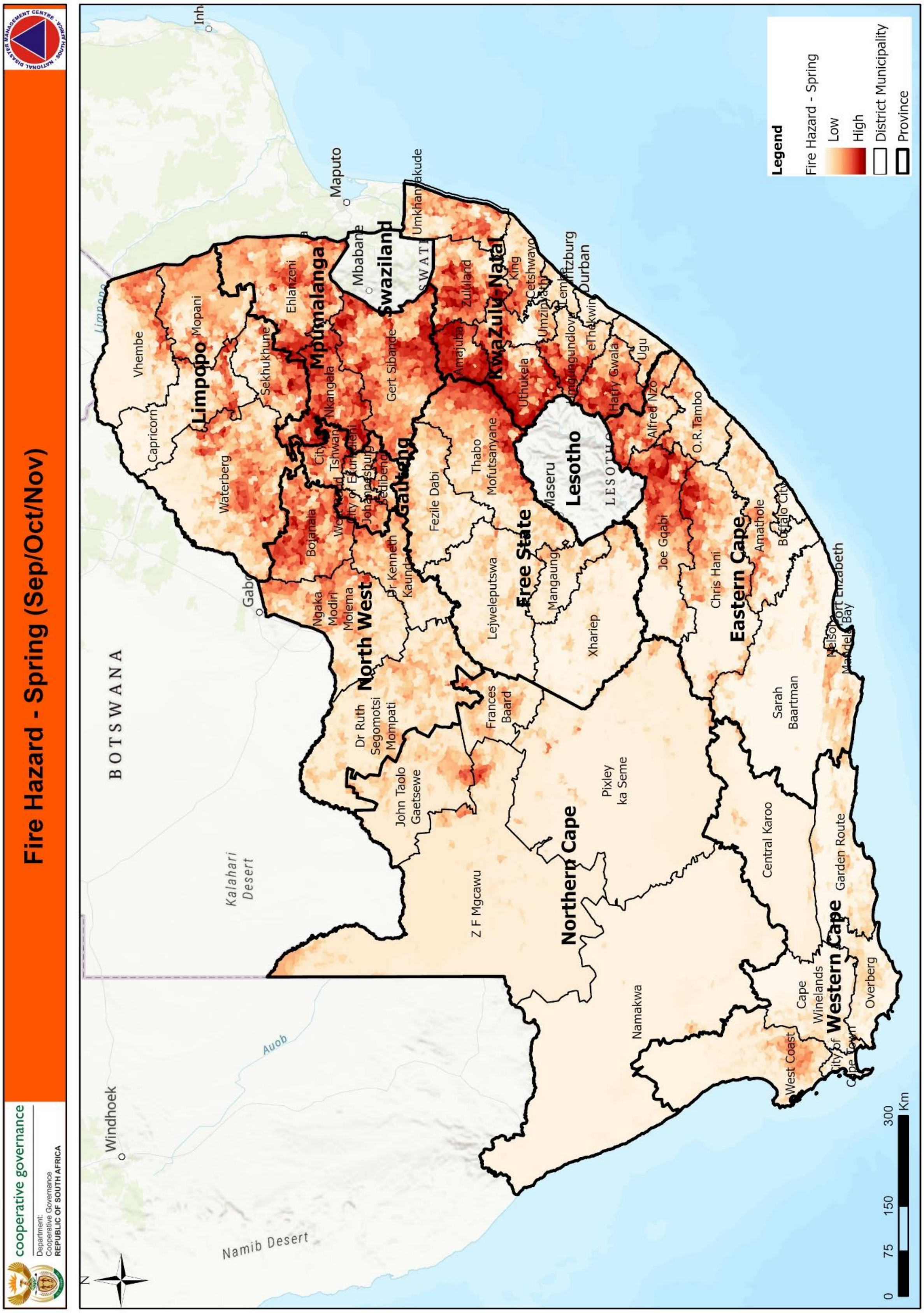


Figure 1: Fire hazard map – spring.

2.1.2 Flood

The historical hazard profile for South Africa, derived from the EMDAT, CAELUM (SAWS database) and situation report submitted to the NDMC, rates flooding events as one of the highest in terms of frequency in South Africa. Flooding in South Africa consists of riverine and flash flooding events. The desktop analysis from the indicative risk profile outlines various hazard parameters related to likelihood, frequency, magnitude and predictability using various studies (Land capability by ARC:2002, South African Atlas of AgroHydrology and Climatology by UKZN: 2001) and data sources (historical events) in a weighted scoring model.

Figure 2 presents the spring flood hazard profile, highlighting areas with high (dark blue) and medium-to-high (blue) flood hazard scores. These are concentrated in northern and coastal **KwaZulu-Natal** (eThekwini, iLembe, King Cetshwayo, uMkhanyakude, and uThukela District Municipality in the west). Elevated scores are also evident in parts of the **Eastern Cape** (Buffalo City Metro, Amathole) and the **Western Cape** (Cape Winelands).

Historically, major flooding events have occurred in the northeastern regions of the country, often coinciding with the onset of summer rainfall. This risk is exacerbated by a rise in convective storm activity typically observed in late spring.

According to the SAWS seasonal forecast (Figure 7), there is an elevated likelihood of above-normal rainfall over the vast areas of South Africa in the coming months. When the hazard is identified as seasonally high, such as in the eastern regions of South Africa, there is an increased likelihood of localized flooding.

Stakeholders are advised to carefully consider these findings and closely monitor short-term forecasts and early warning updates provided by SAWS.

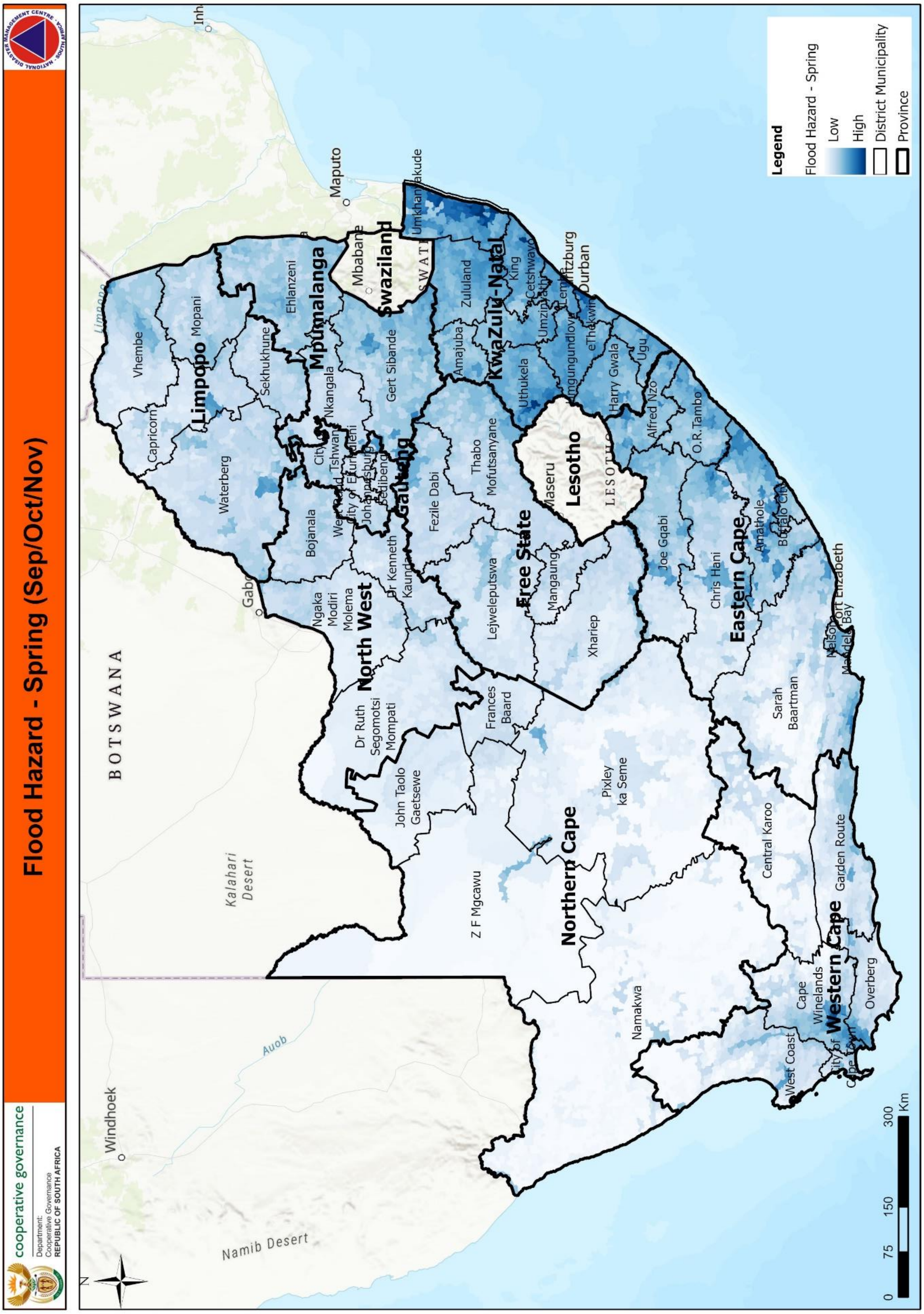


Figure 2: Flood hazard map – spring.

2.1.3.1 Cut-Off Low

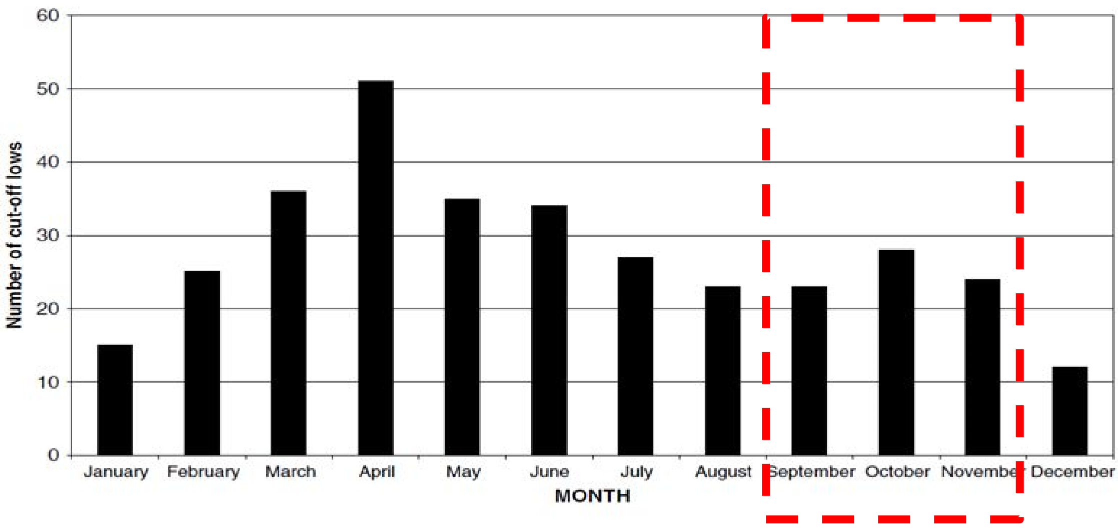
"A Cut-Off Low is a low-pressure system that develops south of South Africa, stemming from the main westerly trough systems of cold air. Cut-Off Low's are unstable, baroclinic systems that slope to the west with height and are associated with strong convergence and upward motion, particularly while they are deepening.

A Cut-Off Low's system usually prevails over an area for more than a day and can last up to 6 days. The Cut-Off Low moves slowly over a confined region leading to heavy rainfall." (https://resources.eumetrain.org/satmanu/CM4SH/S_Africa/COL/index.htm)

Parameter	**Description**
Precipitation	• Heavy rainfall; exceeding 50mm at a given station over a 24-hour period. • Snowfall
Temperature	• Very cold conditions, maximum temperatures of 10° C or below
Wind (incl. gusts)	• Gale force winds exceeding 17m/s
Other relevant information	• Very rough seas, total sea in excess of 4-6m.

Table 1: Cut Off Low Parameters and Descriptions

Precipitation that occurs with upper-air cut-off lows can be intense and last for extended periods, sometimes impacting multiple provinces at the same time. Although such rainfall may occur at any time of the year, it peaks in April (Graph 1). It is however worth noting that mid to late winter systems are typically more intense and produce heavier rainfall.



Graph 1: Number of Cut-Off Low Temporal Distribution

2.1.3 Windstorm

According to historical data from the SAWS, wind-related hazards rank third in frequency among weather-related events. These hazards are defined by wind speed or by the particular source of strong winds, including tornadoes, tropical cyclones, and thunderstorms. The threshold for classifying a wind hazard based on wind speed varies depending on the socio-economic sector involved (SAWS: 2013).

Assessment of windstorm hazards incorporates parameters including likelihood, frequency, magnitude, and predictability. This evaluation applies methodologies consistent with previous hazard assessments for fire, flood, and snow, utilizing weighted scoring and GIS modelling techniques.

Historically, strong wind, associated with convective storm events, tend to increase in the northeastern parts of South Africa during the spring months. Figure 3 shows that high (dark green) and medium-to-high (blue green) windstorm hazard values are widespread across South Africa during this period. Notably elevated values are recorded in the **Western Cape** (City of Cape Town, Cape Winelands, Central Karoo, and Overberg), the **Eastern Cape** (Nelson Mandela Bay Metro, Buffalo City Metro, Sarah Baartman, Amathole, Chris Hani, and O.R. Tambo), and the **Northern Cape** (Pixley Ka Seme).

In addition, all districts in the **Free State** register either high or medium-to-high wind hazard scores. Raised values are also evident in the western parts of **KwaZulu-Natal** (Amajuba, uThukela, uMgungundlovu) and in southern **Mpumalanga** (Gert Sibande).

Higher tornado activity is commonly recorded in the eastern regions of the country during mid to late spring.

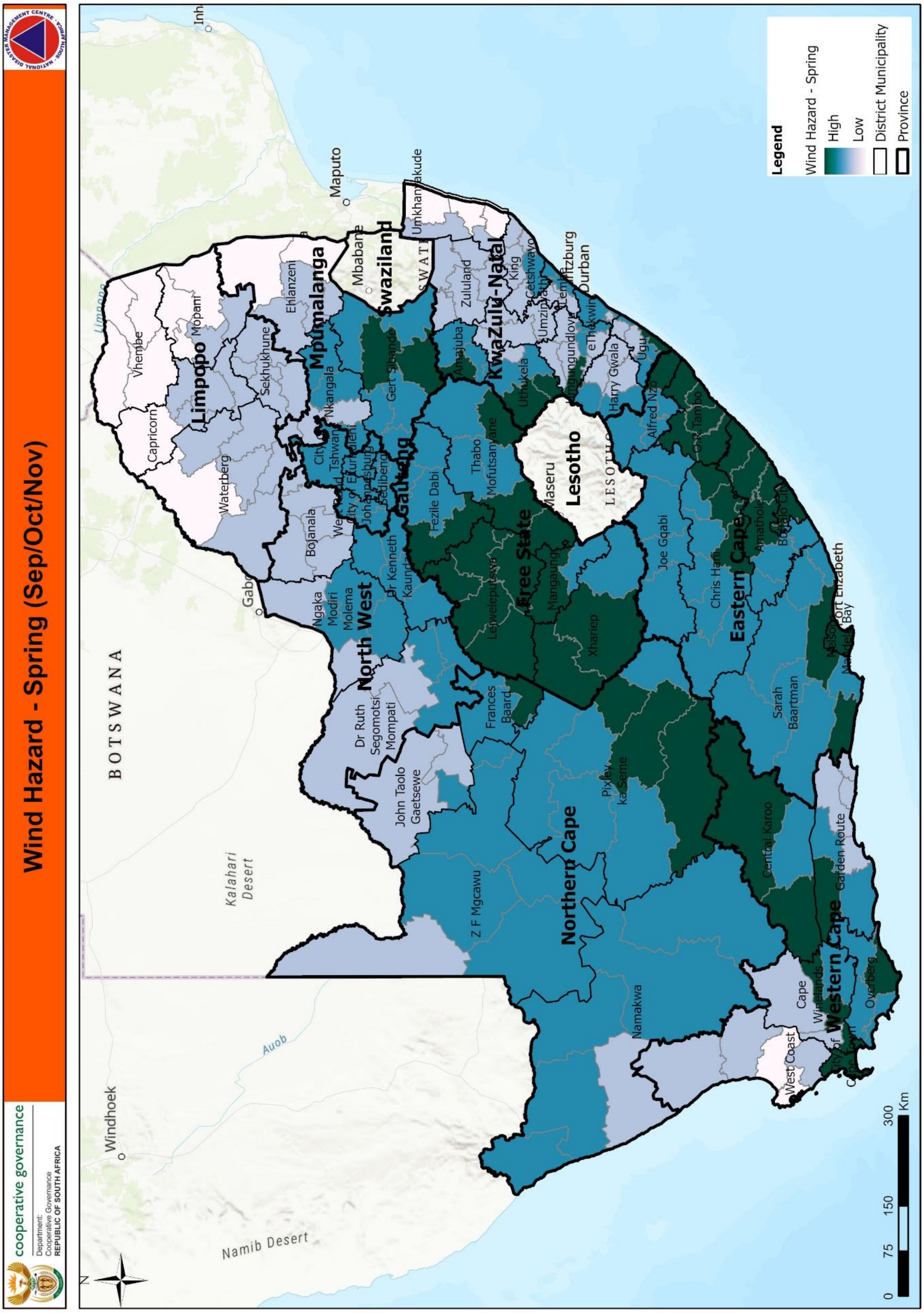


Figure 3: Windstorm hazard map – spring.

2.1.4 Snow

In 2015/16, snow hazard calculations were conducted through a collaboration between the NDMC and the Council for Scientific and Industrial Research (CSIR). The quantified parameters for this hazard included likelihood, frequency, magnitude, and predictability, assessed using a weighted scoring GIS model with a seasonal temporal element. Historical datasets from SAWS and optical remote sensing techniques were used in this process.

Snow hazards decrease as temperatures rise post winter, but historical data shows snow can still occur in early spring, especially in September.

Minor western areas of **KwaZulu-Natal** (Harry Gwala, uMgungundlovu and uThukela) near Lesotho, and parts of the **Western Cape** (City of Cape Town, Cape Winelands and West Coast), show medium snow hazard scores during this period (see Figure 4).

The South African Weather Service predicts a higher likelihood of above-normal minimum temperatures across the country for September to November (Figure 8), which may affect snow hazard manifestation.

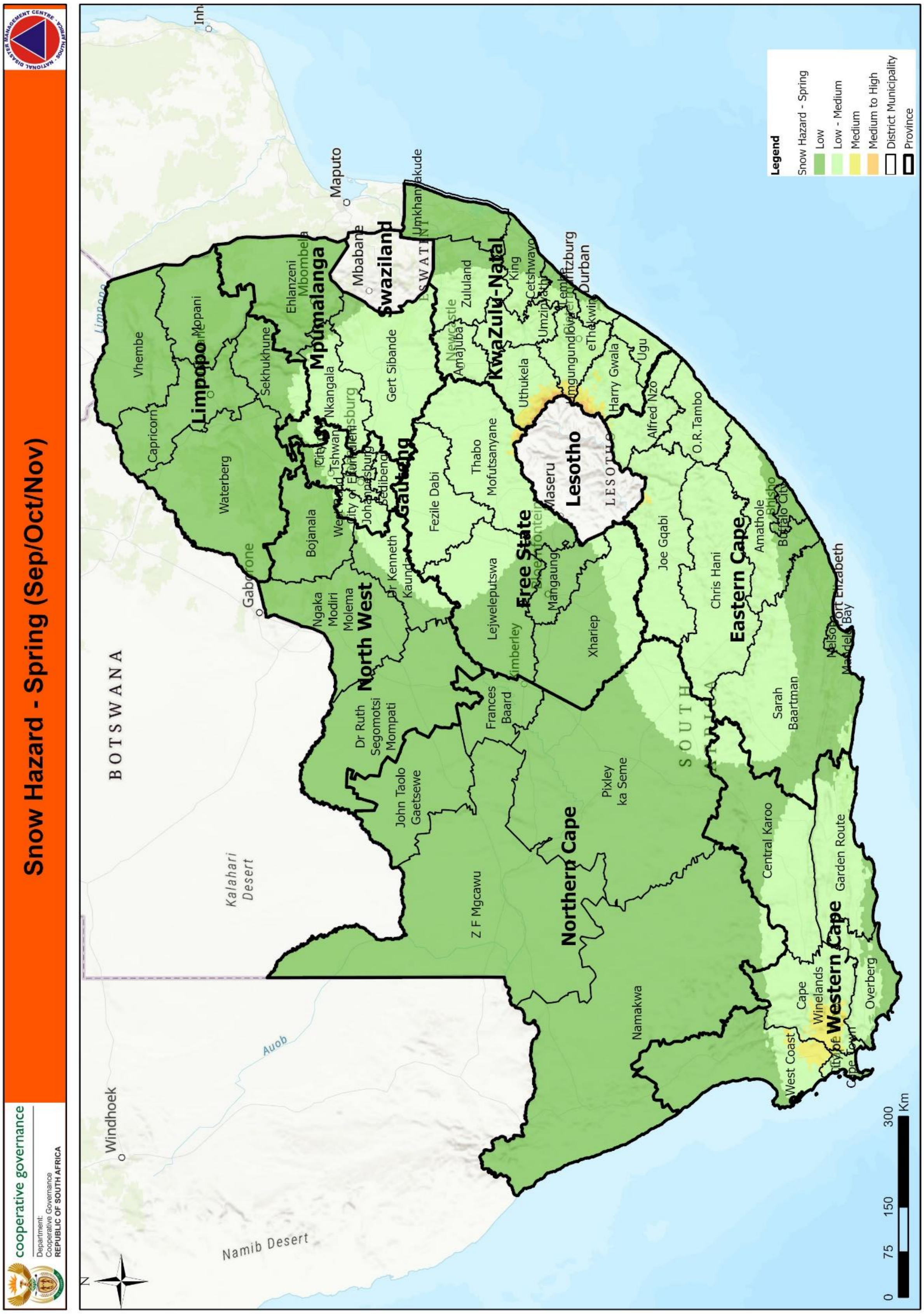


Figure 4: Snow hazard map – spring.

2.1.5 Current Drought Status

A drought is usually identified when a shortage of water (surface/underground) over a long period (more than 24 months) results in a negative impact. Drought can be detected and characterized using the Standard Precipitation Index (SPI – McKee et al., 1993). The SPI was developed to monitor the occurrence of drought from rainfall data. The index quantifies precipitation deficits on different time scales and therefore also drought severity. The ARC-ISCW calculates the SPI at various time scales per quaternary catchment. (Malherbe et al. 2016).

Drought occurrence, especially at longer timescales (Figure 5) remains limited over the country. Over the summer rainfall region, above normal rainfall for 2024/25 summer and above normal rains since early June over the winter rainfall region are attributable for these conditions.

Over short timescales, above normal rains since June have eliminated drought signals over the Western Cape. At medium timescales (12 month) drought is virtually absent presenting isolated pockets limited to southern Lowveld of Mpumalanga.

The precipitation forecast in Figure 7 for the upcoming months suggests a higher likelihood of above-normal rainfall over most parts of the country. This increased precipitation could benefit regions still experiencing drought, especially in the summer rainfall areas.

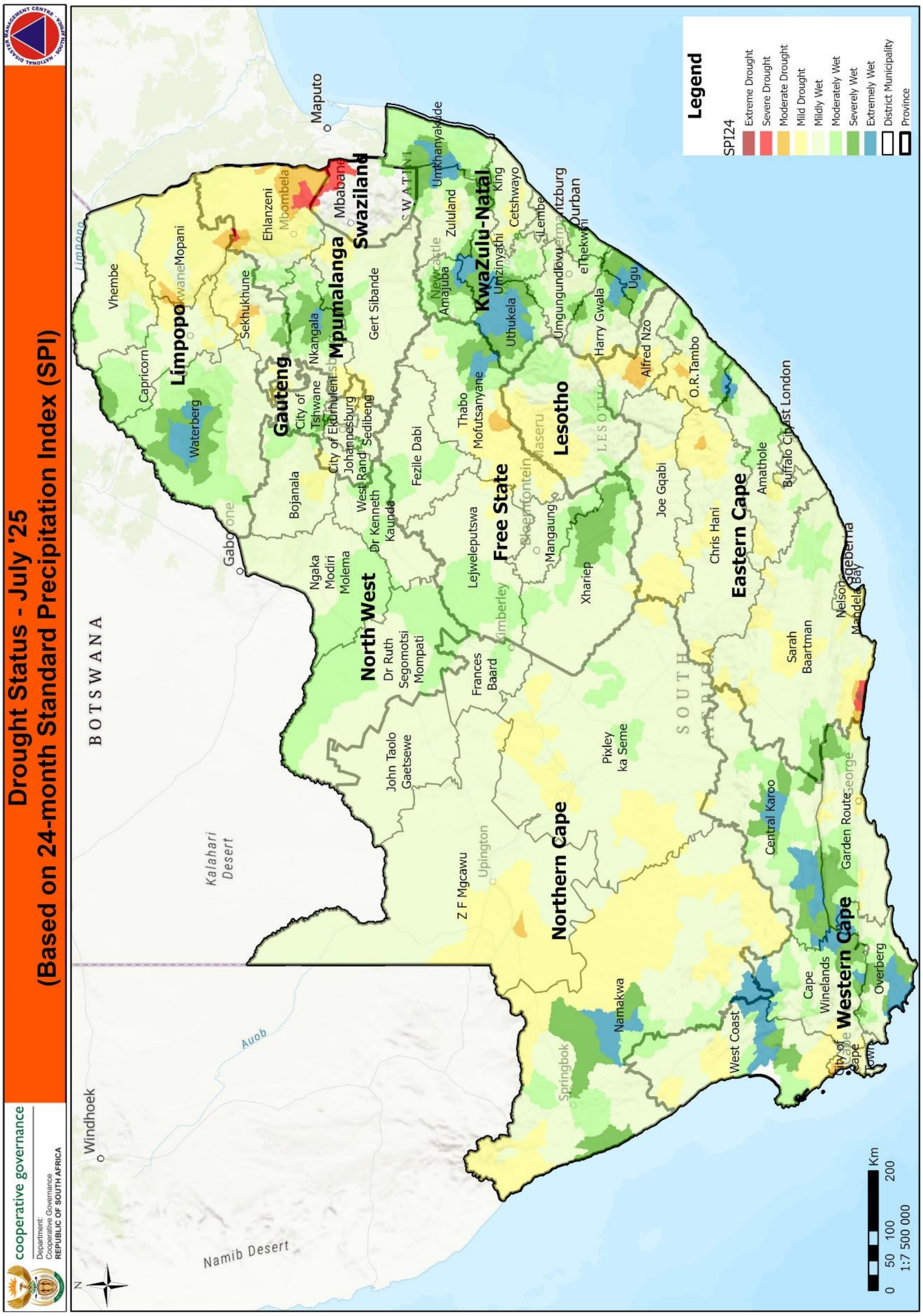


Figure 5: Drought Status Map – July 2025

Compared to the long-term mean, the map (Figure 6) indicates cumulative vegetation activity from 30 March to 4 August 2025.

The Percentage of Average Seasonal Greenness (PASG) demonstrates deviations from the long-term average vegetation activity over a given period. From the legend provided vegetation activity is categorized from presenting well above average (in green) to areas showing potential drought (orange) and drought conditions (red).

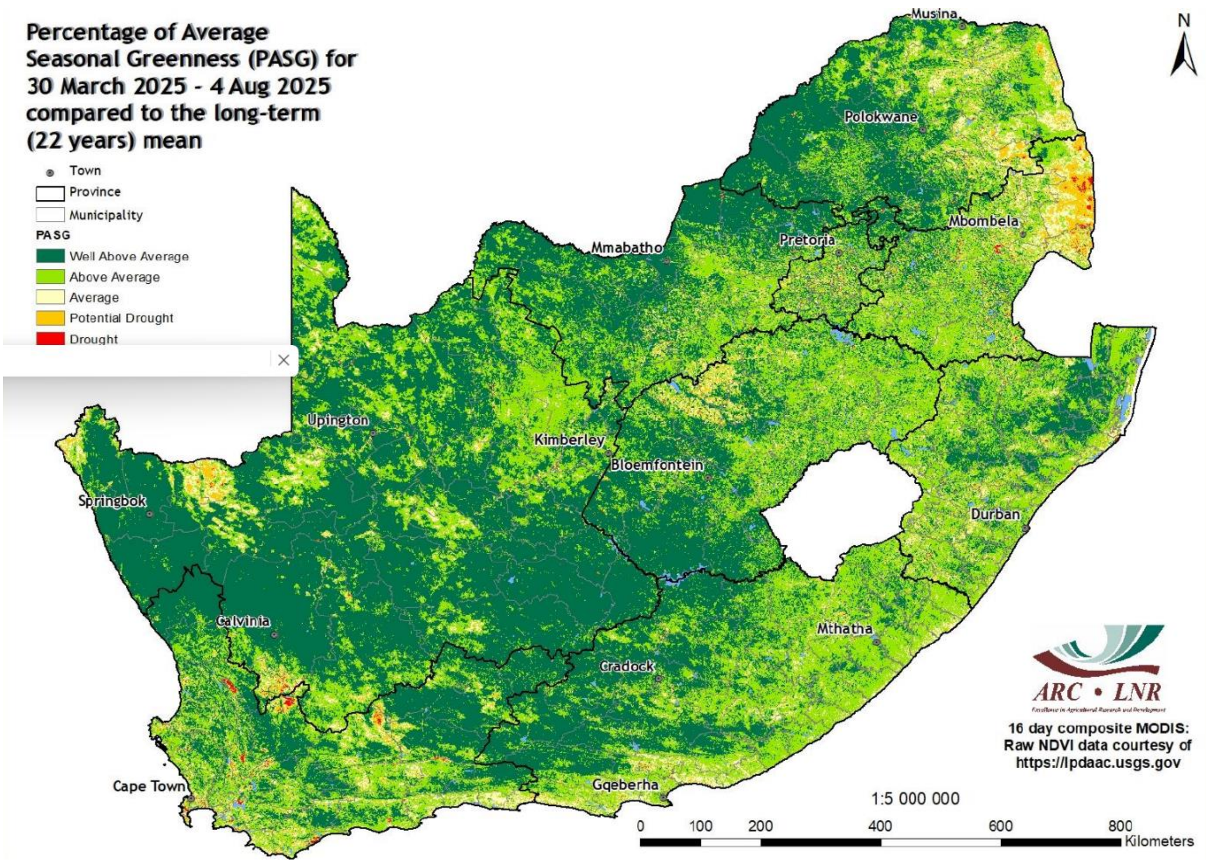


Figure 6: Percentage of Average Greenness (PASG) – 30 Mar– 4 Aug 2025

During this period, almost the entire country experienced above average vegetation activity. This is related to above normal rainfall during the 2024/25 summer over summer rainfall region and above normal rainfall during the recent winter over the winter rainfall region.

The southern Lowveld, over eastern Mpumalanga experiences below average vegetation where moderate to severe drought is also indicated by the short to medium time scale SPI.

2.2 Seasonal Weather Forecasts

The seasonal forecasts are sourced from the South African Weather Services (SAWS) and aim to add greater context to the hazard profiles already discussed. For more information around the Seasonal Climate Watch product and services please contact:

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2.2.1 Overview

"The El Niño-Southern Oscillation (ENSO) is firmly in a neutral state, however, predictions indicate that we may be moving towards a weak La Niña event during the coming summer season. It is still a bit too early to make any reliable conclusions on ENSO's effect during early summer, more reliable interpretations can only be made in the next couple of months as the prediction systems become more reliable."

"Most of the areas that receive significant rainfall in the coming seasons of spring and early summer is situated in the North-East of the country. These areas are expected to receive in general above-normal rainfall during the forecast period up until early summer. There are still some uncertainties due to the ENSO predictions being somewhat unreliable during this period. However, if the trend towards La Niña continues and forecasts remain favourable for above-normal rainfall, it will give significant confidence in the outcome for the next summer season.

"Minimum and maximum temperatures are largely expected to be above-normal for the most parts during the spring seasons." (Seasonal Climate Watch, SAWS: September 2025)

2.2.3 Rainfall

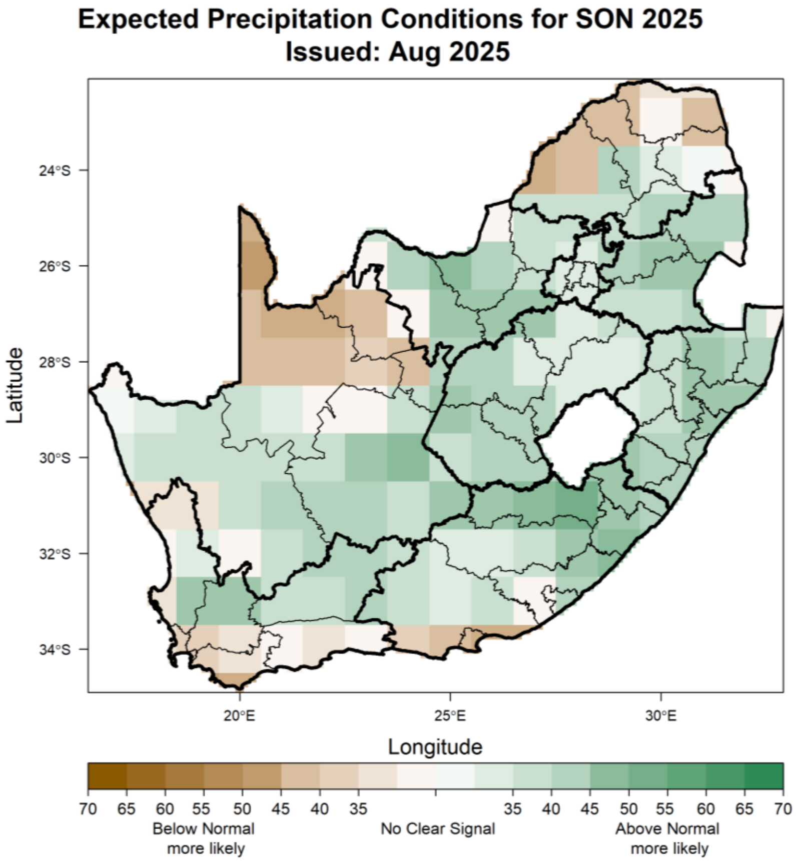

Figure 7: Rainfall - spring 2025 (September / October / November (SON)).

2.2.4 Minimum and Maximum Temperatures

2.2.4.1 Minimum Temperatures

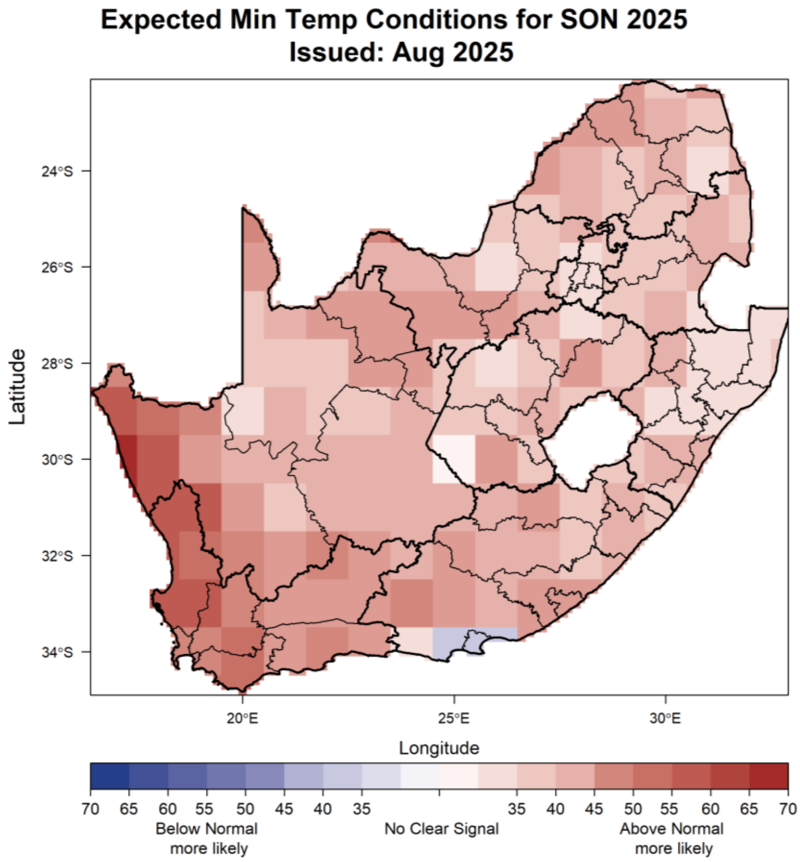

Figure 8: Minimum Temperatures - spring 2025 (September / October / November (SON)).

2.2.4.2 Maximum Temperatures

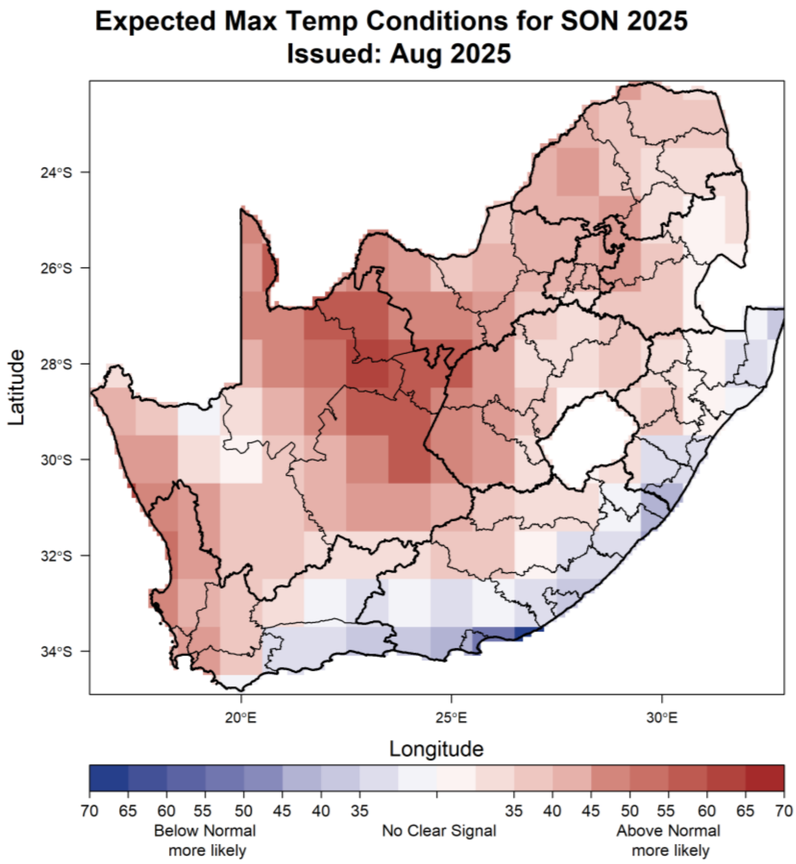

Figure 9: Maximum Temperatures - spring 2025 (September / October / November (SON)).

3. RECOMMENDATIONS

It is recommended that Disaster Management entities and stakeholders note the content of the seasonal hazard profile for spring 2025 and note the commentary made by the SA Weather Services and contributing stakeholders.

4. APPENDICES

None

5. References

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