

February 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 is currently in a strong El Niño state predicted to persist through the 2024 summer season. The event is associated with drier and warmer conditions during the summer seasons. As a result, in February, below-normal rainfall was received in most parts of the Country, while only isolated parts of the Western Cape, Mpumalanga, and Limpopo Provinces received above-normal rainfalls.

The most recent 24-month Standardised Precipitation Index revealed that the Northern Cape (Namakwa District) remains the Province mostly affected by moderate to severe drought, followed by the Sarah Baartman District in the Eastern Cape, also experiencing moderate to severe drought. Some districts in the Western Cape, Limpopo, Free State, and North-West experienced only moderate drought conditions in the last 24 months.

At the end of February 2024, the national dam levels were at 89% of full supply capacity (FSC). This is lower than last year's same period of reporting when national storage was at 98% of FSC. Approximately 28% of the dams nationally were above 100% of FSC (either full or spilling), 65% were between 50 and 100% of FSC, 6% were between 10 and 50% of FSC, and at least 1% were at <10% of FSC (critically low). The comparison of dam storage levels in January and February shows no improvement in dam levels for the current reporting period, which can be attributed to the drier and warmer conditions being experienced throughout the Country.

The analysis of the surface water storage in the Western Cape Water Supply System revealed that the Province's surface water storage is steadily decreasing; however, it should be noted that this system falls in the winter rainfall region, implying that the dams are filled during the wet winter months, from May to October. The Province experienced persistent extreme heat in February, with maximum temperatures exceeding 40 Degrees Celsius.

Rainfall

The distribution of total monthly rainfall across the Country for October to February 2024 is presented in Figure 1. The Country is currently in a strong El Niño state. This El Niño event was predicted to persist through the 2024 summer season, and thereafter, it is predicted to weaken with ENSO neutral conditions by the 2024 winter season. Rainfalls (100-200 mm) were observed over isolated parts of the Limpopo and Mpumalanga Provinces.

The monthly rainfall anomalies expressed as a percentage of normal rainfall are presented in Figure 2. Below-normal rainfall was received in most parts of the Country, while only isolated parts of the Western Cape, Mpumalanga, and Limpopo Provinces received above-normal rainfalls.

The South African Weather Service (SAWS) multi-model rainfall forecast has indicated mostly below-normal rainfall over most of the Country during Jan-Feb-Mar (JFM), Feb-Mar-Apr (FMA), and Mar-Apr-May (MAM) except the central and eastern coastal areas indicating higher likelihood of above-normal rainfall. Minimum and maximum temperatures are expected to be mostly above-normal countrywide for the forecast period.

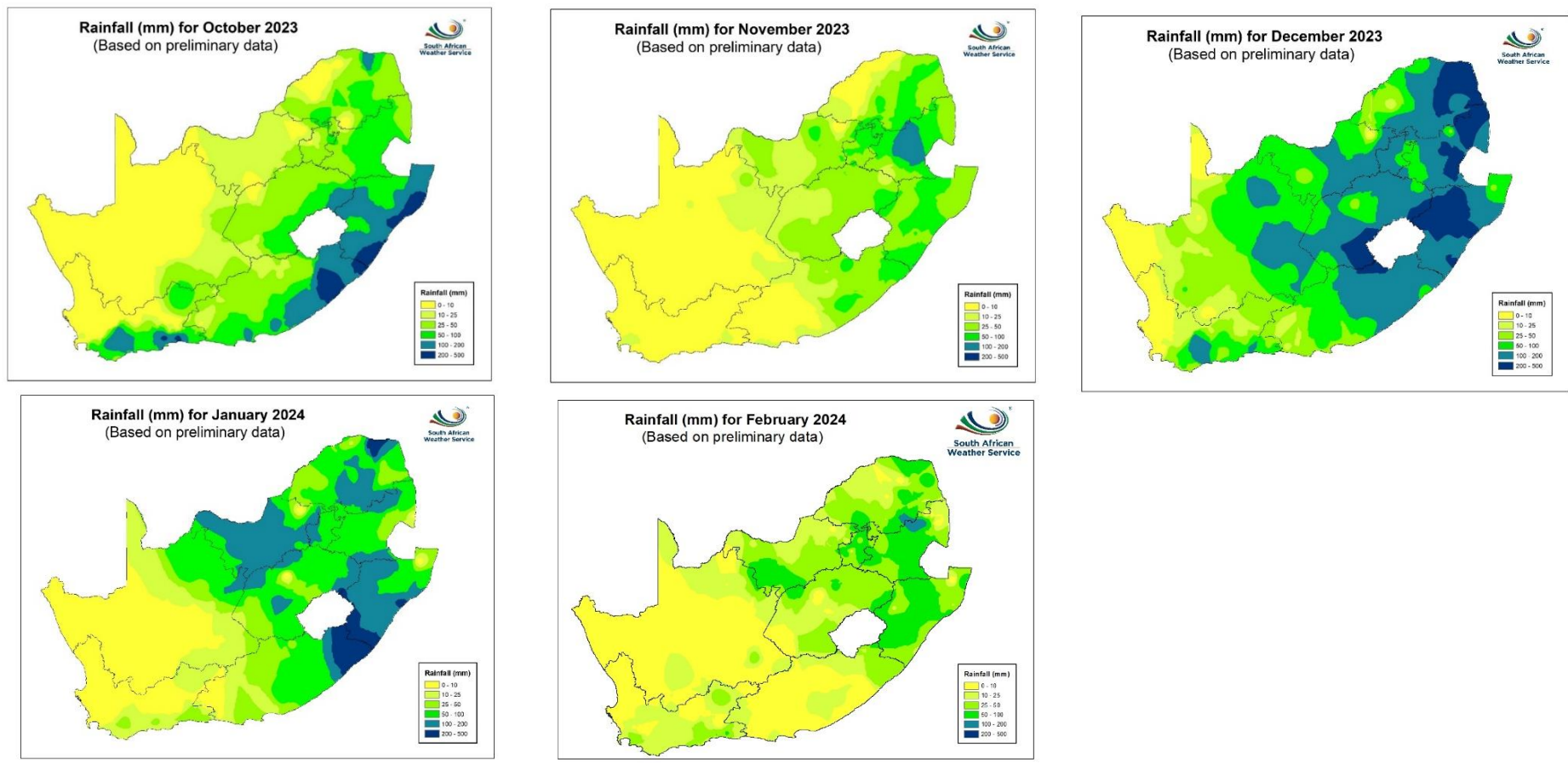


Figure 1: Summer season monthly rainfall distribution for October 2023 to February 2024 (Source: SAWS <https://www.weathersa.co.za/home/historicalrain>)

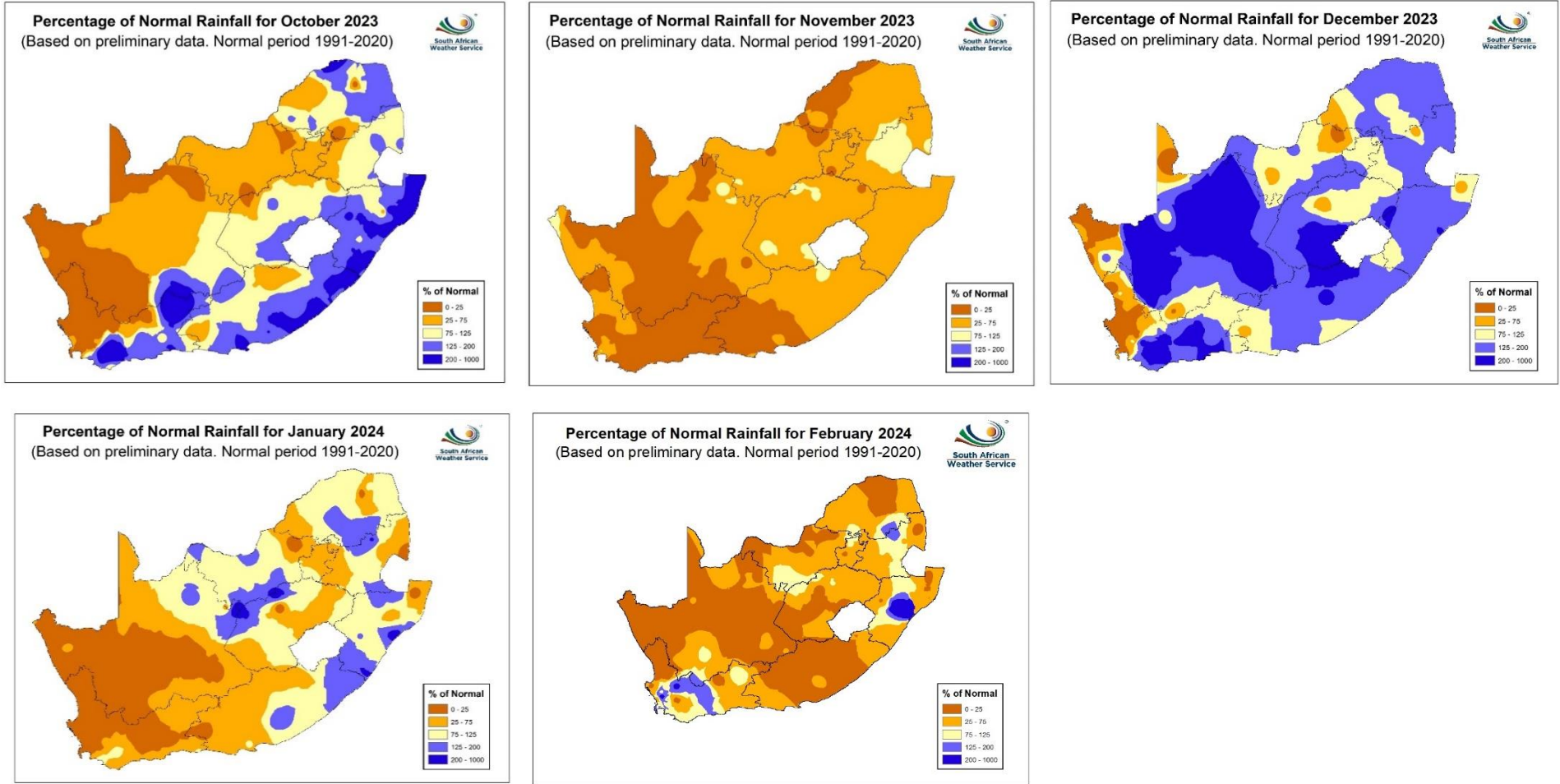


Figure 2: Summer season Percentage of normal rainfall for October 2023 to February 2024. Blue shades are indicative of above-normal rain, and the darker yellow shades of below-normal rainfall (Source: SAWS <https://www.weathersa.co.za/home/historicalrain>)

National Dam Storage

At the end of February 2024, the national dam levels were at **89%** of full supply capacity (FSC). This is lower than last year's same period of reporting when national storage was at **98%** of FSC. Approximately **28%** of the dams nationally were **above 100% of FSC** (either full or spilling), **65%** were between 50 and 100% of FSC, **6%** were between 10 and 50% of FSC, and at least **1%** were at <10% of FSC (critically low). The Country's five largest dam storage %FSC, February 2023 vs February 2024 comparison is presented in Table 1. Because of the drier and warmer conditions experienced this summer, there was no significant increase in the storage for the highlighted large dam during February as compared to the previous year.

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

Reservoir	River	Province/Country	26 February 2023 (%FSC)	26 February 2024 (%FSC)	% Change (-/+)
Vaal Dam	Vaal River	Free State	109.8	68.5	-41.3
Katse Dam	Malibamatso River	Kingdom of Lesotho	100.1	97.5	-2.6
Gariiep Dam	Orange River	Free State	110.2	93.8	-16.4
Vanderkloof Dam	Orange River	Free State	109.7	98.1	-11.6
Pongolapoort Dam	Phongolo River	Kwazulu-Natal	87.5	81.5	-6

A dam storage level comparison for February 2023 and February 2024 is given in **Error! Not a valid bookmark self-reference..** The critical status of these dams worsened in February 2024 as compared to the previous year. The spatial distribution of the dams and a classified range of their storage levels on 26 February 2024 is presented in Figure 3.

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

Reservoir	River	Province/Country	26 February 2023 (%FSC)	26 February 2024 (%FSC)	% Change (-/+)
Middel-Letaba Dam	Middel-Letaba River	Limpopo	7.4	2.7	-4.7
Leeugamka Dam	Leeu River	Western Cape - Other Rainfall	74.5	0.7	-73.8

Figure 4 presents the 24-month Standardised Precipitation Index (SPI) for January 2024, indicating that several District Municipalities experienced droughts over the last 24 months. The Northern Cape (Namakwa district) remains the Province most affected by moderate to severe drought, followed by the Sarah Baartman district in the Eastern Cape, which is experiencing moderate to severe drought. Other districts that have experienced moderate drought in the last 24 months include the City of Cape Town in Western Cape, the Thabo Mafutsanyane District in Free State, the Mopani and Capricorn Districts in Limpopo, and the Ngaka Modiri Molema District in the North-West. Drought conditions in these areas are a result of continuous below-normal rainfalls being received.

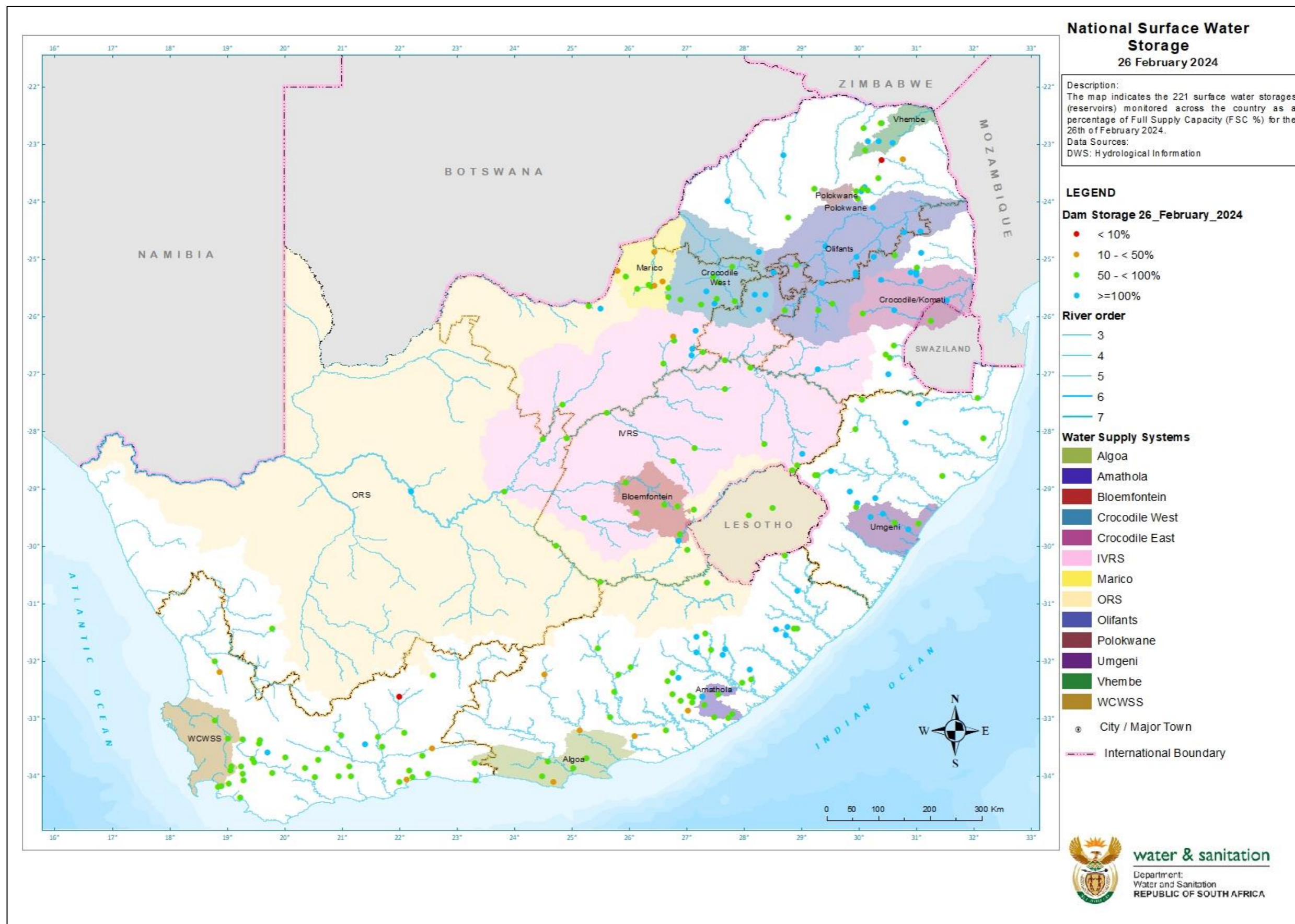


Figure 3: Surface Water Storage Levels - February 2024.

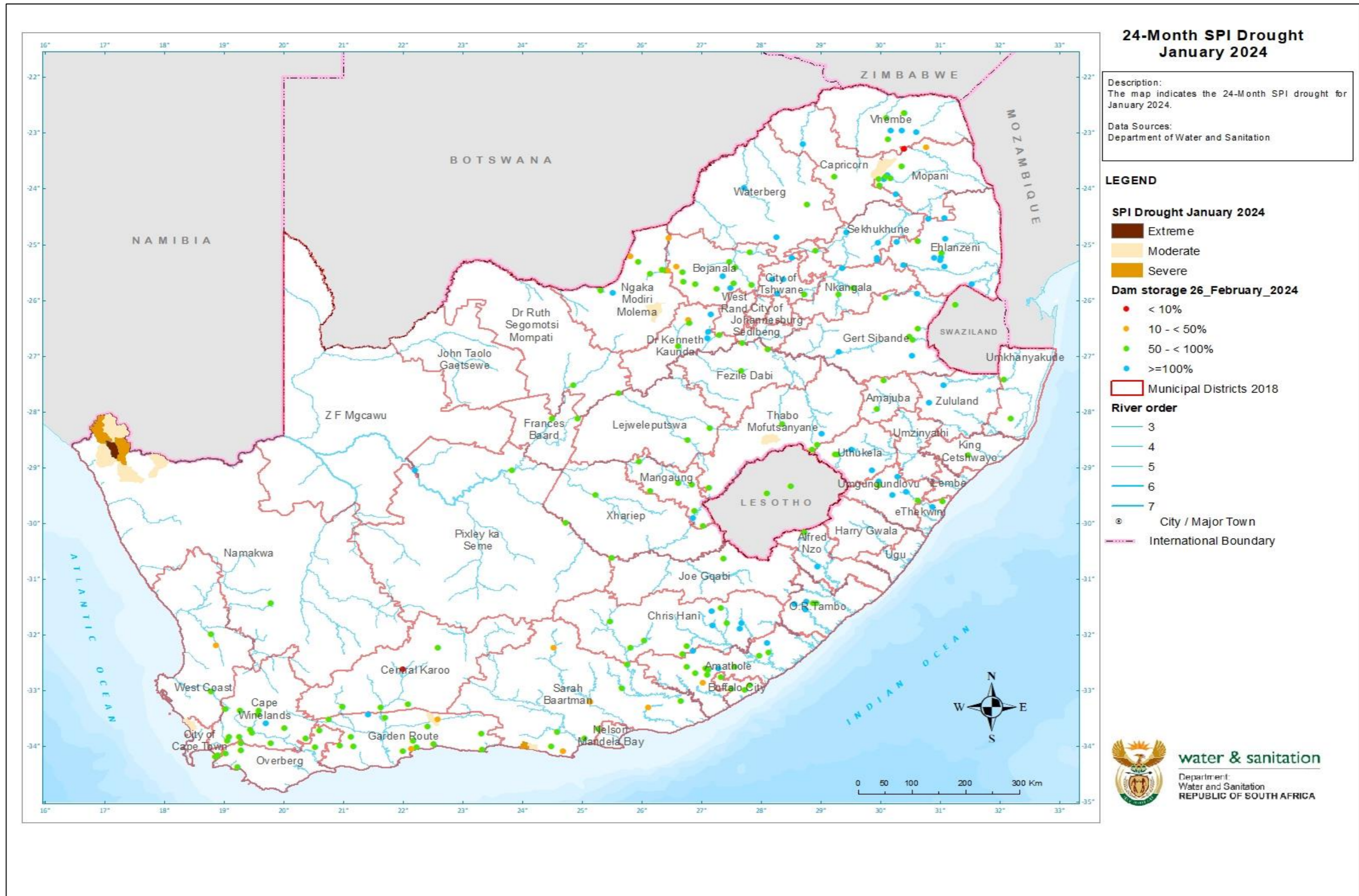


Figure 4: 24-month Spatial Precipitation Index – January 2024

Figure 5 compares the storage levels per Province and International areas for February 2024 to the same time last year. Seven of the nine Provinces presented a decline in dam storage levels compared to the previous year. The two Provinces with increased dam storage levels were Eastern Cape (+4.3%) and Western Cape (+16.4%), while the highest decline was in Northern Cape (-47.2%).

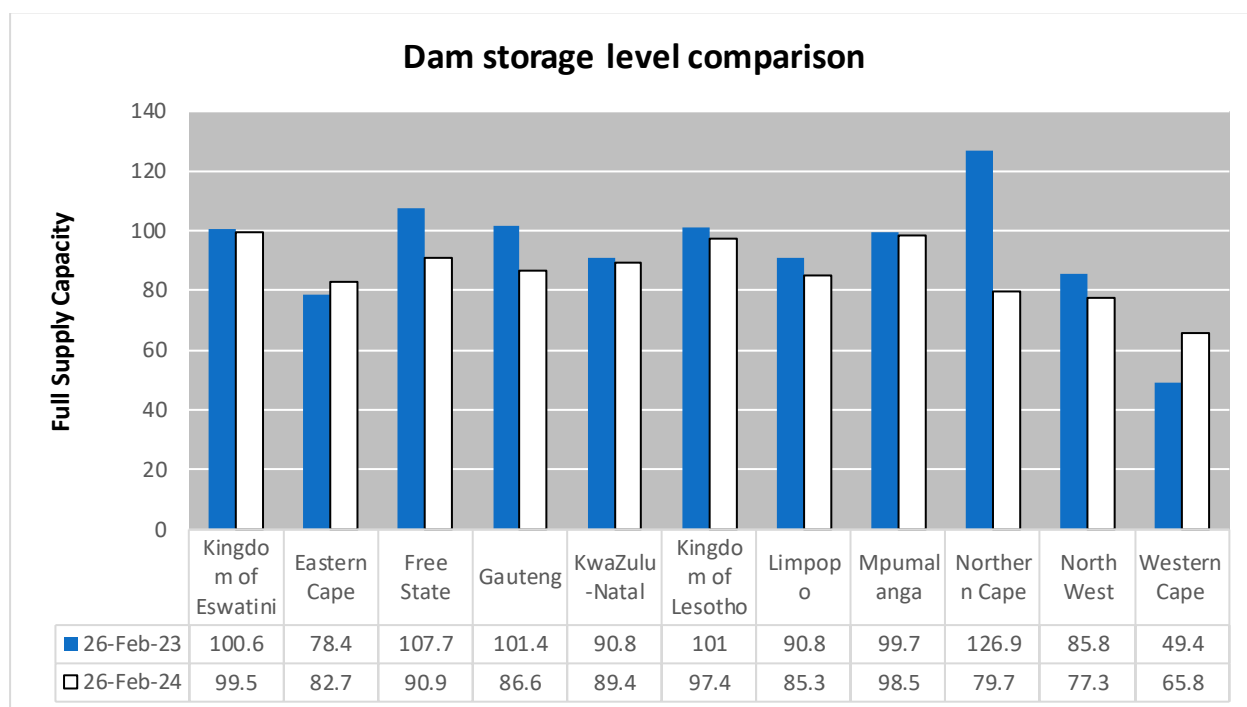


Figure 5: Water Storage Levels February 2023 vs. February 2024.

District Municipalities

The year-on-year comparison of water storage levels per District Municipality (DM) is presented in Figure 6. West Coast DM, Sarah Baartman DM, Cape Winelands DM, Overberg DM, Garden Route DM, and Namakwa DM experienced a significant increase (>20%) in dam storage levels compared to last year. In contrast, Sedibeng DM, Pixley ka Seme DM, and Francis Baard DM experienced significant declines (>-20%) 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 effected 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.

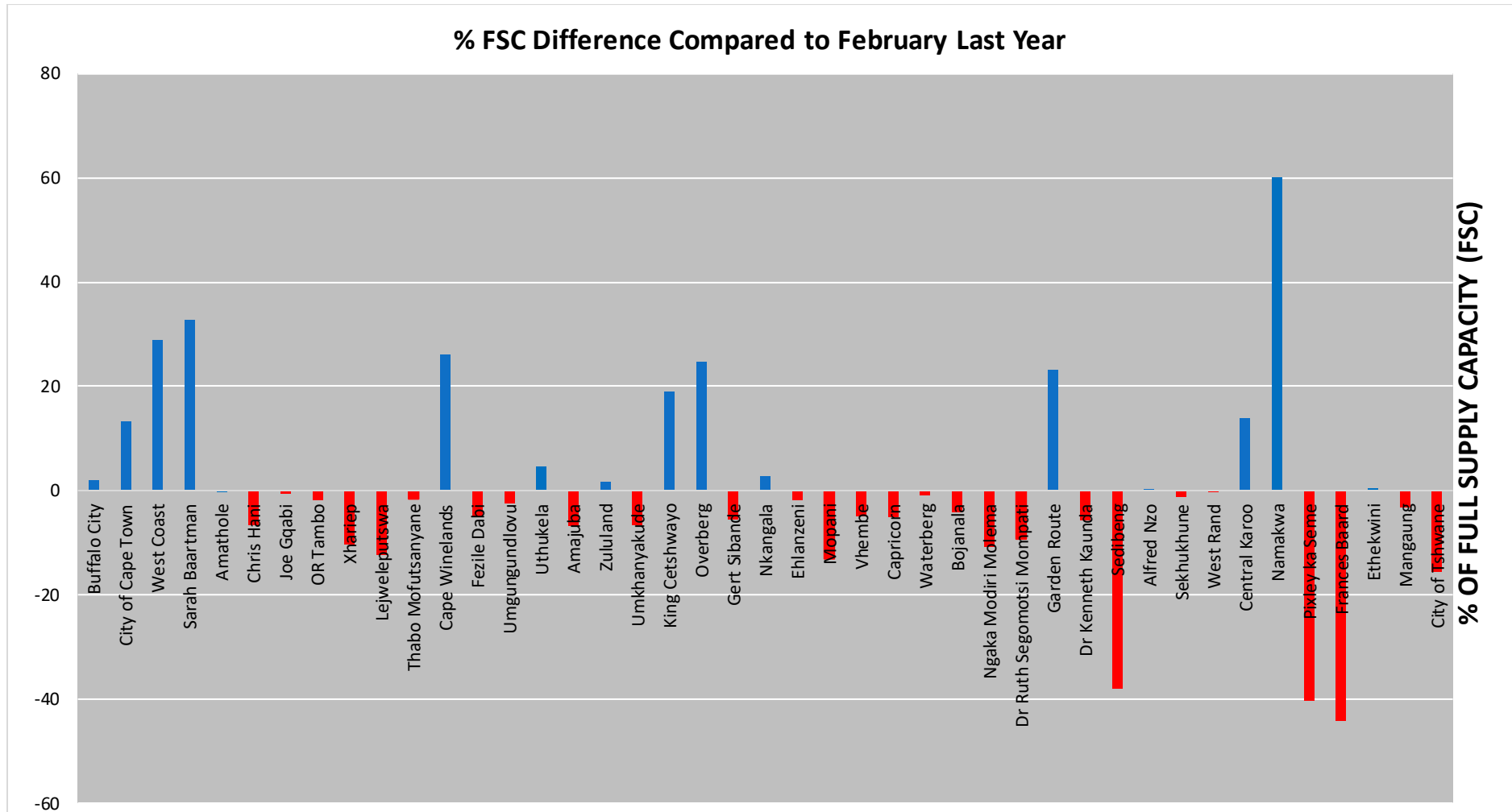


Figure 6: Difference in Water Storage Levels per District Municipality February 2023 vs February 2024

Table 3: Water Supply Systems storage levels

Water Supply Systems/clusters	Capacity in 10 ⁶ m ³	26 February 2023 (% FSC)	19 January 2024 (% FSC)	26 February 2024 (% FSC)	System Description
Algoa System	282	12.2	74.3	73.5	<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 System	241	101.1	99.7	99.2	<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 System	57	100.5	96.8	97.6	<u>The following 3 dams serve Queenstown (Chris Hani DM, Enoch Ngijima LM):</u> Boesmanskrantz Dam, Waterdown Dam, Oxxraal Dam
Luvuvhu	225	103.1	100.3	100.2	<u>The following 3 dams serve Thohoyandou etc:</u> Albasini Dam, Vondo Dam, Nandoni Dam
Bloemfontein	219	100.1	95.9	95.5	<u>The following 4 dams serve Bloemfontein, Botshabelo and Thaba Nchu:</u> Rustfontein Dam, Groothoek Dam, Welbedacht Dam, Knellpoort Dam
Butterworth System	14	100.2	99.3	99.6	<u>Xilinx Dam and Gcuwa weirs serve Butterworth</u>
Integrated Vaal River System	10 546	103.2	90.4	89.9	<u>The following 14 dams serve Gauteng, Sasol, and ESKOM:</u> 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
Polokwane	254.27	104	100.3	100.2	<u>The following 2 dams serve Polokwane:</u> Flag Boshielo Dam, Ebenezer Dam
Crocodile West	444	95.8	93.1	93.5	<u>The Following 7 dams serve Tshwane up to Rustenburg:</u> Hartbeespoort Dam, Rietvlei Dam, Bospoort Dam, Roodeplaat Dam, Klipvoor Dam, Vaalkop Dam, Roodekopjes Dam
uMgeni System	923	102.5	100.3	100.6	<u>The following 5 dams serve Ethekwini, iLembe & Msunduzi:</u> Midmar Dam, Nagle Dam, Albert Falls Dam, Inanda Dam, Spring Grove Dam
Cape Town System	889	56.2	74.9	73.0	<u>The following 6 dams serve the City of Cape Town:</u> Voelvllei Dam, Wemmershoek Dam, Berg River Dam, Steenbras-Lower Dam, Steenbras-Upper Dam, Theewaterskloof Dam
Crocodile East	159	101.3	100.5	100.7	Kwena Dam supplies Nelspruit, KaNyamazane, Matsulu, Malelane and Komatipoort areas and Surroundings

Water Supply Systems/clusters	Capacity in 10 ⁶ m ³	26 February 2023 (% FSC)	19 January 2024 (% FSC)	26 February 2024 (% FSC)	System Description
Orange	7 996	110	96.5	95.4	The Following two dams service parts of the Free State, Northern and Eastern Cape Provinces: Gariep Dam, Vanderkloof Dam
uMhlathuze	301	81.2	99.7	99.4	Goedertrouw Dam supplies Richards Bay, Empangeni Towns, 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	The decision date was changed from 1 June to 1 November, therefore new AOA were conducted, and water restrictions 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, these are yet to be gazetted.
Bloemfontein	A 15% restriction has been recommended on Domestic and Industrial water supply when the system drops below 95%, notice yet to be gazetted.
Polokwane	20% restrictions on Domestic and Industries

Synopsis of the Western Cape Water Supply System (WCWSS) Surface Water Storage

The Western Cape Water Supply System (WCWSS) serves the Greater Cape Town, Stellenbosch, Paarl, and Wellington, as well as towns on the West Coast and the Swartland region. The WCWSS is located in a winter rainfall area with wet winters and dry summers, which means that the dams are filled during the wet winter months, from May to October, when approximately 90% of the annual runoff occurs, and the water requirement comprises only approximately 30% of the annual requirement (DWAF, 2007).

Dam inflows are limited in the dry summer months of November to April. Approximately half of the dam storage volumes must be filled during winter to meet the high-water demand in summer. The remaining 50% of the dam storage volume is needed to provide long-term carry-over storage for dry periods. The dams in the WCWSS are operated in an integrated manner to minimize spillage during wetter years and thus maximize the amount of stored water available for essential uses during droughts (DWAF, 2007).

The Western Cape Province experienced extreme heat in February 2024, with maximum temperatures peaking above 40 degrees Celsius in some areas (Figure 7). The persistent heat contributed to the loss of water in the WCWSS catchments by increasing evaporation and water use. For instance, storage in the Cape Town System decreased from 80.5% of FSC on 29 January 2024 to 73% of FSC on 26 February 2024 (-7.5%).

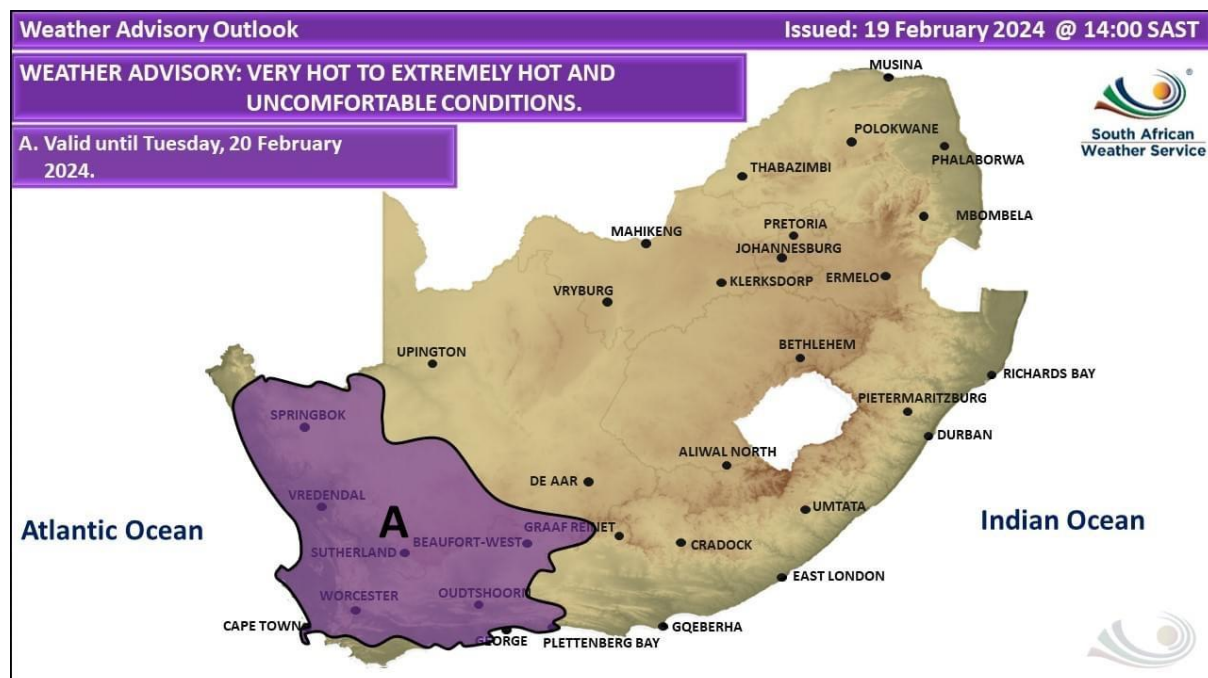


Figure 7: Extreme heat advisory for the Western Cape province (Source: SAWS).

The WCWSS storage for the current reporting period (Figure 8) shows an improvement in the Gouritz River Catchment storage compared to the same period last year, while other catchments regressed. The combined surface water storage for the Cape Town System was at 76.4% during the same period last year, while the Breede is slightly (-0.6%) lower than last year, indicating the impact of recent high temperatures often associated with increased water usage.

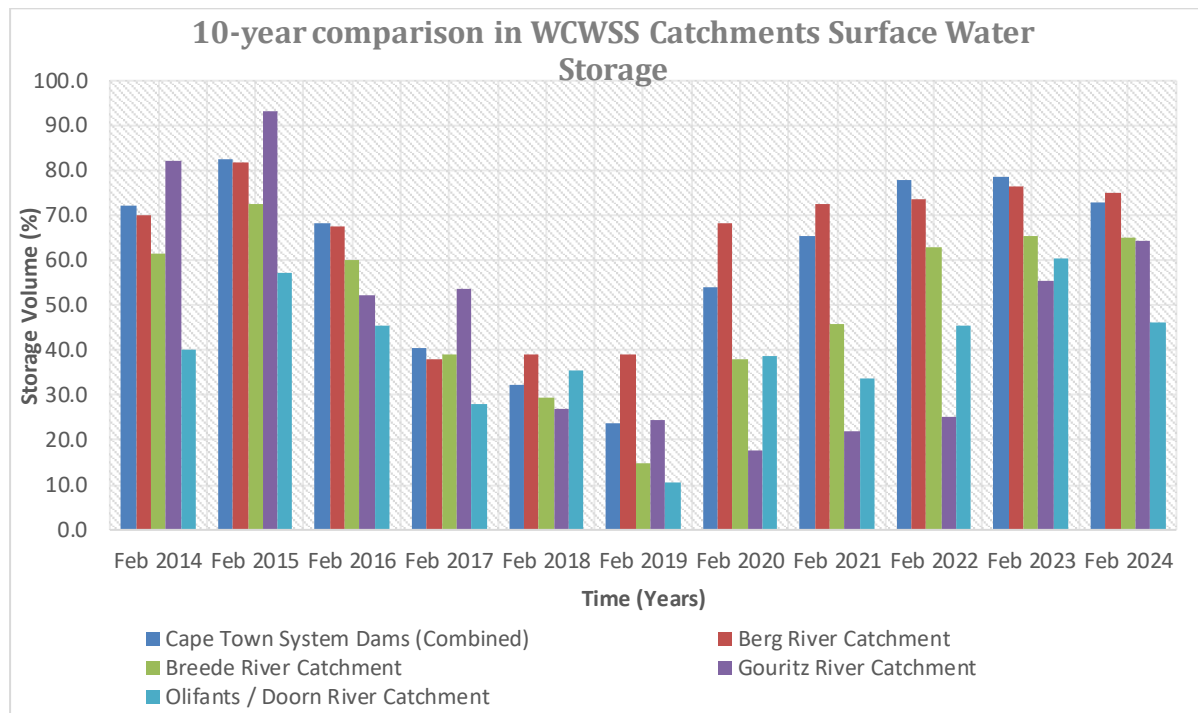


Figure 8: 10-year comparison in surface water storage for WCWSS catchments.

The effects of droughts in the WCWSS are assessed using the DWS suite of models – the Water Resources System Model (WRSM), the Water Resource Yield Model (WRYM), and the Water Resource Planning Model (WRPM). Systems are managed by progressively restricting supplies through a risk-based approach to safeguard the availability and assurance of supply for the water year. The Department imposes these restrictions after consultation with all Water User Associations (WUA) and water service providers and authorities. However, no failures in risk criteria were observed for 2023/24 in the WCWSS System, the local farm dams, and tributary Irrigation on the Upper Berg. According to DWS (2024), due to relatively high system storage levels on the decision date (November), no restrictions were required for the 2024 operating year.

On individual dams, the main storage dams supplying WCWSS are Theewaterskloof, Voëlvlei, Wemmershoek, and the Upper and Lower Steenbras Dams (Table 5). The largest dam in the system is the Theewaterskloof Dam on the Sonderend River (Breede River Catchment), with a storage capacity of 479.3 Mm³. Table 5 and Figure 9 show that on 1 January 2024, actual storage at Theewaterskloof Dam was 88.1% of its FSC and 71.5% by 26 February 2024, tracking outside the worst projected sequence (Figure 9). The performance of the dam may be attributed to constraints faced by the City (DWS, 2024).

Table 5: Storage Levels for the Western Cape Water Supply System (WCWSS)

Dam Name	Full Storage (Net - Mm ³)	Storage 1 Nov 2023 (% Net full; Decision date)	Storage 1 January 2024 (%Net full)	Storage 26 February 2024 (% Net full)
Steenbras Upper	31.8	100.0	97.4	95.2
Steenbras Lower	33.9	100.0	86.5	66.2
Voëlvlei	158.6	100.0	86.1	68.6
Berg River	127.0	100.0	91.6	77.2
Wemmershoek	58.7	100.0	98.4	80.7
Theewaterskloof	479.3	100.0	88.1	71.5
Total System Storage	889.3	100.0	89.2	73.0

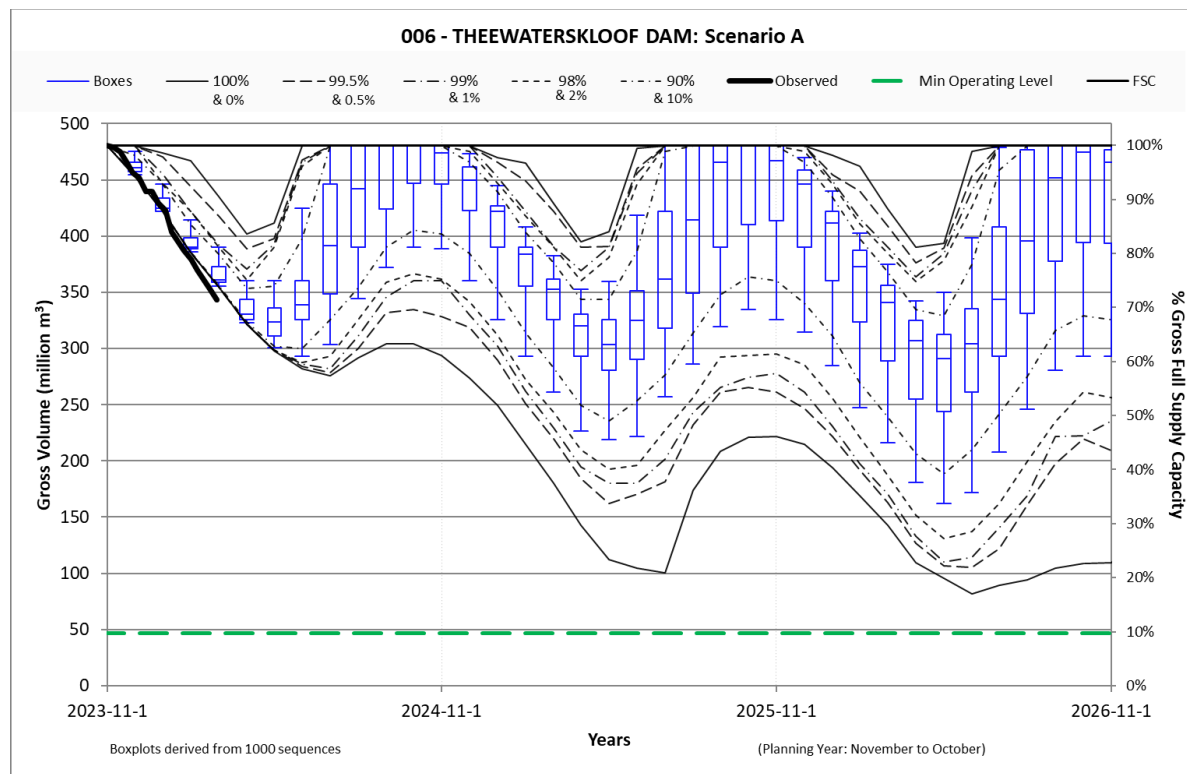


Figure 9: The Theewaterskloof Dam storage monitoring plot (Source: DWS, 2024).

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National State of Water Reporting Web page:

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

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Glossary

Term	Definition
FSC	Full Storage Capacity
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
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 needed water treatment system

References

Department of Water Affairs and Forestry (DWAf), 2007. Western Cape Water Supply System: Reconciliation Strategy. DWAf, Pretoria, South Africa.

Department of Water and Sanitation (DWS), 2024. Western Cape Water Supply System Operational Analysis 2023–2024: February 2024 Monthly Monitoring Report. DWS, Pretoria, South Africa.