NDMC

SEASONAL HAZARD PROFILE

Autumn 2025

Prepared by:

Directorate: Disaster Risk Assessment and Early Warning

March 2025

Drafter:

Mr Mark Van Staden

Deputy Director: Disaster Risk Assessment and Early Warning

Date: 14 March 2025

Seasonal Profile noted and supported/……..

Mr Dechlan Pillay

Director: Disaster Risk Assessment and Early Warning

Date:

Seasonal Profile noted and approved/……..

Elias Sithole

Dr Bongani Elias Sithole

Deputy Director-General (Head) NDMC

Date: 14/03/2025

CONTENTS

LIST OF FIGURES

LIST OF GRAPHS

LIST OF TABLES

1. SUMMARY STATEMENT

The NDMC seasonal hazard profile is intended to guide and inform disaster management stakeholders at all spheres of government in terms of a medium term (3 month) forecast as it pertains to various hazards throughout South Africa.

Each seasonal hazard profile will aim to highlight, at a national level, a spatial pattern related to hazards for the given timeframe. 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 has 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.

The release dates for this product will be aligned with the South African seasonal calendar with the following time frames:

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)

Cautionary Note: *It is important to note that the product primarily illustrates a national view and should not be used to obtain what may be perceived to be "exact" parameter values at very specific localities. Often when spatial detail is presented on a map, values are derived by means of simulation models and often smoothing of local effects and dampening of outlier values occur. Values at a specific point should thus be viewed in relative rather than absolute terms.*

2. SEASONAL HAZARD PROFILE – AUTUMN 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) Assist in identifying possible areas where disaster risk reduction (DRR) initiatives, to minimize risk, may be targeted.

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 generally moving towards the eastern provinces in winter and spring.

The indicative hazard profile in South Africa takes into account 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.

The autumn fire hazard profile (Figure 1) suggests a continued increase in fire risk (Orange and Brown) across the south-western regions of South Africa following summer.

High fire hazard areas include parts of the **Western Cape**, such as the City of Cape Town Metropolitan, West Coast, Cape Winelands, and Overberg district municipalities. Fire hazard is expected to intensify in these areas until the first significant autumn or winter rains arrive.

Similarly, heightened fire hazard levels are observed across the Highveld, particularly in **Gauteng**. An above-average amount of biomass in the summer rainfall region, due to favourable rainfall conditions during the 2024/25 summer, may increase fire susceptibility.

The presence of excessive dry biomass (Figure 6), high maximum temperatures (Figure 10), and elevated wind hazard ratings (Figure 3) could all contribute to an increased fire risk in the upcoming season.

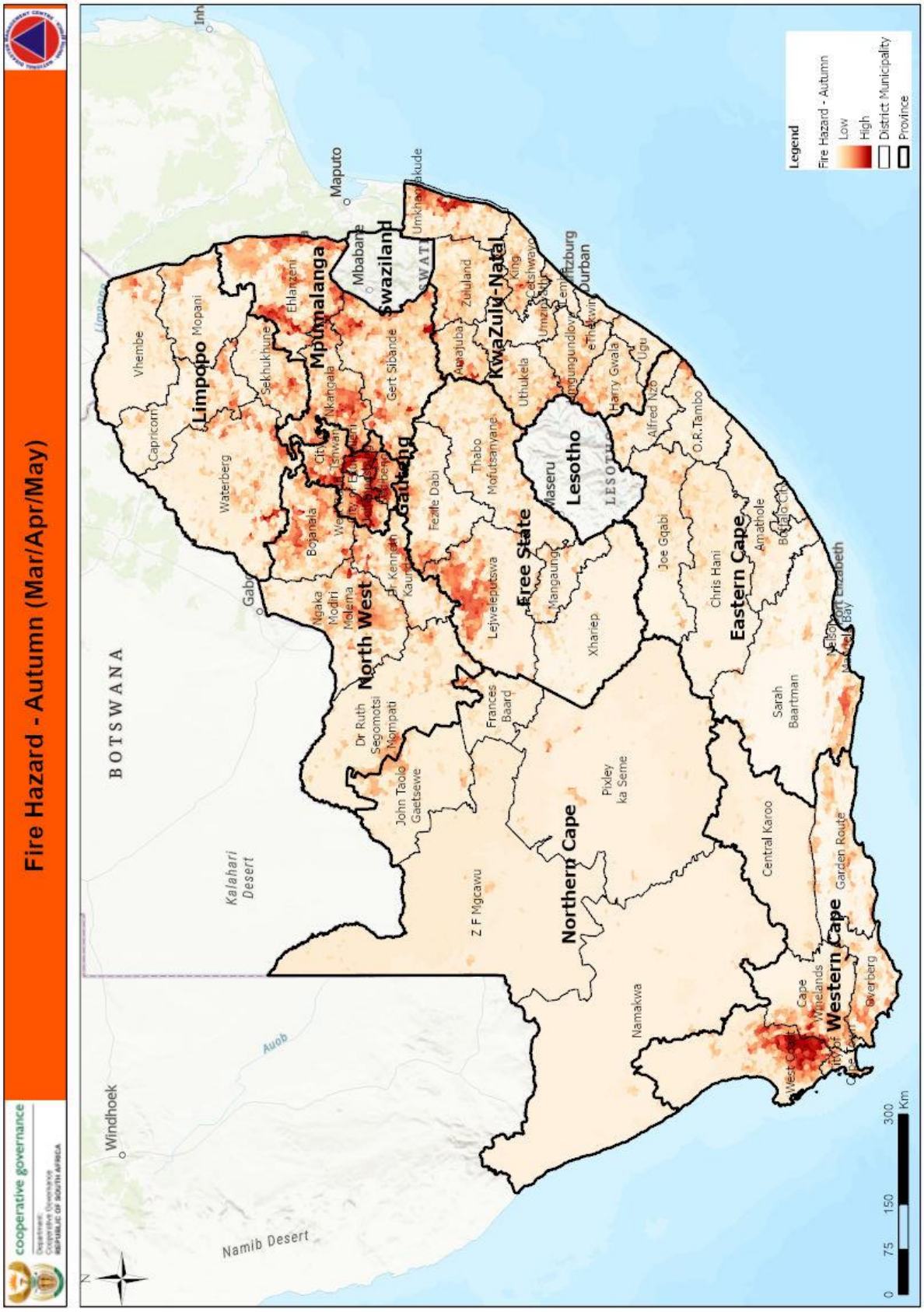


Figure 1: Fire hazard map – autumn

2.1.2 Flood

The historical hazard profile for South Africa derived from the EMDAT, CAELUM (SAWS database) and situation reports submitted to the NDMC, rates flooding events 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 Agro hydrology and Climatology by UKZN: 2001) and data sources (historical events) in a weighted scoring model.

Outputs of the Indicative Risk Profile for Floods is illustrated in Figure 2. The eastern regions of South Africa show an increased flood hazard (darker blue) during the autumn period.

Areas affected include the northern regions of **KwaZulu-Natal** (UMkhanyakude, UThungulu, and UThukela) and coastal areas (iLembe and EThekwini). Similarly, elevated flood risk is observed in parts of the **Eastern Cape**, including Buffalo City Metro, Alfred Nzo, Amatole, O.R. Tambo, and Chris Hani district municipalities. Notably, areas in the **Western Cape**, such as Cape Winelands and Overberg, also exhibit elevated flood hazard levels.

A higher likelihood of above normal precipitation (Green) for eastern parts of the country is alluded to by SAWS (Figure 8). Contrary to the above are the northern parts of **KwaZulu-Natal**, **Mpumalanga**, southern parts coastal areas of **Eastern Cape** and patches in northern **North West** that indicate a higher likelihood of below normal precipitation (Brown).

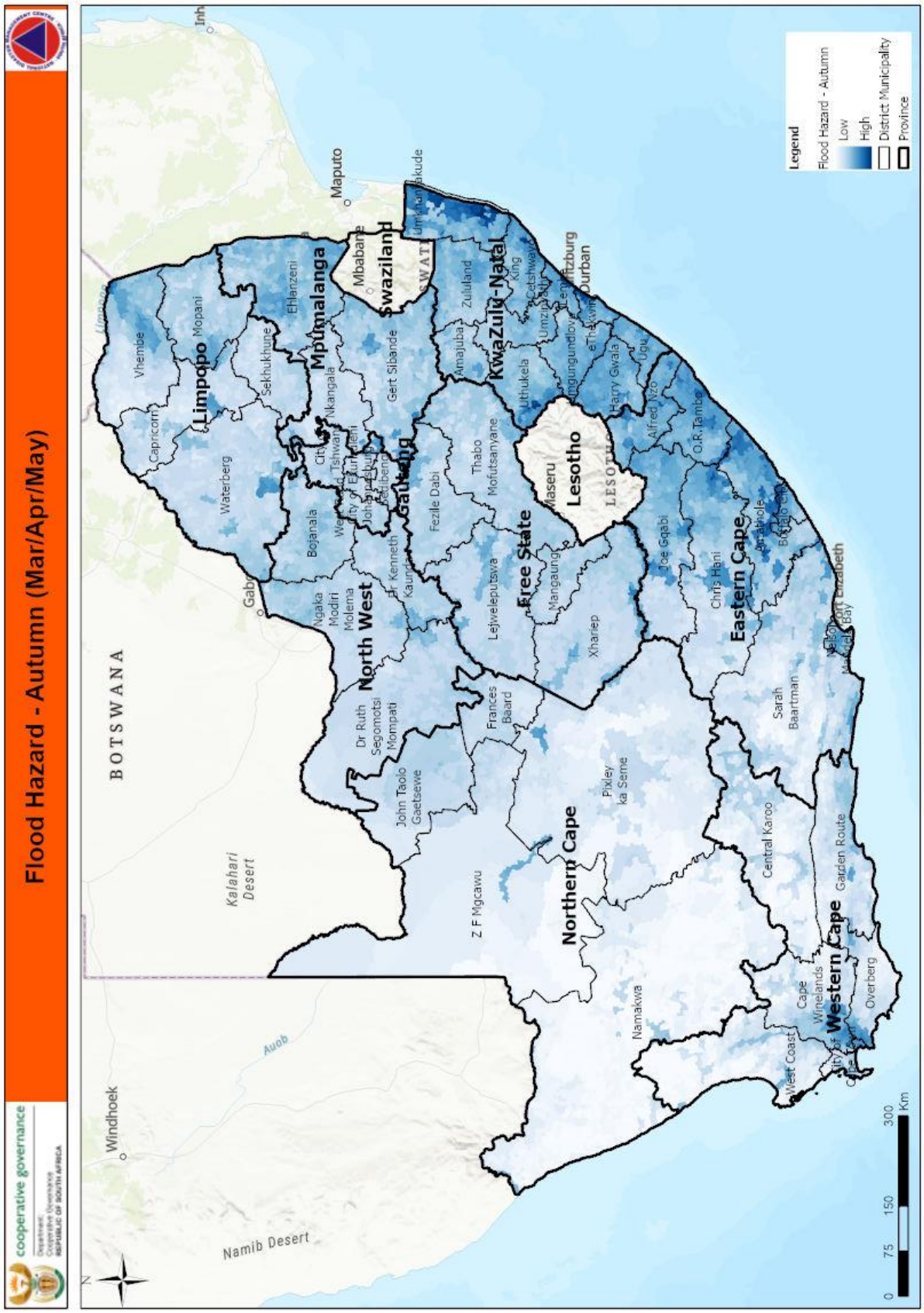


Figure 2: Flood hazard map - autumn

2.1.3.1 Cut-Off Low

"Cut-Off Low (COL) pressure systems are one of the main precipitation and hazardous weather producing weather systems that affect South Africa.

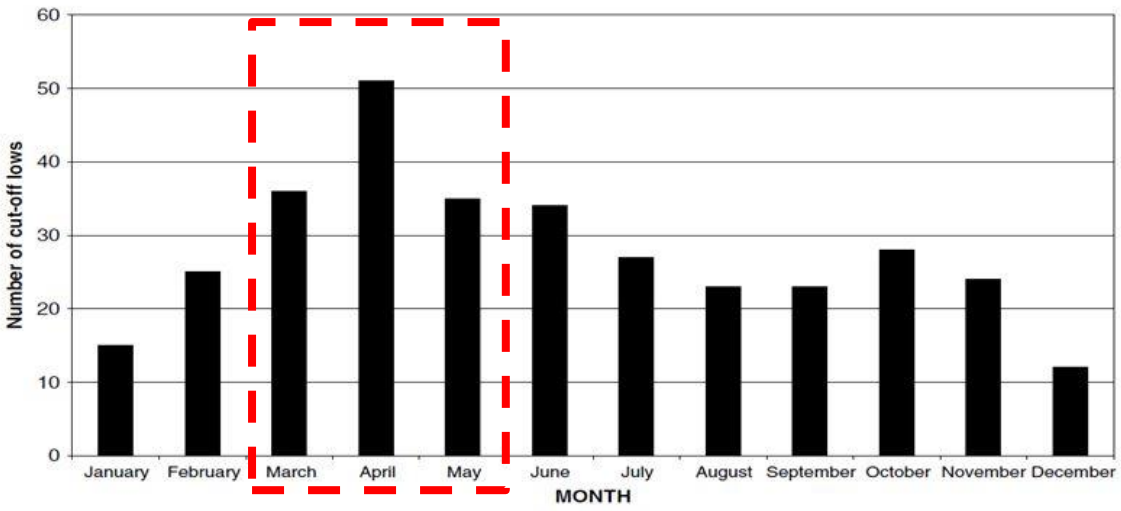
A Cut-Off Low is a low-pressure system that develops south of South Africa, stemming from the main westerly trough systems of cold air. Cut-Off Low's are unstable, baroclinic systems that slope to the west with height and are associated with strong convergence and upward motion, particularly while they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

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

The graph below shows the Cut-Off Low's are most frequent during the autumn season in South Africa (March, April and May), with the highest frequency during April. One out of ten Cut-Off Low's produces severe conditions and leads to flash flooding." (https://resources.eumetrain.org/satmanu/CM4SH/S_Africa/COL/index.htm)



Graph 1: Cut-Off Low Temporal Distribution

2.1.4 Windstorm

Wind related hazards rates third on the historical data obtained by the NDMC in terms of frequency of weather-related events. Wind hazards are defined in terms of the wind speed or the origin of the strong wind, e.g. tornadoes, tropical cyclones and thunderstorms. In terms of wind speed, the definition or threshold of a wind hazard is dependent of the socio-economic sector it relates to (SAWS: 2013).

The windstorm hazard relates to parameters such as likelihood, frequency, magnitude and predictability using similar methodology outlined (weighted scoring GIS modelling) in previous hazard assessments related to fire, flood and snow.

Dark Green and Blue-Green areas on the map (Figure 3) highlight regions with higher windstorm hazard values in autumn. Areas include large zones over the interior and southern parts of South Africa.

Most of the western **Free State** shows medium to high values, with Lejweleputswa experiencing high values. In the **Eastern Cape**, elevated values are noted in Nelson Mandela Metro, large portions of O.R. Tambo, southern Sarah Baartman, and western parts of Chris Hani District Municipality. Smaller areas in western **KwaZulu-Natal**, such as Uthukela, also exhibit higher values.

Similarly, elevated windstorm hazard values are seen in parts of the **Northern Cape** (Pixley ka Seme, southern Francis Baard) and the **Western Cape** (City of Cape Town Metropolitan, Central Karoo, Overberg, and Cape Winelands)

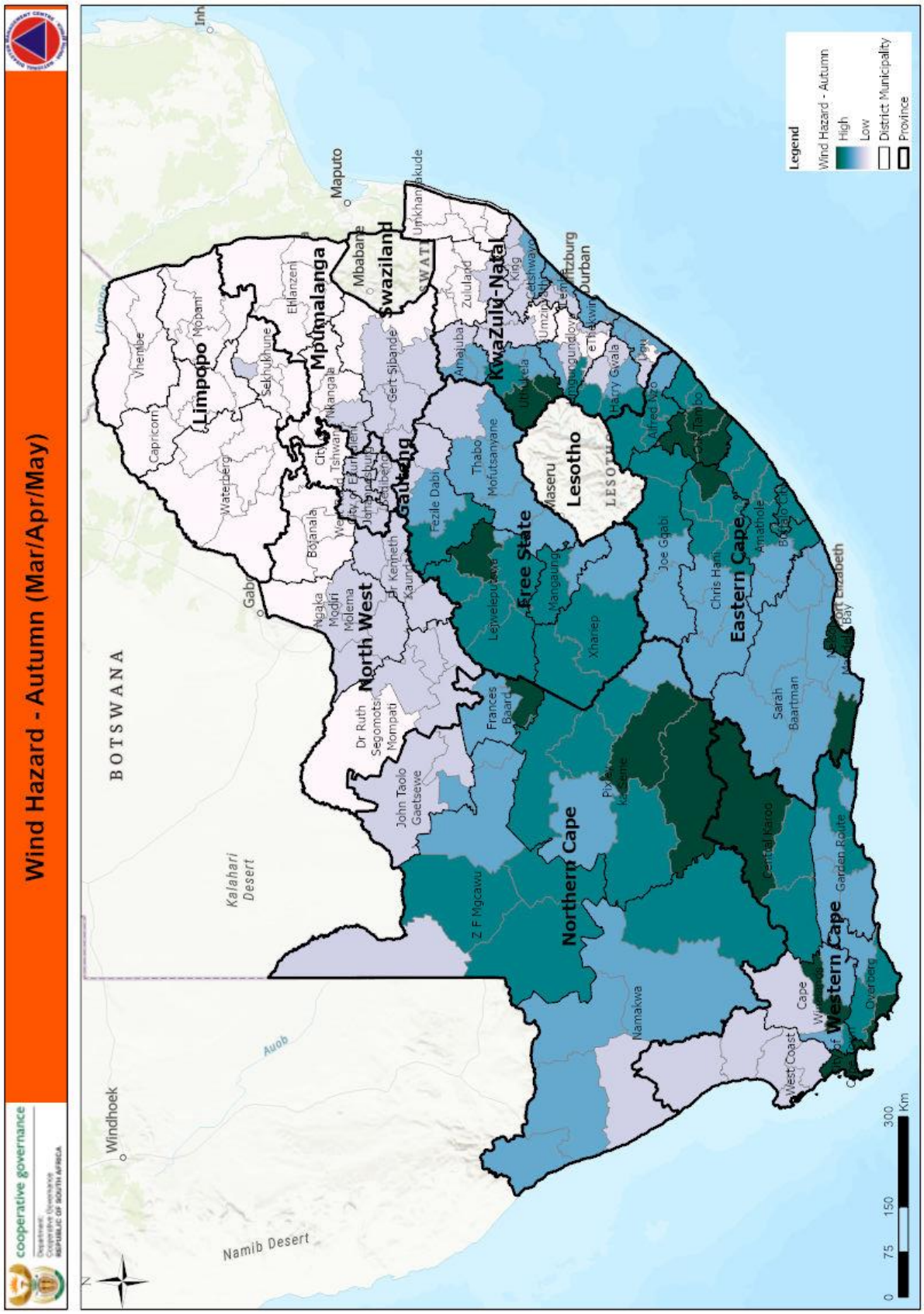


Figure 3: Windstorm hazard map – autumn

2.1.4 Snow

In 2015/16, snow hazard calculations were done as a joint partnership between the NDMC and the Council for Scientific and Industrial Research (CSIR). Parameters quantified for this hazard included: likelihood, frequency, magnitude and predictability using a weighted scoring GIS model with a seasonal component. Historical datasets obtained from SAWS and optical remote sensing techniques were applied in the process.

Figure 4 shows that low (Green) and low to medium (Lime Green) snow hazard values are widespread across South Africa, apart from the Joe Gqabi district municipality in the **Eastern Cape**, which indicates medium (Yellow) snow hazard ratings for the autumn period.

The South African Weather Service (SAWS) has predicted a higher likelihood of above-normal minimum temperatures across the country (Figure 9). This may help reduce the likelihood of snow occurrence in the coming months.

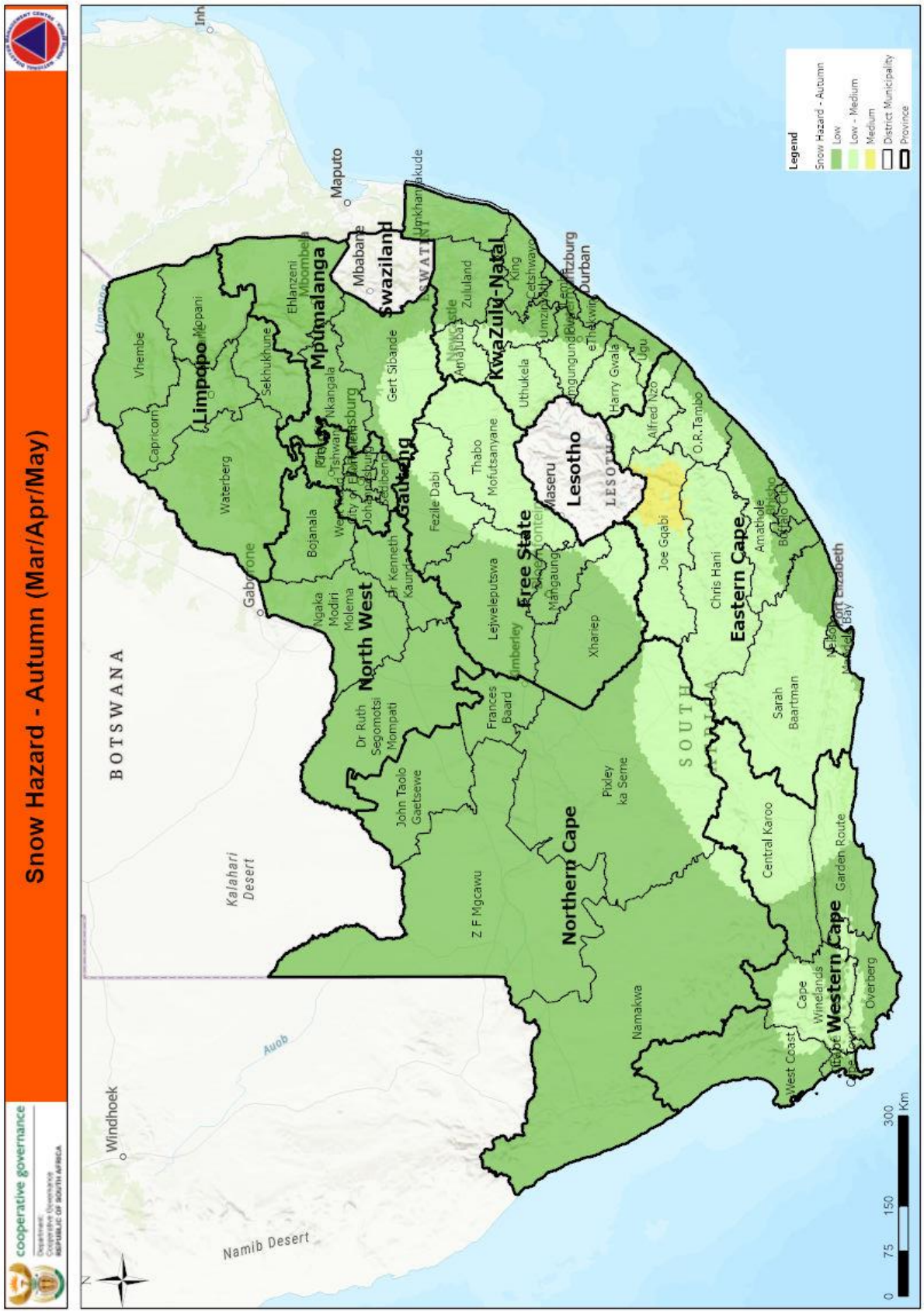


Figure 4: Snow hazard map – autumn

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, remains very limited over the interior. Widespread above-normal rainfall over the winter rainfall region during the 2024 winter also resulted in wet conditions there

At the short time scale, drought is now only focused on the interior of the Northern Cape and adjacent parts of the Western and Eastern Cape provinces.

Relatively large parts of the Free State eastern parts of the Eastern Cape, together with pars of the Northern Cape, experience moderate to severe drought at the medium (12-month) time scale, associated with drought in the previous summer and a delayed start to the current summer.

As speculated, based on rainfall observations, by the end of February the north-eastern parts of the country are trending wetter according to the SPI.

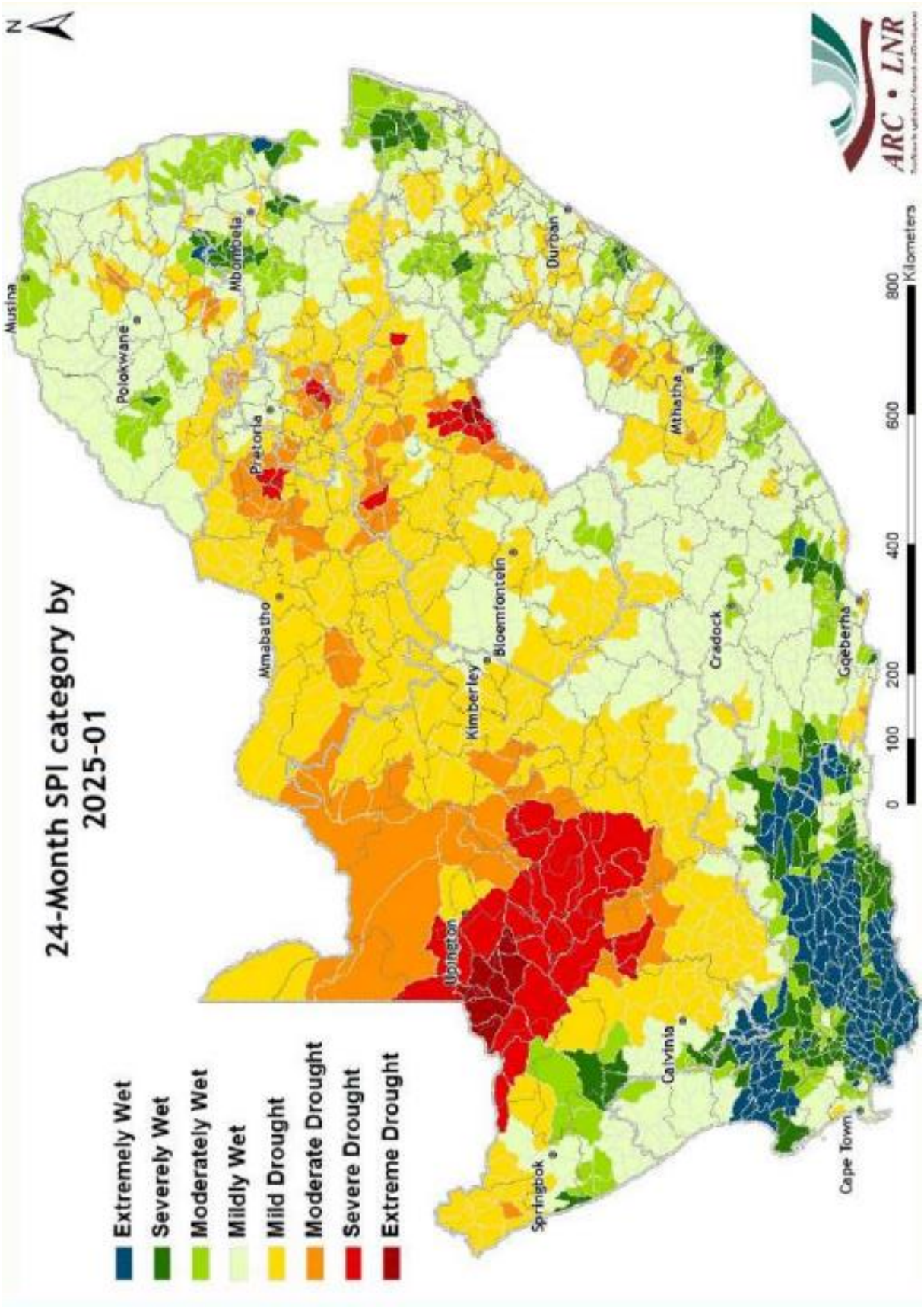


Figure 5: Drought Status Map – January 2025

The Percentage of Average Seasonal Greenness (PASG) (Figure 6) demonstrates deviations from the long-term average vegetation activity over a given timeframe. 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).

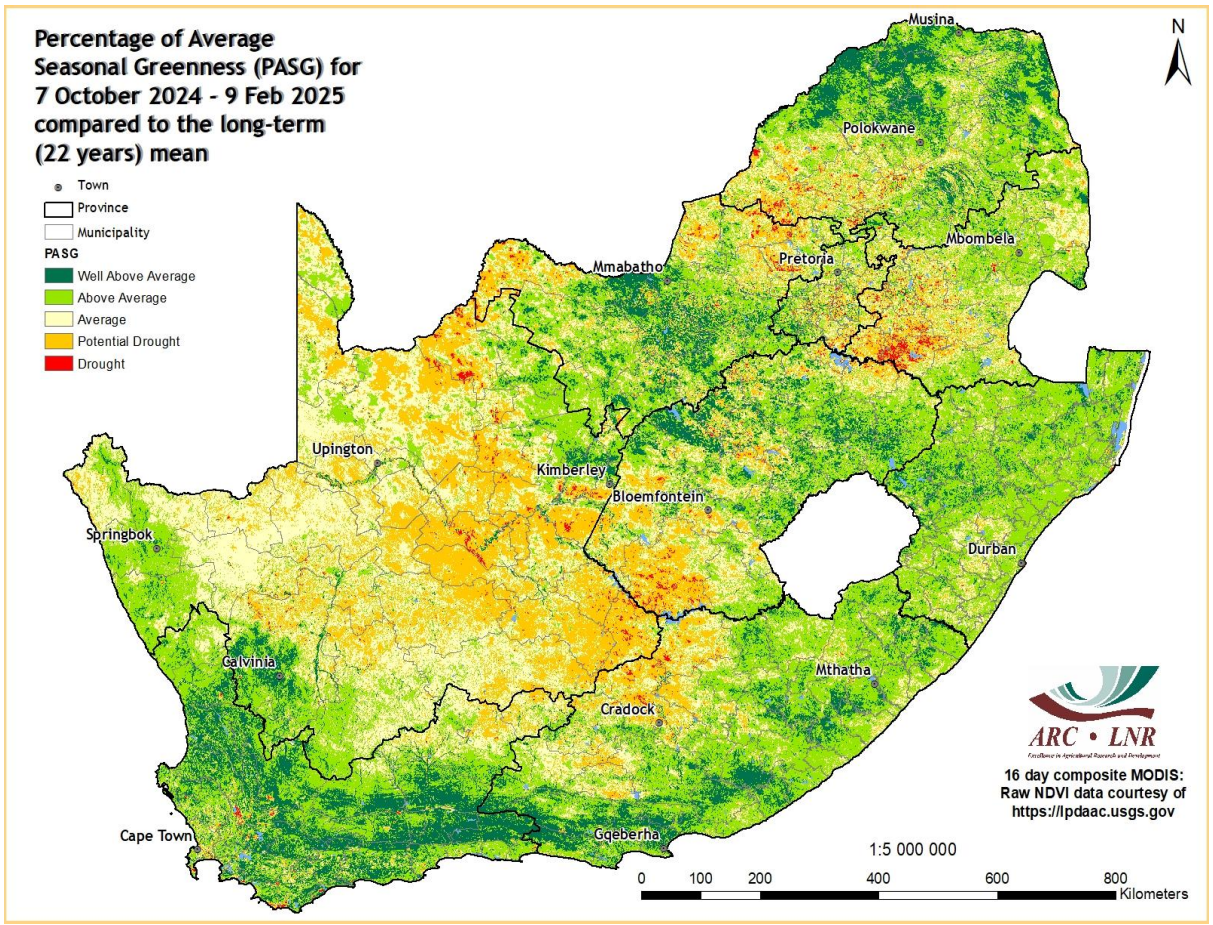


Figure 6: Percentage of Average Greenness (PASG) – 7 October - 9 February 2025

Most parts of the country experience above-normal cumulative vegetation activity. Most of the **Western Cape,** southern parts of the **Northern Cape,** and western parts of the **Eastern Cape** experienced well-above-average cumulative vegetation activity.

Cumulative vegetation activity was below average over **the Northern Cape** and western **Free State,** as well as the southern parts of **Mpumalanga,** where the rainy season had a delayed start**.**

2.1.6 Tropical Cyclones

The 2024-2025 tropical cyclone season is expected to be characterized by normal to above average activity across the cyclone basin of the South-West Indian Ocean. It is estimated, with a 70% probability, that between 9 and 13 named systems (storms and cyclones) will develop with 4 to 7 of these reaching tropical cyclone intensity.

Cyclogenesis is favoured in the eastern and central parts of the basin (Figure 7). The Mascarene Islands, the east coast of Madagascar and Mozambique have near to above normal risk of impacts.

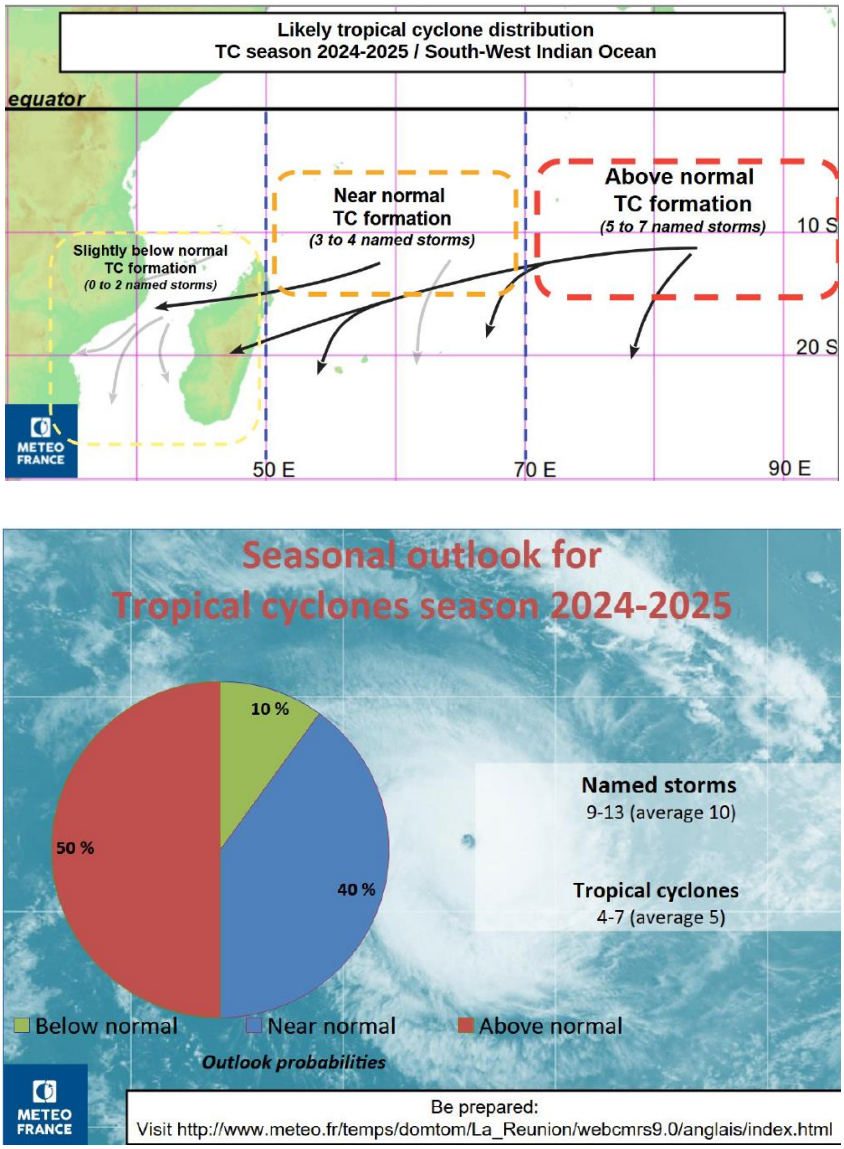


Figure 7: Seasonal Outlook for Tropical Cyclones 2024/25 (MeteoFrance: Oct'24)

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:

(Mr) Cobus Olivier
Scientist: Prediction Research
Tel: 012 367 6008
E-mail: cobus.olivier@weathersa.co.za
Website: www.weathersa.co.za

2.2.1 Overview

“The El Niño-Southern Oscillation (ENSO) has recently crossed the La Niña threshold and is predicted to remain on the boundary of this threshold for the next few months. Current predictions are still uncertain, with multiple global models predicting different direction (either strengthening the La Niña state or moving back to a Neutral state. For South Africa caution is still advised in using the ENSO in any important planning decisions as it seems to be currently very volatile and unpredictable. For South Africa time is running out as well for a potential La Niña to affect us as summer is coming to an end.

Current predictions indicate above-normal rainfall for most of the north-eastern parts of the country during autumn, however this is expected to change to only above-normal rainfall for the interior and eastern coastal areas during late autumn and eventually mostly below-normal during early winter. However, due to significant reduction in rainfall over the central and north-eastern parts of the country during late autumn and early winter, the most important forecast is for the south-western parts of the country, where below-normal rainfall is expected during these seasons.

Minimum and maximum temperatures are expected to be mostly above-normal countrywide for the forecast period. However, the southern coastal areas indicate that below-normal temperatures are more likely throughout the summer period.” (Seasonal Climate Watch, SAWS: March 2025)

2.2.3 Rainfall

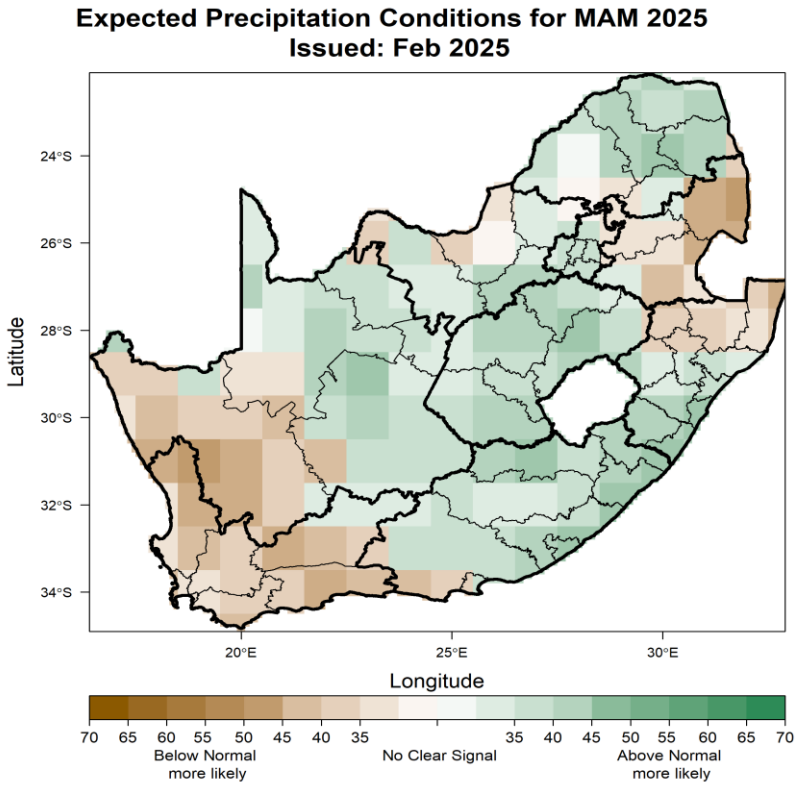


Figure 7: Rainfall - autumn 2025 (March / April / May (MAM)).

2.2.4 Minimum and Maximum Temperatures

2.2.4.1 Minimum Temperatures

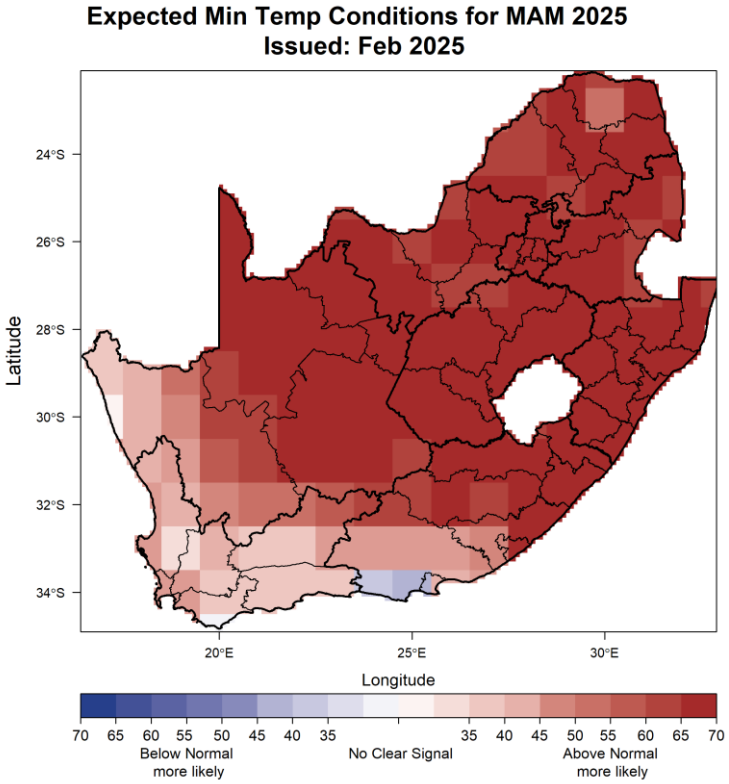


Figure 8: Minimum Temperatures - autumn 2025 (March / April / May (MAM)).

2.2.4.2 Maximum Temperatures

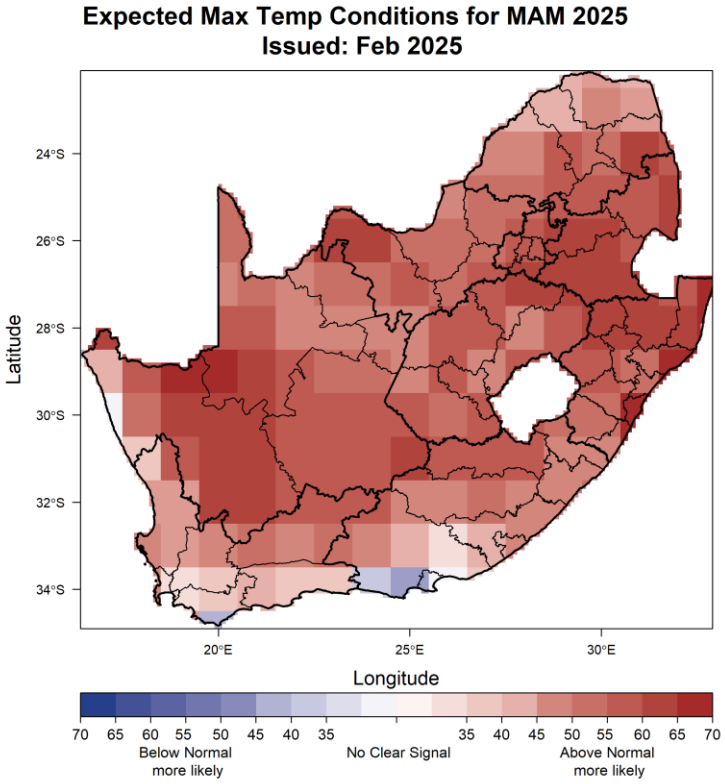


Figure 9: Maximum Temperatures - autumn 2025 (March / April / May (MAM)).

3. RECOMMENDATIONS

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

4. APPENDICES

None

5. References

1. ARC. (2025). Umlindi Monthly
2. CSIR. (2015). Hazard Quantification – Snowfall: Project Report
3. EUMetTrain Website (https://www.eumetrain.org/)
4. Malherbe, J and Maluleke, P. (2013). Assessment of historical drought events over South Africa
5. MeteoFrance (2024). Seasonal forecast of tropical cyclone activity in the South-West Indian Ocean for cyclone season 2024-2025 [November 2024]
6. National Disaster Management Centre (2016). Indicative Risk Profile for Snow: Desktop GIS Analysis: Project Report
7. National Disaster Management Centre (2015). Indicative Risk Profile for Windstorms: Desktop GIS Analysis: Project Report
8. National Disaster Management Centre (2014). Indicative Risk Profile for Drought: Desktop GIS Analysis: Project Report
9. National Disaster Management Centre (2013). Indicative Risk Profile for Flood
10. National Disaster Management Centre (2012). Indicative Risk Profile for Fire
11. SAWS. (2025). Seasonal Climate Watch Monthly
12. SnowReport.co.za. 2014.Snow Report- Report Sightings. Available from: http://snowreport.co.za. [December 2014]

Switchboard: 012 848 4600

Fax: 012 848 4635/6/7/8

Mark Van Staden

Deputy Director: Disaster Risk Assessment and Early Warning

markv@ndmc.gov.za

Tel: 012 848-4625