

SEPTEMBER 2024



MONTHLY STATE OF WATER BULLETIN

WATER IS LIFE - SANITATION IS DIGNITY



water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA



Overview

South Africa experiences winter rainfall in the southwestern parts of the country and summer rainfall in the eastern part. The country's southwestern tip has a Mediterranean climate with hot, dry summers and cool, wet winters. The South African climate is currently in a neutral El Niño-Southern Oscillation (ENSO). However, current SAWS predictions are uncertain whether it will weaken towards a La Niña state during our next summer season.

At the end of September 2024, the national dam levels were at **79.7%** of Full Supply Capacity (FSC). This level is lower than the last two hydrological years, at the same time of reporting when national storage levels were greater than 90% of FSC. Around **16%** of the national dams were **above 100% of FSC** (either full or spilling), **70%** were between 50 and 100% of FSC, **11.72%** were between 10 and 50% of FSC, and at least **1.4%** were below 10% of FSC (critically low).

The most recent 24-month Standardised Precipitation Index revealed that the Namakwa District in the Northern Cape, is the only district that had areas experiencing extreme drought with some of its areas having severe to moderate drought in the last 24 months. Several District Municipalities (DM) also had some areas experiencing severe drought including the Thabo Mafutsanyane DM in the Free State, the Sarah Baartman DM in the Eastern Cape, the Capricorn, and the Mopani DM in Limpopo. Moreover, district municipalities such as the Zululand DM, Gert Sibande DM, Bojanala DM, Ngaka Modiri Molema DM, Sekhukhune DM, Ekurhuleni and Sedibeng DM only experienced moderate drought.

Despite strong warming trends in surface air temperatures across Southern Africa, extreme low temperatures occasionally occur. The most recent extreme low-temperature event occurred from 18-21 September 2024. It began with a cold front that landed in the Western Cape province on 18 September 2024, and was followed by the development of an intense cut-off low-pressure system along the border of the Northern and Eastern Cape provinces, which moved into some parts of KwaZulu Natal and Free State. SAWS issued severe weather warnings up to Orange Level 6 for disruptive snow for parts of the Eastern Cape, KwaZulu-Natal, Free State, and Mpumalanga. As predicted, KwaZulu-Natal, the Eastern Cape, and portions of the Free State experienced disruptive snowfall. According to SAWS records, snow of this magnitude in the spring last occurred in Gauteng on 10 September 1981.

Rainfall

The South African climate is currently in a neutral El Niño-Southern Oscillation (ENSO). However, current SAWS predictions are uncertain whether it will weaken towards a La Niña state during our next summer season. The monthly rainfall distribution for the current hydrological year, October to March and April to September, is presented in Figure 1 and Figure 2, respectively. In September most of the provinces received insignificant rainfall, and the cessation of the winter rainfall season was notable during the last two weeks of September; with the start of spring, some parts of the country received good rainfall. Overall, rainfall amount of up to 100 mm was received over isolated parts of the Free State, Eastern Cape, and KwaZulu-Natal.

The monthly rainfall anomalies for the current hydrological year, expressed as a percentage of normal rainfall for October to March and for April to September are presented in Figure 3 and Figure 4, respectively. Above-normal rainfalls were received in isolated parts of the Western Cape, Northern Cape, Free State, Mpumalanga, and KwaZulu Natal provinces.

The South African Weather Service (SAWS) multi-model rainfall and temperature forecast for October-November-December (OND), November-December-January (NDJ), and December-January-February (DJF) indicates wetter conditions over the interior of the country during the early-and mid-winter seasons, while north-eastern parts of the country indicate drier conditions extending through to the mid-summer period. Minimum and maximum temperatures are expected to be mostly above-normal countrywide for the forecast period.

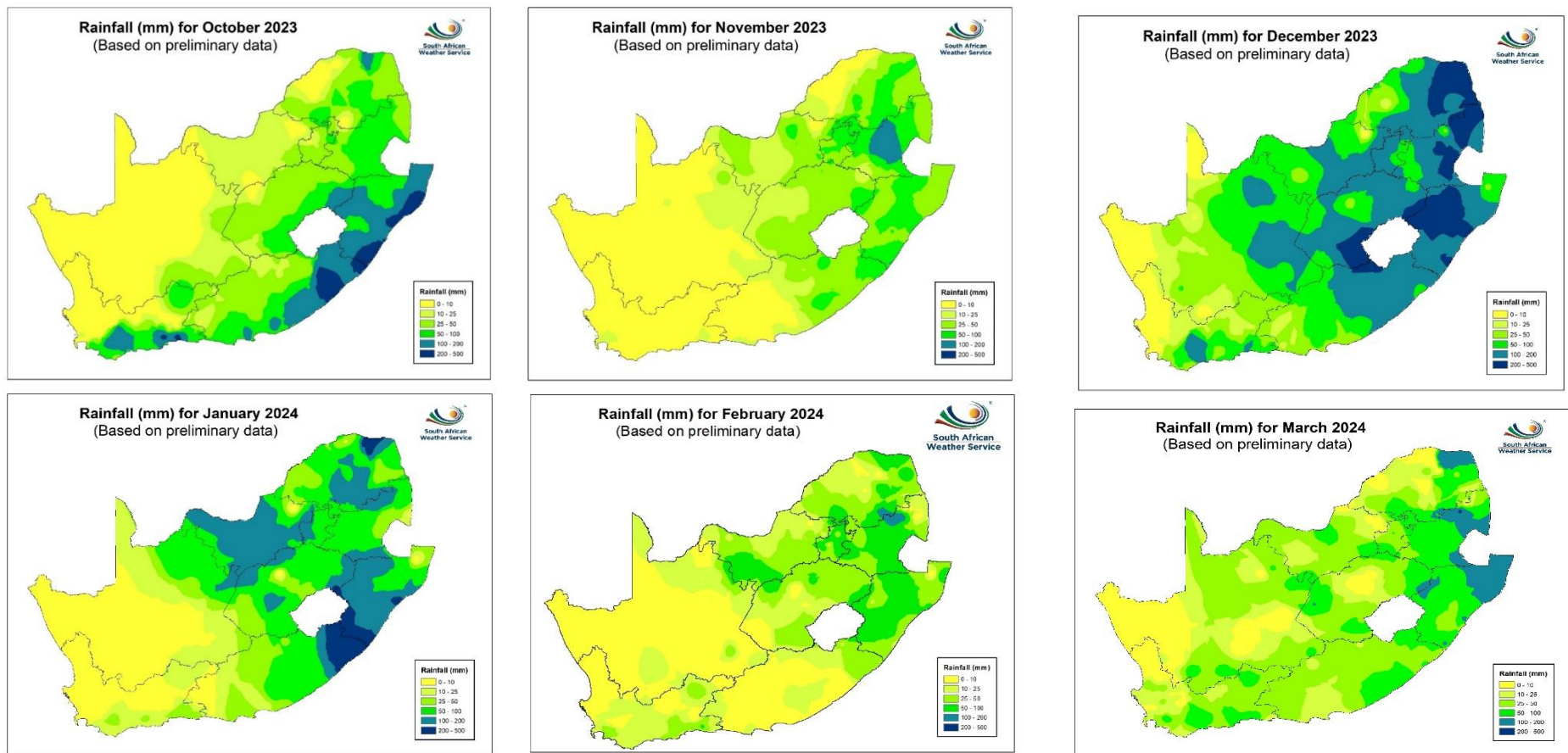


Figure 1: Summer season monthly rainfall distribution for October 2023 to March 2024 (Source: SAWS <https://www.weathersa.co.za/home/historicalrain>)

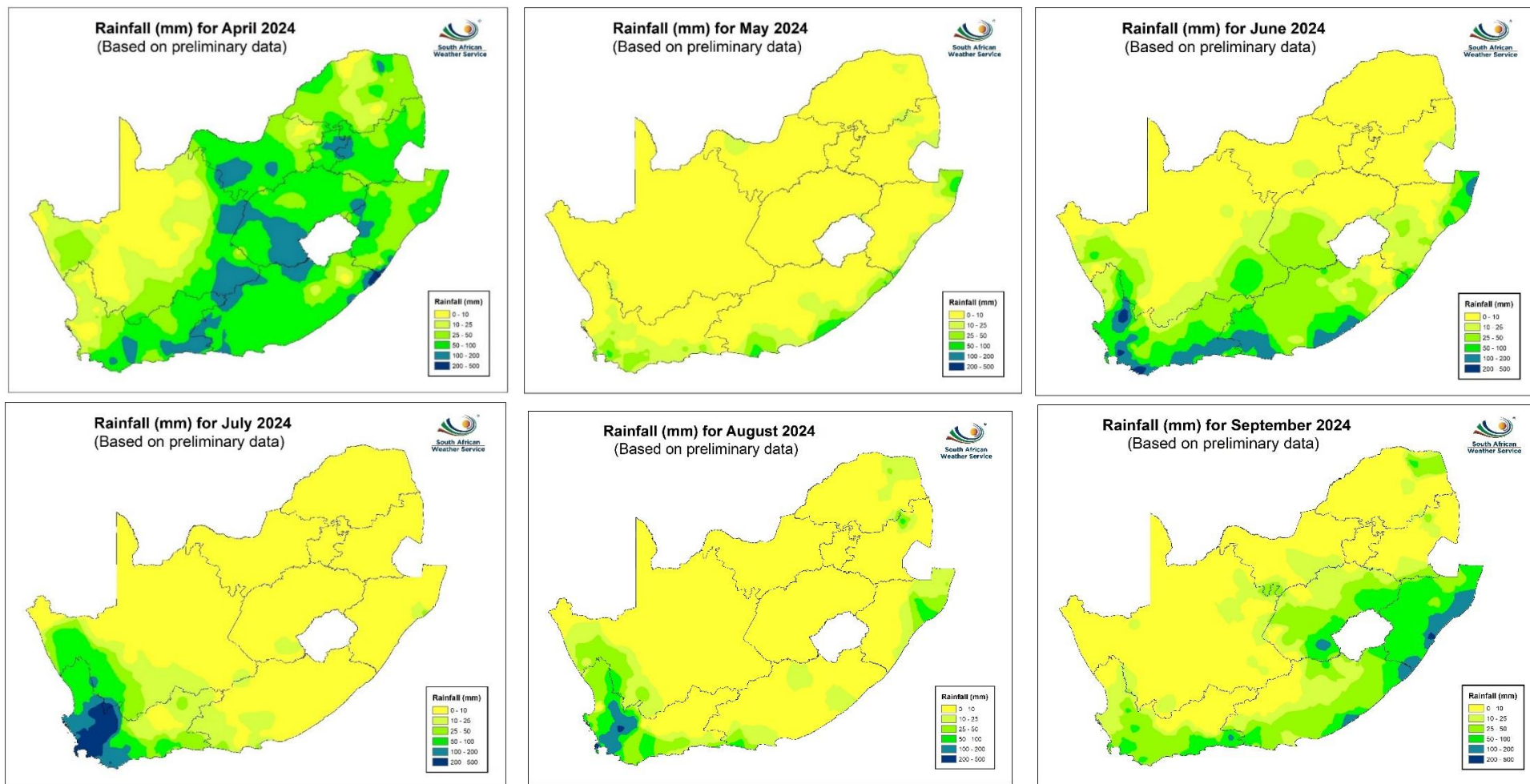


Figure 2: Winter season monthly rainfall distribution for April to September 2024 (Source: SAWS <https://www.weathersa.co.za/home/historicalrain>)

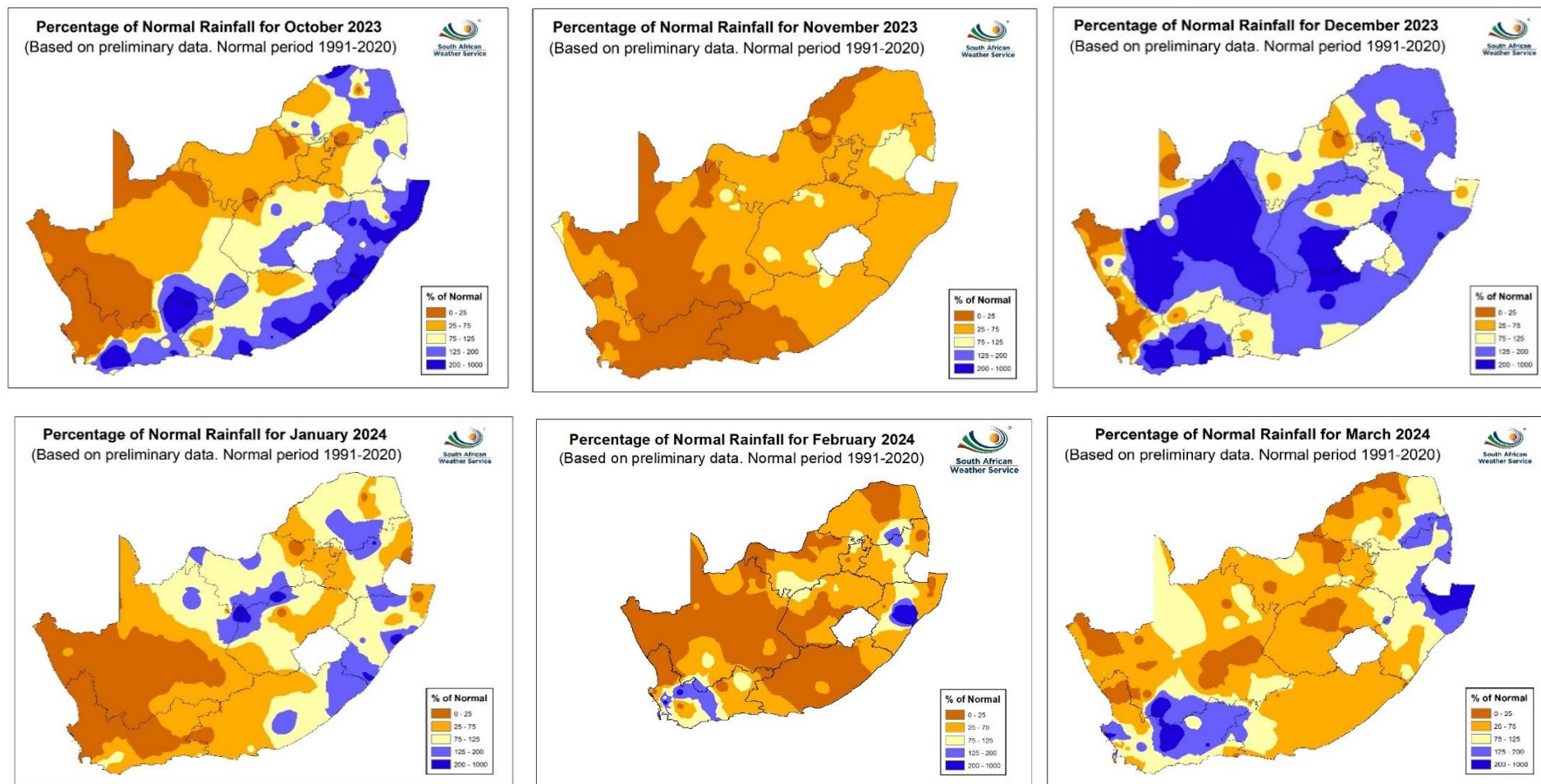


Figure 3: Summer season Percentage of normal rainfall for October 2023 to March 2024. Blue shades are indicative of above-normal rain, and the darker yellow shades of below-normal rainfall (Source: SAWS <https://www.weathersa.co.za/home/historicalrain>)

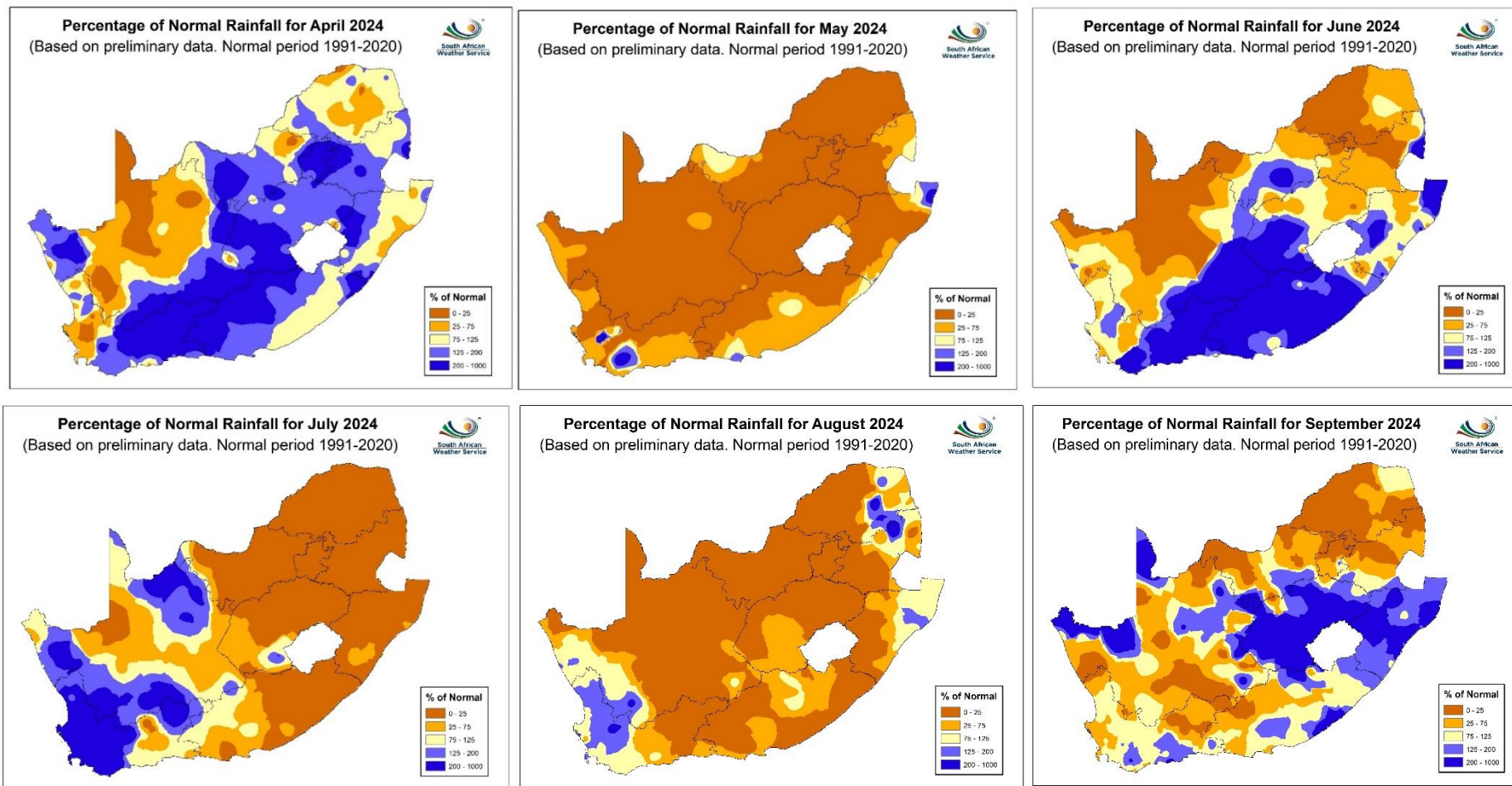


Figure 4: Summer season percentage of normal rainfall for April to September 2024. Blue shades are indicative of above-normal rain, and the darker yellow shades of below-normal rainfall (Source: SAWS <https://www.weathersa.co.za/home/historicalrain>)

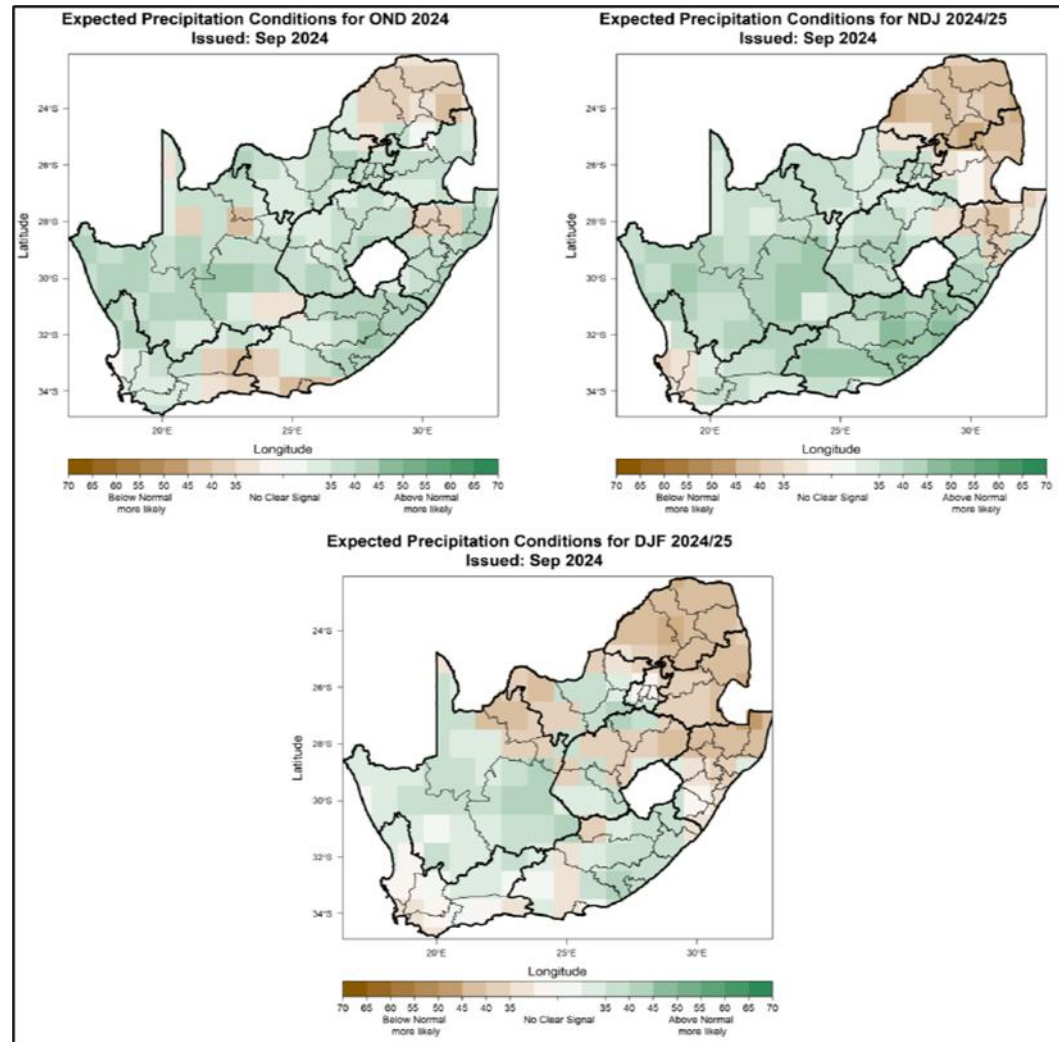


Figure 5: October-November-December 2024 (OND; top-left), November-December-January 2024/25 (NDJ; top-right), December-January-February 2024/25 (DJF; bottom) seasonal precipitation prediction. (Source: SAWS)

National Dam Storage

The national dam's water storage trends for the previous four hydrological years and the trend for the current hydrological year (2023/24) are presented in Figure 6. At the end of September 2024, the national dam levels were at **79.7%** of Full Supply Capacity (FSC). This level is lower than the last two hydrological years, at the same time of reporting when national storage levels were greater than 90% of FSC. **16%** of the national dams were **above 100% of FSC** (either full or spilling), **70%** were between 50 and 100% of FSC, **11.72%** were between 10 and 50% of FSC, and at least **1.4%** were below 10% of FSC (critically low).

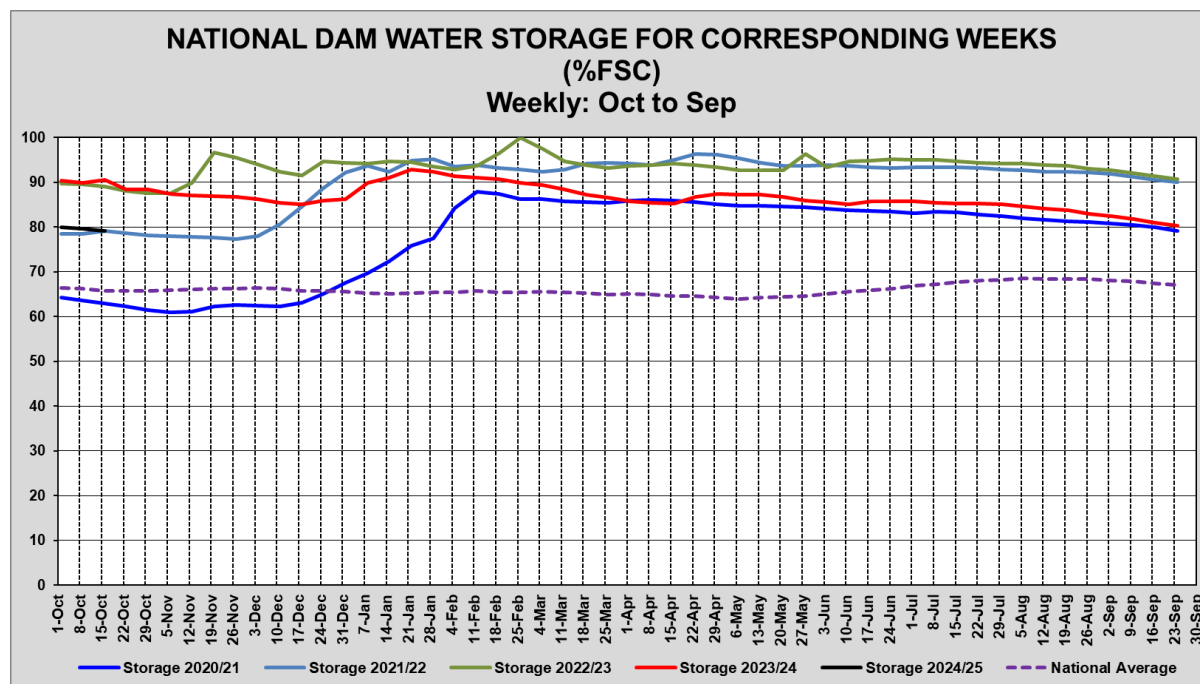


Figure 6: National Dam Storage end September 2024

The comparison between September 2023 and September 2024 of the country's five largest dam storage (%of FSC) is presented in Table 1. Due to the drier and warmer conditions experienced this spring compared to 2023, the Vaal Dam and Gariep Dam storage levels have declined by -39.5% and -16.8%, respectively.

The Middle-Letaba and Glen Alpine Dams in Limpopo Province remain the only dams at critical levels, as given in Table 2.

Table 1: Storage Levels comparison for the Five Largest storage dams (by volume) to last year

Reservoir	River	Province/ Country	WMA/Cou ntry	Full Suppl y Capac ity	30 September 2024	30 Septembe r 2024	Diff. betwee n %Full
Gariep Dam	Orange River	Free State	Orange	4903.45	87.8	71	-16.8
Vanderkloof Dam	Orange River	Free State	Orange	3136.93	97.8	97.5	-0.3
Sterkfontein Dam	Nuwejaarspruit River	Free State	Vaal Major	2616.9	99.7	98	-1.7
Vaal Dam	Vaal River	Free State	Vaal Major	2560.97	80.5	41	-39.5
Pongolaport Dam	Phongolo River	Kwazulu-Natal	Pongola-Mtamvuna	2395.24	83.1	82.6	-0.5

Table 2: Dams below 10% of Full Supply Capacity compared to last year

Reservoir	River	Province	30 September 2023 (%FSC)	30 September 2024 (%FSC)	% Change (-/+)
Middle-Letaba Dam	Middel-Letaba River	Limpopo	4.3	0.7	-3.6
Glen Alpine Dam	Mogalakwena River	Limpopo	62	28	-34

The spatial distribution of the dams with a classified range of their storage levels on 30 September 2024 is presented in Figure 7. An observation can be made that most of the dams in the Western Cape province were above 100% of FSC (either full or spilling), while the majority of national dams across the country were at storage levels of between 50-100% of FSC.

Figure 8 presents the 24-month Standardised Precipitation Index (SPI) for August 2024, indicating that the Namakwa District in the Northern Cape, is the only district that had areas experiencing extreme drought with some of its areas having severe to moderate drought in the last 24 months. Several District Municipalities (DM) also had some areas experiencing severe drought in the last 24 Months including the Thabo Mafutsanyane DM in the Free State, the Sarah Baartman DM in the Eastern Cape, the Capricorn, and the Mopani DM in Limpopo. Moreover, district municipalities such as the Zululand DM in KwaZulu-Natal, Gert Sibande DM in Mpumalanga, Bojanala and Ngaka Modiri DM Molema in North-West, Sekhukhune DM in Limpopo, Ekurhuleni and Sedibeng DM in Gauteng only experienced moderate drought. These areas are experiencing drought as a result of below-normal rainfall received during the previous summer rainfall season.

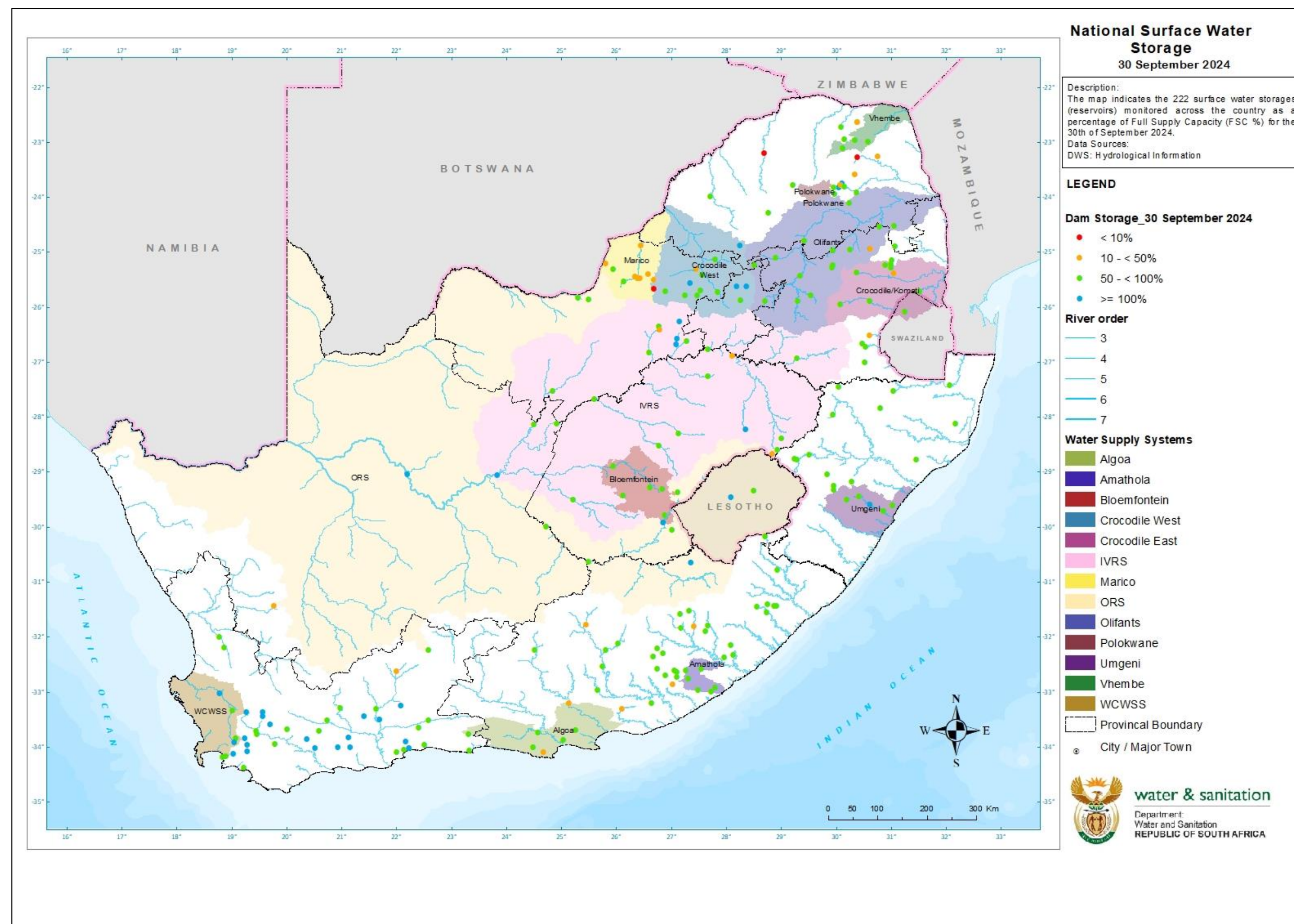


Figure 7: Surface Water Storage Levels - September 2024

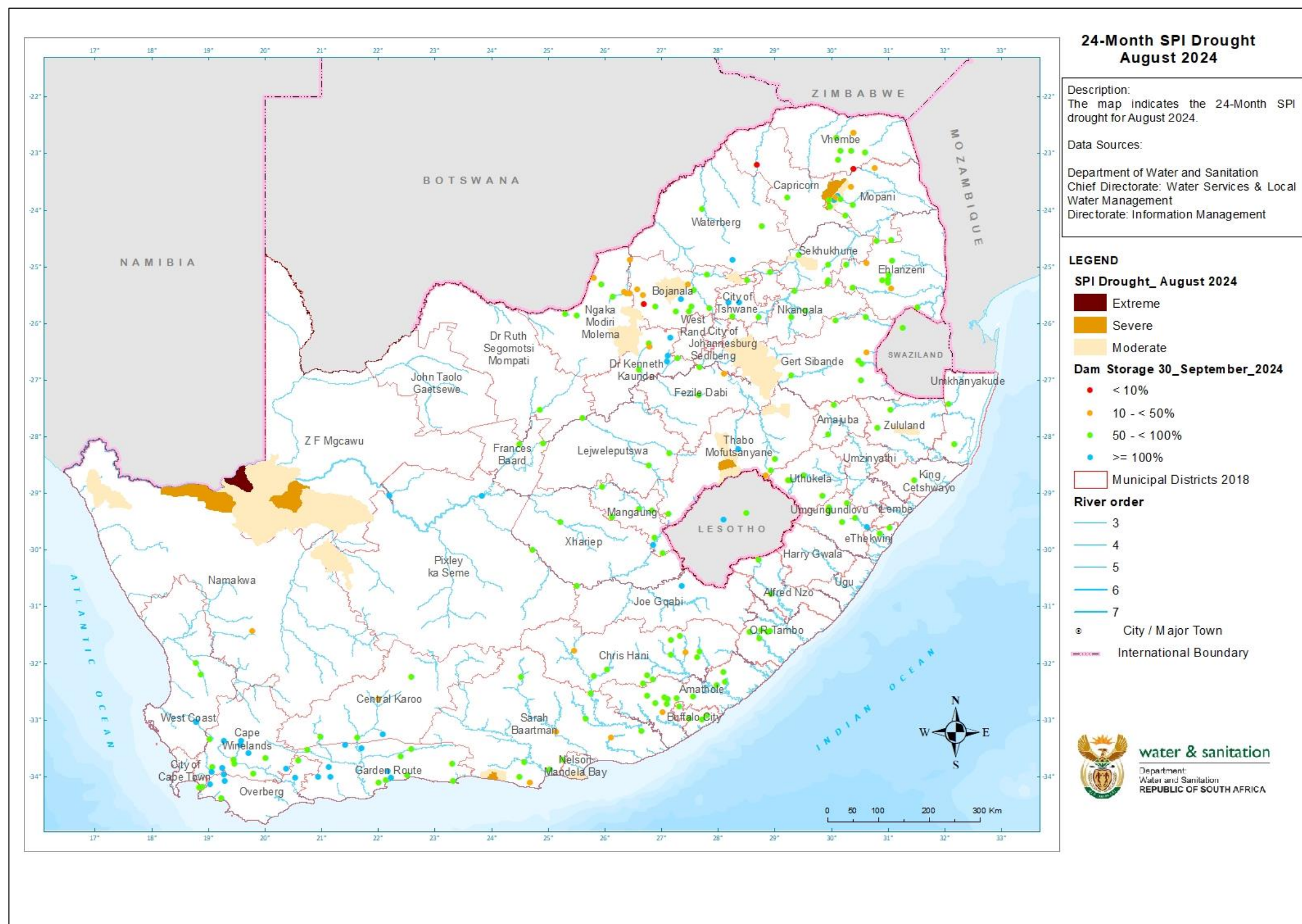


Figure 8: 24-month Standardised Precipitation Index (SPI) and dam levels

The comparison of the storage levels per province and international areas for September 2024 to the same time last year is presented in Figure 9. Free State (-14.2%), North West (-17.5%), Limpopo (-10.3%), and Northern Cape (-10.1%) showed significant declines in dam storage levels compared to the previous year. While, Western Cape (+49.6%) showed significant increases, year-on-year.

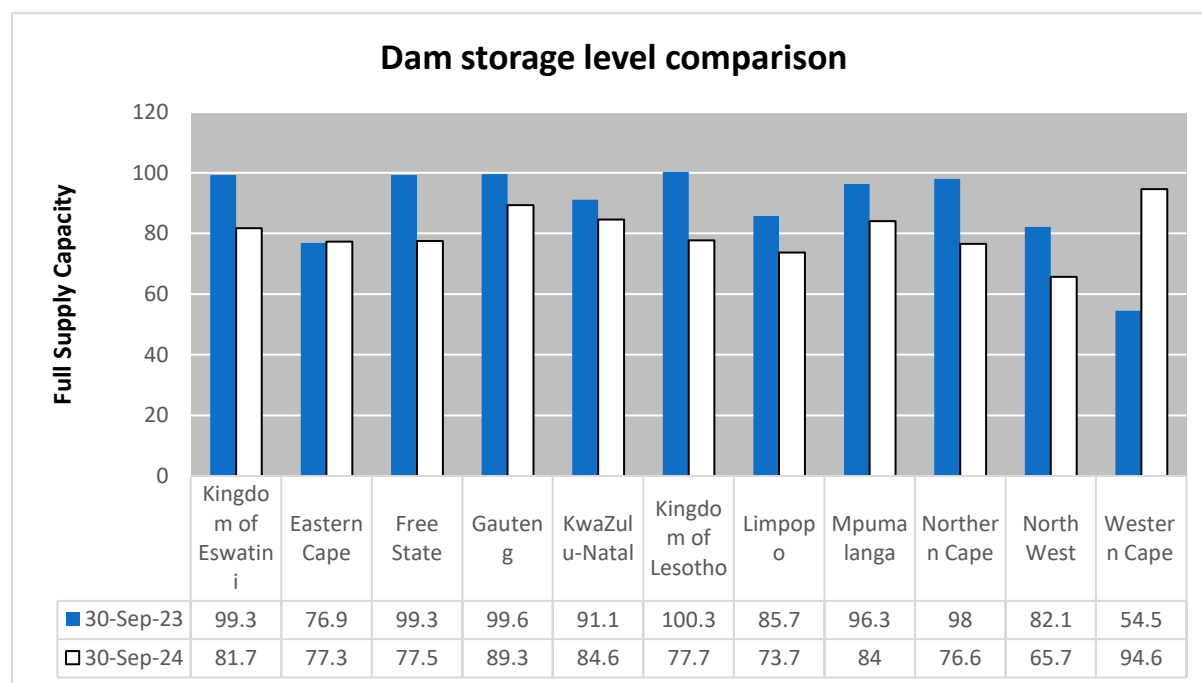


Figure 9: Water Storage Levels September 2023 vs. September 2024

District Municipalities

The year-on-year comparison of water storage levels per District Municipality (DM) is presented in Figure 10. Garden Route DM experienced significant increases (>+20%) in dam storage levels compared to last year. But, Capricorn DM and Namakwa DM experienced significant declines (>-40%) in dam levels compared to last year.

The dam storage levels in water supply systems (WSSs) and applicable restrictions are presented in Table 3. The Algoa WSS decision date was changed from 1 June to 1 November, and a new annual operating analysis for the decision date was performed, resulting in an update of water restrictions which were in effect from 1 November 2023 to 31 October 2024. However, these restrictions are yet to be gazetted.

Due to infrastructure limitations, permanent restrictions are applicable for the Polokwane and Bloemfontein WSSs.

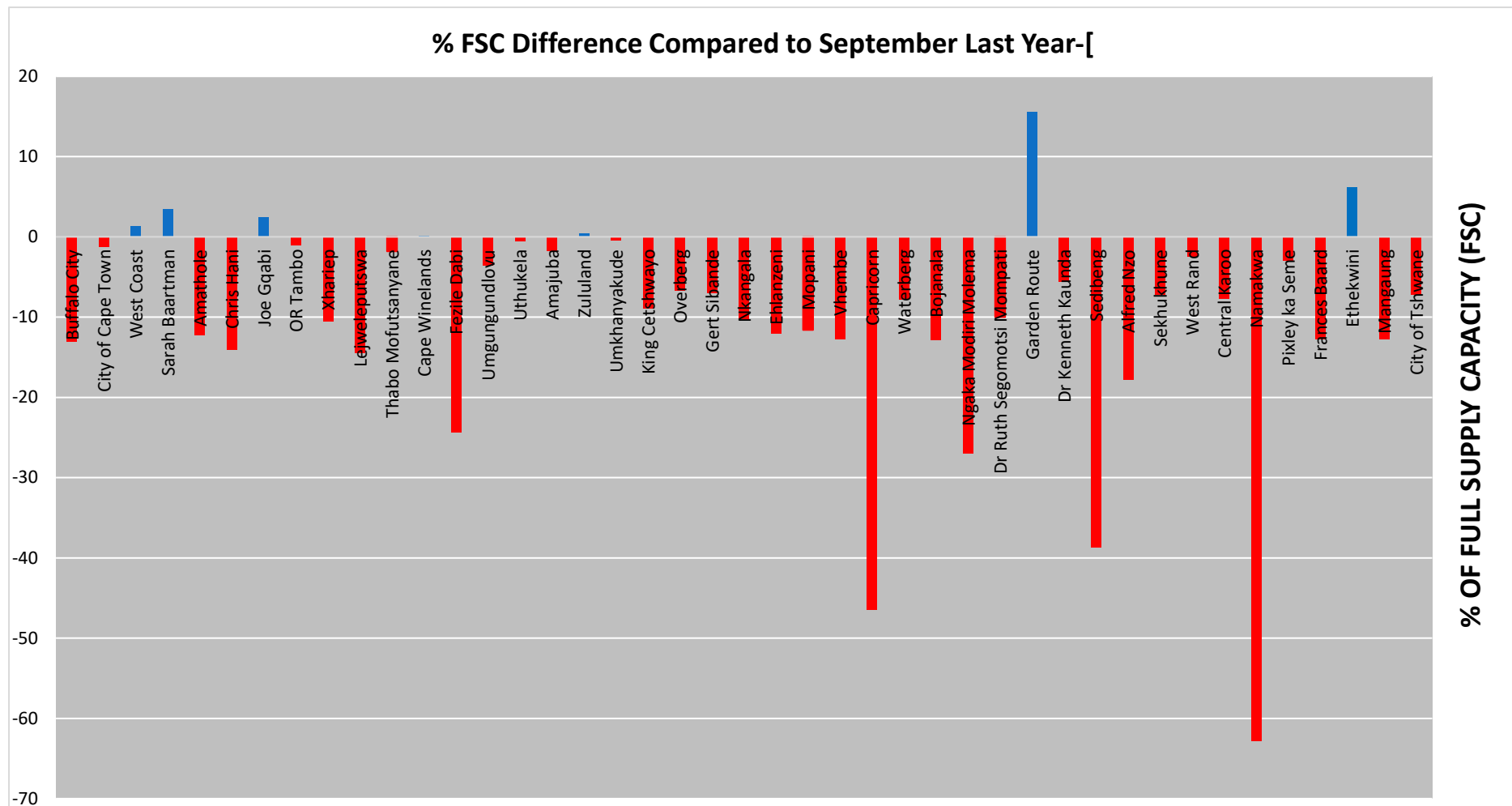


Figure 10: Comparison of water storage levels per District Municipality September 2023 vs September 2024

Table 3: Water Supply Systems storage levels

Water Supply Systems/clusters	Capacity in 10 ⁶ m ³	30 September 2023 (% FSC)	30 September 2024 (% FSC)	System Description
Algoa WSS	282	71.5	75.9	<u>The following 5 dams serve the Nelson Mandela Bay Metro, Sarah Baartman (SB) DM, Kouga LM and Gamtoos Irrigation:</u> Kromrivier Dam, Impofu Dam, Kouga Dam, Loerie Dam, Groendal Dam
Amathole WSS	241	100.6	91.4	<u>The following 6 dams serve Bisho & Buffalo City, East London:</u> Laing Dam, Rooikrans Dam, Bridle Drift Dam, Nahoon Dam, Gubu Dam, Wriggleswade Dam
Klipplaat WSS	57	100.8	94.6	<u>The following 3 dams serve Queenstown (Chris Hani DM, Enoch Ngijima LM):</u> Boesmanskrantz Dam, Waterdown Dam, Ockraal Dam
Luvuvhu WSS	225	98.3	92.4	<u>The following 3 dams serve Thohoyandou etc:</u> Albasini Dam, Vondo Dam, Nandoni Dam
Bloemfontein WSS	219	94.3	81.2	<u>The following 4 dams serve Bloemfontein, Botshabelo and Thaba Nchu:</u> Rustfontein Dam, Groothoek Dam, Welbedacht Dam, Knellpoort Dam
Butterworth WSS	14	100.2	77.6	<u>Xilinx Dam and Gcuwa weirs serve Butterworth</u>
Integrated Vaal River WSS	10 546	90.9	75.9	<u>The following 14 dams serve Gauteng, Sasol, and Eskom: Vaal Dam, Grootdraai Dam, Sterkfontein Dam, Bloemhof Dam, Katse Dam, Mohale Dam, Woodstock Dam, Zaaihoek Dam, Jericho Dam, Westoe Dam, Morgenstond Dam, Heyshope Dam, Nooitgedacht Dam, Vygeboom Dam</u>
Polokwane WSS	254.27	96.5	85.1	<u>The following 2 dams serve Polokwane: Flag Boshielo Dam, Ebenezer Dam</u>
Crocodile West WSS	444	94.5	86.3	<u>The following 7 dams serve Tshwane up to Rustenburg:</u> Hartbeespoort Dam, Rietvlei Dam, Bospoort Dam, Roodeplaat Dam, Klipvoor Dam, Vaalkop Dam, and Roodekopjes Dam
uMgeni WSS	923	87.1	85.2	<u>The following 5 dams serve Ethekewini, iLembe & Msunduzi:</u> Midmar Dam, Nagle Dam, Albert Falls Dam, Inanda Dam, and Spring Grove Dam
Cape Town WSS	889	104.6	100.2	<u>The following 6 dams serve the City of Cape Town:</u> Voelvlei Dam, Wemmershoek Dam, Berg River Dam, Steenbras-Lower Dam, Steenbras-Upper Dam, and Theewaterskloof Dam
Crocodile East WSS	159	92.5	77.4	Kwena Dam supplies Nelspruit, KaNyamazane, Matsulu, Malelane, and Komatipoort areas and surroundings
Orange WSS	7 996	91.7	81.3	<u>The following two dams service parts of the Free State, Northern, and Eastern Cape provinces:</u> Gariiep Dam, and Vanderkloof Dam

Water Supply Systems/clusters	Capacity in 10 ⁶ m ³	30 September 2023 (% FSC)	30 September 2024 (% FSC)	System Description
uMhlathuze WSS	301	98.4	89.5	Goedertrouw Dam supplies Richards Bay, Empangeni small towns surrounding rural areas, industries, and irrigators, supported by lakes and transfer from Thukela River

Table 4: Water Supply Systems with Restrictions

Water Supply Systems/clusters	Restrictions
Algoa WSS	The decision date was changed from 1 June to 1 November, therefore new AOA was conducted, and water restrictions were imposed as from 1 November 2023, Urban (Domestic and Industrial) = 5%, Irrigation = 15% for Kouga Subsystem and Urban (Domestic and Industrial) = 40%, Irrigation = 50% for the Kromme Subsystem, Gazetted on 26 April 2024 (Notice No. 50569)
Bloemfontein WSS	A 15% restriction has been recommended on Domestic and Industrial water supply when the system drops below 95%, notice is yet to be gazetted
Polokwane WSS	20% restrictions on Domestic and Industrial

Extreme Weather Conditions - September 2024

Despite strong warming trends in surface air temperatures across Southern Africa, extreme low temperatures occasionally occur. The primary weather systems associated with these conditions over South Africa are ridging anticyclones from the South Atlantic Ocean (Ndarana *et al.*, 2021) and mid-tropospheric cut-off low-pressure systems aloft. Cold fronts, which usually precede ridging anticyclones, account for the majority of cold air advection from higher colder latitudes, such as the South Atlantic High ridges over southern Africa (Ndarana *et al.*, 2021).

The most recent extreme low-temperature event occurred from 18-21 September 2024. It began with a cold front that landed in the Western Cape on Wednesday, 18 September 2024, causing showers and rain in the southwestern parts of the country and spreading to the Garden Route and Little Karoo. On Thursday (19 September 2024), surface temperatures dropped dramatically across parts of the Western Cape's interior and the Eastern Cape (Figure 11). The cold front was followed by the development of an intense cut-off low-pressure system along the border of the Northern and Eastern Cape provinces, which moved into some parts of KwaZulu Natal and Free State.

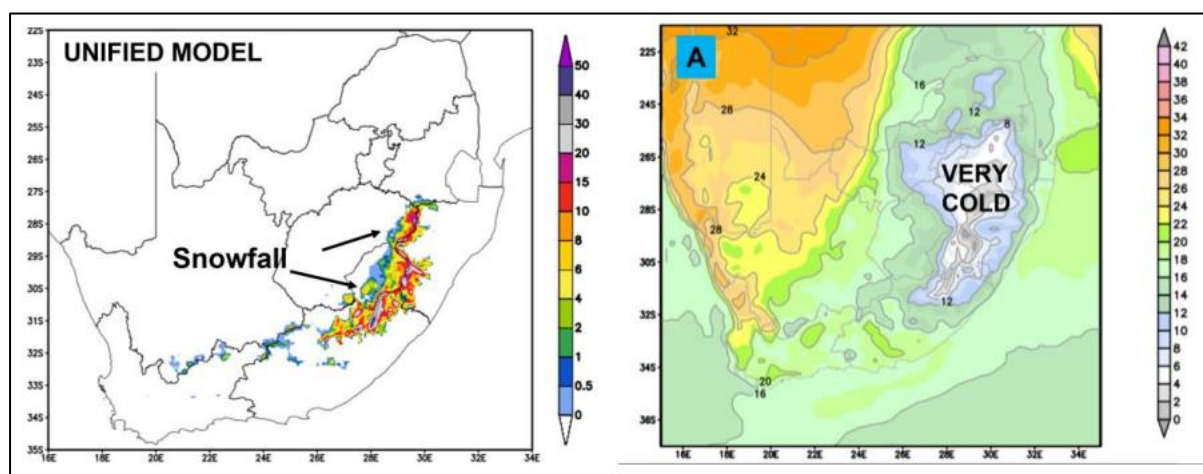


Figure 11: Snowfall prediction (in cm) according to the Unified Model (left) for Friday into Saturday (20 and 21 September) and the maximum forecasted temperatures (in °C) (right) according to the Global Forecast System (GFS). (Source: Global Forecast System (GFS), SAWS)

SAWS started issuing severe weather warnings of up to Orange Level 6 for disruptive snow on the 19th of September 2024, some severe weather warnings are presented in Figure 12. Predictions for the amount of snowfall varied from 15 to 30 cm over the high-lying regions of the Eastern Cape's northeast, KwaZulu-Natal's western and southern regions, the eastern Free State, and the southern Highveld and escarpment of Mpumalanga. The alert was effective from Friday, 20 September 2024, until early Saturday morning, 21 September 2024.

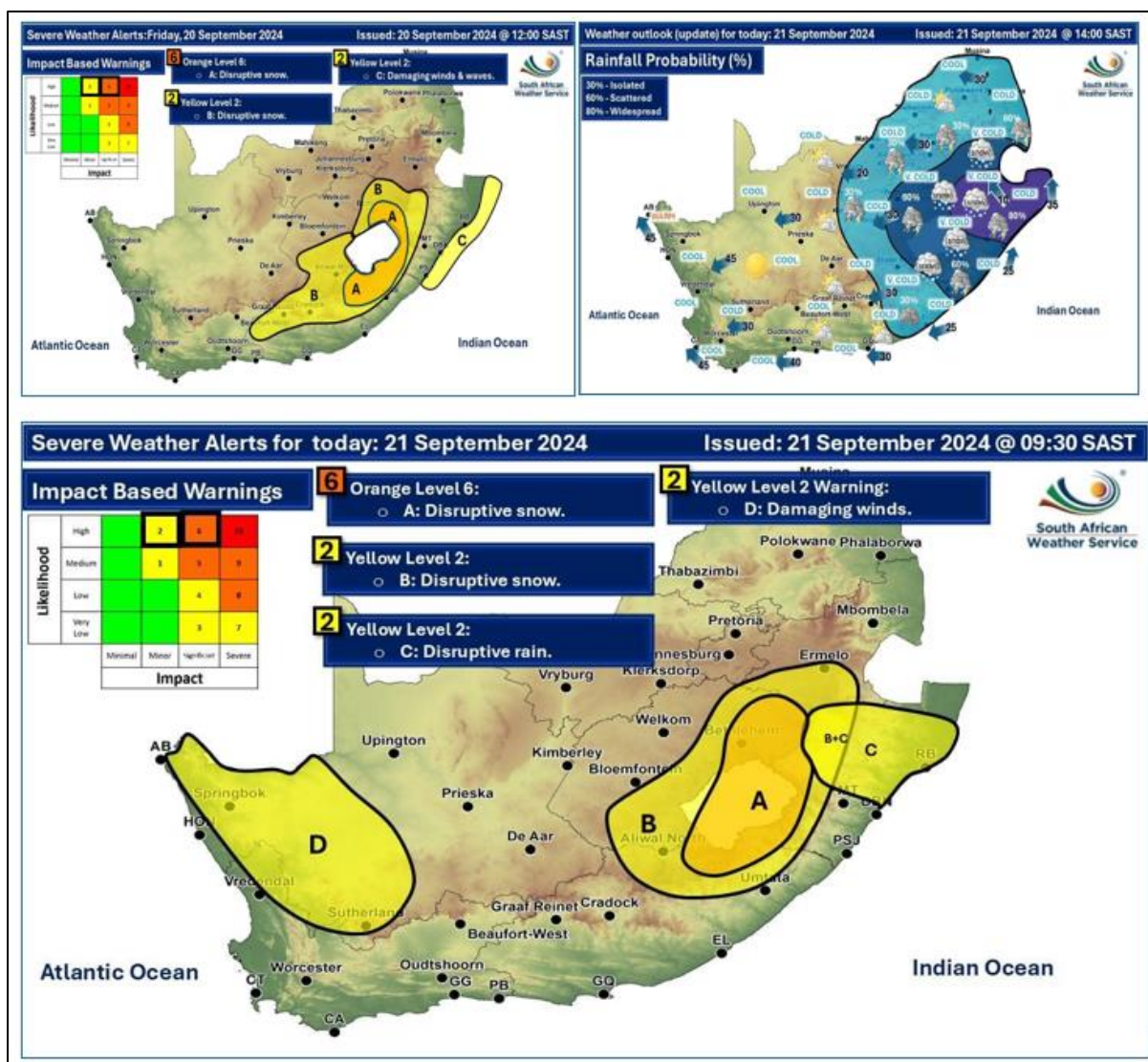


Figure 12: Severe weather warnings for disruptive precipitation (Source: SAWS).

As predicted, KwaZulu Natal, Eastern Cape, and portions of the Free State experienced disruptive snowfall, covering their higher ground regions. Numerous vehicles were left stranded on national routes due to the hazardous conditions on the roads. Traffic came to a complete stop overnight on Friday 21 September 2024, trapping travelers in their cars for over 24 hours (Figure 13). KZN government reported that there were over 1 800 vehicles that were stuck on the N3 between Van Reenen's Pass through Montrose up to the Mooi River plaza. At least two people died from hypothermia while trapped on the N3.

Although South Africa receives snow from time to time, the amount of snow that fell between Free State and KwaZulu Natal was unprecedented. According to SAWS records, snow of this magnitude in the spring last occurred in Gauteng on 10 September 1981. Another event occurred in July 1996, when snow depths reached one meter in parts of Lesotho and the Drakensberg region.



Figure 13: Vehicles trapped in snow on the road (Source: Facebook).

Compiled by: Hulisani Mafenya, Nokulunga Biyase, Mirrander Ndhlovu, Thandekile Mbili and Joshua Rasifudi

For technical inputs and enquiries:

Sub-Directorate: Integrated Water Resource Studies:

Tel: 012 336 6856

Email: IntegratedWaterStudies@dws.gov.za

Accessible on the Website:

National State of Water Reporting Web page:

<https://www.dws.gov.za/Projects/National%20State%20of%20Water%20Report/default.aspx>

Department of Water and Sanitation

Private Bag X313

Pretoria

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Glossary

Term	Definition
EDCs	Endocrine Disrupting Compounds
ENSO	El Niño-Southern Oscillation
FSC	Full Storage Capacity
HY	Hydrological Year
SAWS	South African Weather Service
SPI	Standardized Precipitation Index (SPI) is a widely used index to characterise meteorological drought on a range of timescales. On short timescales, the SPI is closely related to soil moisture, while at longer timescales, the SPI can be related to groundwater and reservoir storage
WCWSS	Western Cape Water Supply System
WSS	Water Supply System
Water Supply System	A typical town/city water supply system consists of a gravity or pumping-based transmission and distribution system from a local or distant water source with a needed water treatment system

References

Ndarana,T, Mpati,S, Bopape, M, Engelbrecht,F, and Chikoore,H. (2021). The flow and moisture fluxes associated with ridging South Atlantic Ocean anticyclones during the subtropical Southern African summer. International Journal of Climatology, Vol:41, Issue: S1.