

November 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), with predictions of weakening further. At the end of November 2024, the national dam levels were **76.5%** of Full Supply Capacity (FSC). This level is lower than the last three hydrological years, at the same time of reporting when national storage levels were greater than 90% of FSC. At least **21.6%** of the national dams were **above 100% of FSC** (either full or spilling), while **64%** were between 50 and 100% of FSC, **11.7%** were between 10 and 50% of FSC, and **1.8%** were below 10% of FSC (critically low).

The most recent 12-month Standardised Precipitation Index revealed that several District Municipalities (DM) experienced severe drought in the last 12 Months, including Namakwa DM, Thabo Mafutsanyane DM, Sarah Baartman DM, Capricorn DM, and Mopani DM. Moreover, district municipalities such as the Zululand DM, Gert Sibande DM, Bojanala DM, Ngaka Modiri Molema DM, Sekhukhune DM, Ekurhuleni DM, and Sedibeng DM experienced moderate drought in the last 12 Months.

Rainfall

The South African climate is currently in a neutral El Niño-Southern Oscillation (ENSO) and is predicted to weaken further. However, current South African Weather Service (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, which started in October 2024, is presented in Figure 1 and Figure 2, respectively. In November, most of the provinces received rainfall (25-100 mm). Overall, rainfall between 200 and 500 mm was received over isolated parts of Eastern Cape and KwaZulu Natal.

The monthly rainfall anomalies for the current hydrological year, expressed as a percentage of normal rainfall for October 2024 and November 2024, are presented in Figure 2. Above-normal rainfalls (>100 mm) were received in isolated parts of the Western Cape, Northern Cape, Eastern Cape, Mpumalanga, and KwaZulu Natal.

The SAWS multi-model rainfall and temperature forecast predictions indicate above-normal rainfall for parts of the north-eastern central and coastal areas, with most parts of the summer rainfall areas expected to receive below-normal rainfall. During the latter parts of summer (Feb-Mar-Apr), there is a widespread increase in chances for above-normal rainfall over the summer rainfall areas, potentially indicating a very late influence from the potential La Niña event. 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.

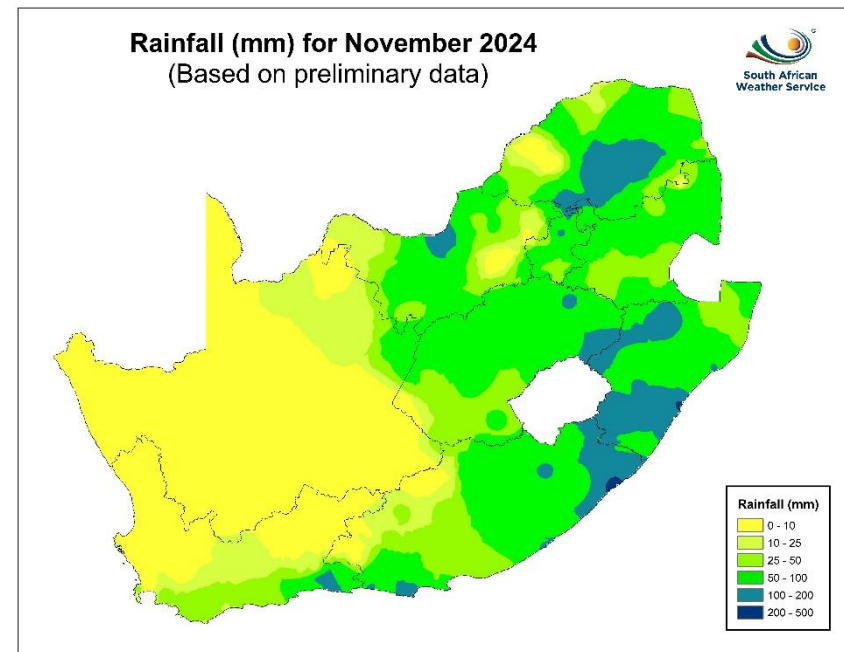
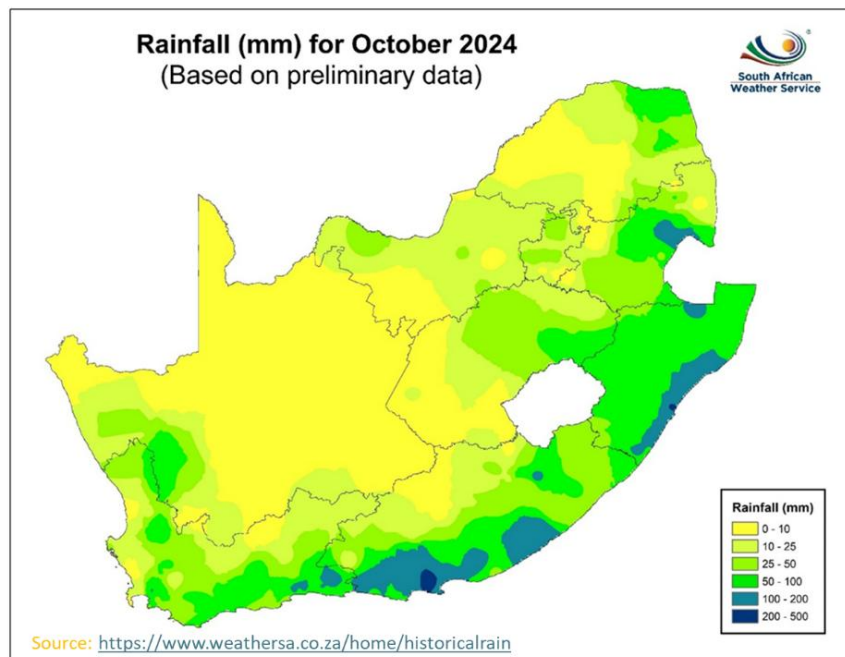


Figure 1: Monthly rainfall distribution for October 2024 and November 2024

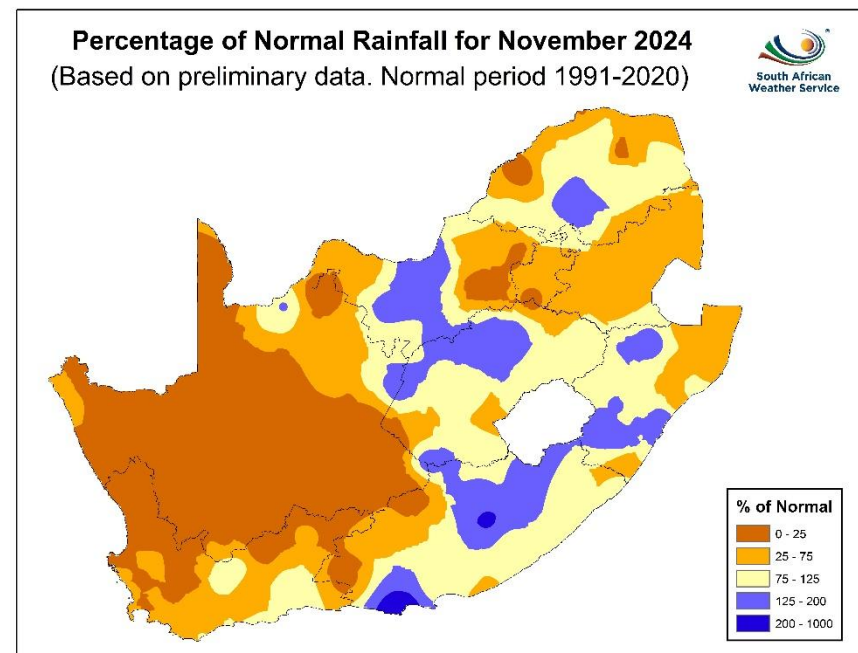
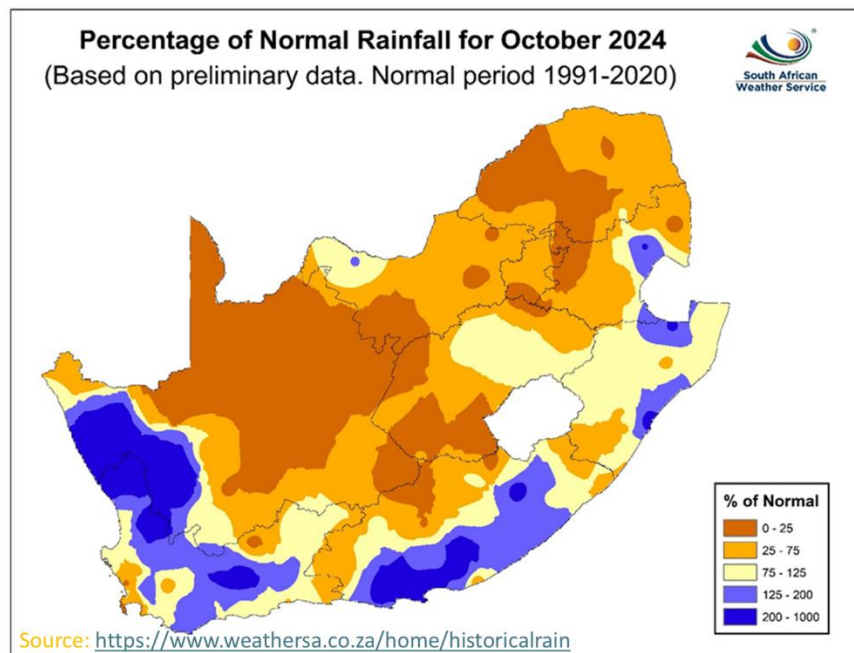


Figure 2: Summer season Percentage of normal rainfall for October 2024 and November 2024.

National Dam Storage

The national dam's water storage trends for the previous four hydrological years and the trend for the current hydrological year (2024/25) are presented in Figure 3. At the end of November 2024, the national dam levels were **76.5%** of Full Supply Capacity (FSC). This level is lower than the last three hydrological years, at the same time of reporting when national storage levels were greater than 85% of FSC.

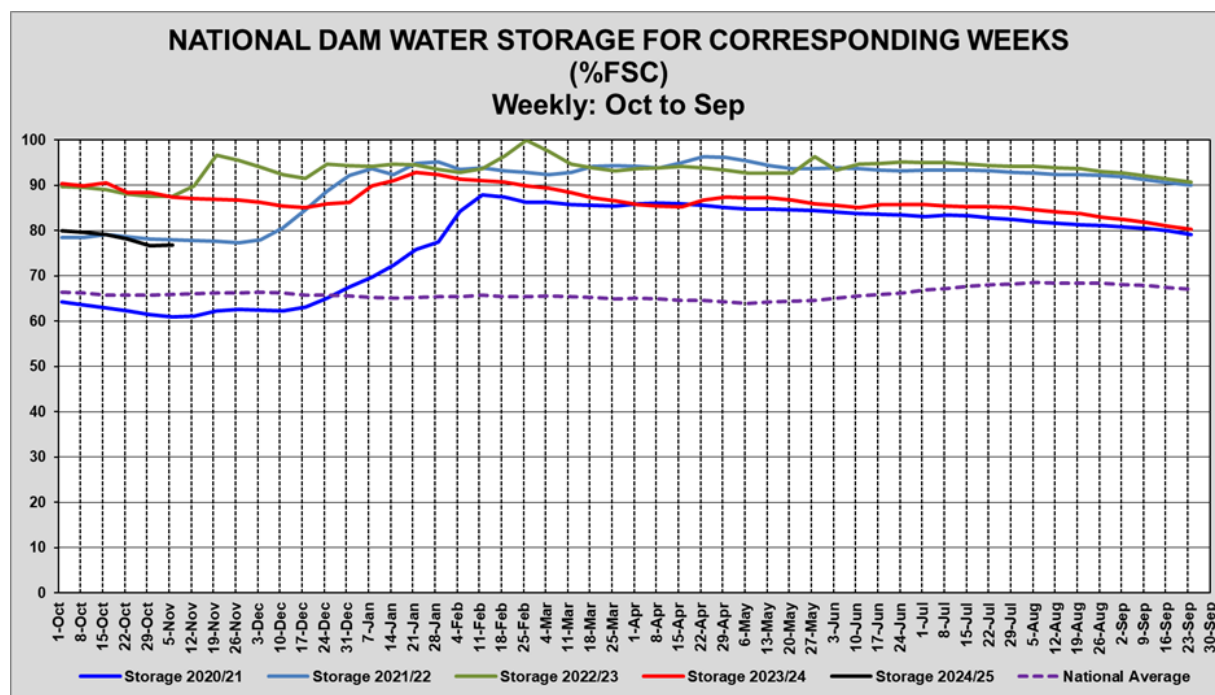


Figure 3: National Dam Storage at the end of November 2024

At least **21.6%** of the national dams were **above 100% of FSC** (either full or spilling), while **64%** were between 50 and 100% of FSC, **11.7%** were between 10 and 50% of FSC, and **1.8%** were below 10% of FSC (critically low). The comparison between October 2023 and October 2024 of the country's five largest dam storage (%of FSC) is presented in Table 1. Due to the drier and warmer conditions experienced in spring 2024 compared to spring 2023, the Vaal Dam and Gariep Dam storage levels have declined by -40.8% and -14.5%, respectively.

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

Reservoir	River	Province	Full Supply Capacity (Mm ³)	25 November 2023 (% FSC)	25 November 2024 (% FSC)	Difference (%)
Gariep Dam	Orange River	Free State	4903.45	88.3	73.8	-14.5
Vanderkloof Dam	Orange River	Free State	3136.93	89.7	88.6	-1.1
Sterkfontein Dam	Nuwejaarspruit River	Free State	2616.9	99.1	98	-1.1
Vaal Dam	Vaal River	Free State	2560.97	70.4	29.6	-40.8
Pongolaport Dam	Phongolo River	KwaZulu Natal	2395.24	72.8	72.4	-0.4

In Limpopo Province, the Middle-Letaba and Glen Alpine Dams remain the only dams at critical levels, while the same is true for Swartruggens Dam in North West Province and Leeugamka Dam in the Western Cape Province, as given in Table 2.

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

Reservoir	River	Province	Full Supply Capacity (Mm ³)	25 November 2023 (% FSC)	25 November 2024 (% FSC)	Difference (%)
Swartruggens Dam	Elands River	North West	0.47	75.5	0.7	-74.8
Middel-Letaba Dam	Middle-Letaba River	Limpopo	171.93	3.2	0.7	-2.5
Glen Alpine Dam	Mogalakwena River	Limpopo	18.89	7.4	0.8	-6.6
Leeugamka Dam	Leeu River	Western Cape	13.41	28.4	7.9	-20.5

The spatial distribution of the dams showing the classified range of their storage levels as of 25 November 2024 is presented in Figure 4. Most of the dams in the Western Cape 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 and 100% of FSC.

Figure 5 presents the 12-month Standardised Precipitation Index (SPI) for October 2024. An observation is made that several district municipalities (DM) have experienced severe droughts in the last 12 months. These include Namakwa DM in the Northern Cape, Thabo Mafutsanyane DM in the Free State, Sarah Baartman DM in the Eastern Cape, and Capricorn and Mopani DMs in Limpopo.

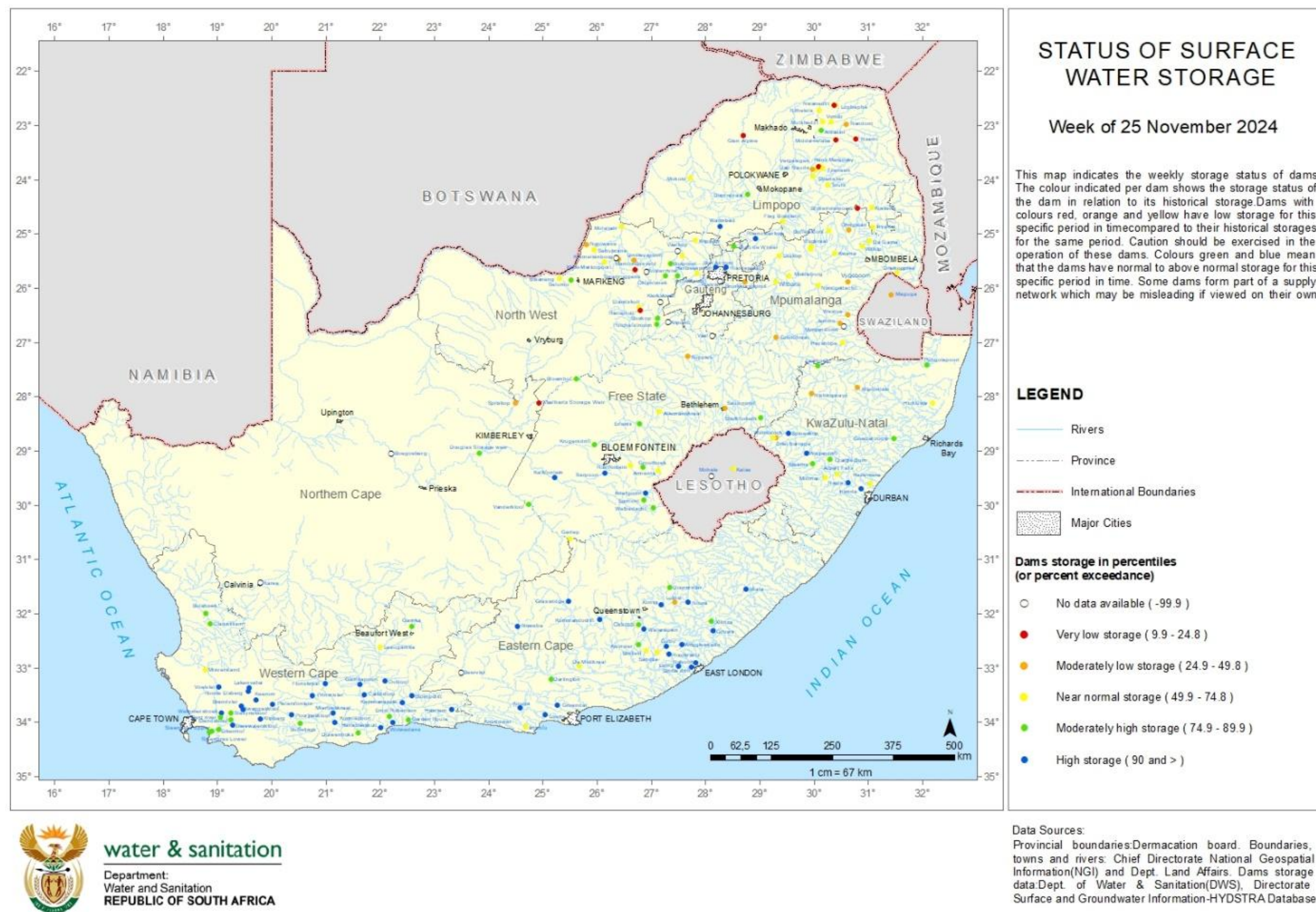
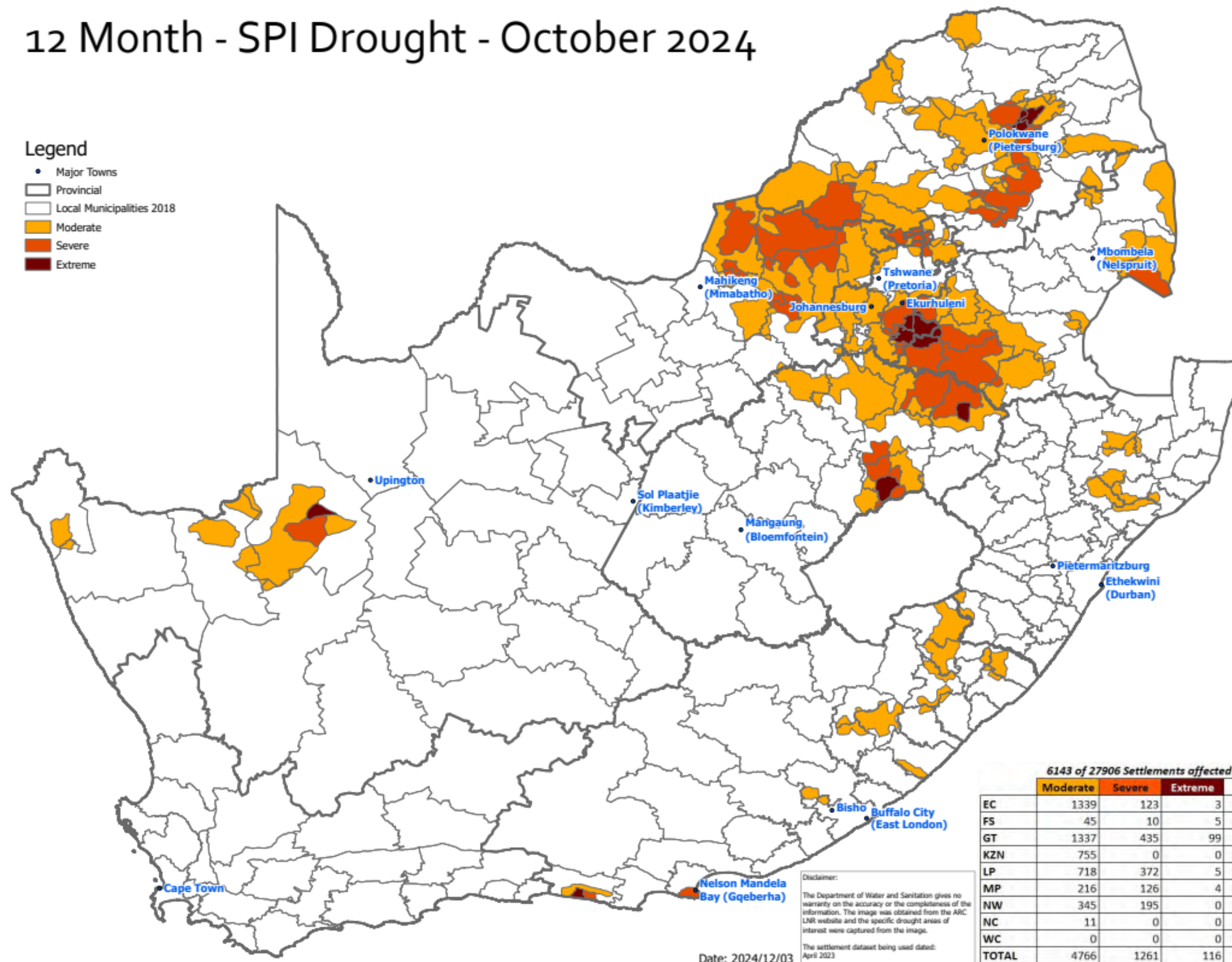


Figure 4 Surface Water Storage Levels - November 2024

12 Month - SPI Drought - October 2024

Legend

- Major Towns
- Provincial
- Local Municipalities 2018
- Moderate
- Severe
- Extreme



6143 of 27906 Settlements affected by drought

	Moderate	Severe	Extreme	Total	Settlements
EC	1339	123	3	1465	9088
FS	45	10	5	60	319
GT	1337	435	99	1871	2515
KZN	755	0	0	755	9465
LP	718	372	5	1095	2675
MP	216	126	4	346	735
NW	345	195	0	540	1042
NC	11	0	0	11	545
WC	0	0	0	0	1522
TOTAL	4766	1261	116	6143	27906

Disclaimer:
The Department of Water and Sanitation gives no warranty on the accuracy or the completeness of the information. The image was obtained from the ARC LNR website and the specific drought areas of interest were captured from the image.
The settlement dataset being used dated: April 2023

Date: 2024/12/03

Figure 5: 12-month Standardised Precipitation Index (SPI) and dam levels

District municipalities such as Zululand DM in KwaZulu-Natal, Gert Sibande DM in Mpumalanga, Bojanala and Ngaka Modiri Molema DMs in North-West, Sekhukhune DM in Limpopo, Ekurhuleni and Sedibeng DMs 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.

The comparison of the storage levels per province and international areas for November 2024 to the same time last year is presented in Figure 6. The provinces showing significant declines ($>-10\%$) in dam storage levels compared to the previous year are Free State (-13.7%), Limpopo (-10.1%), Mpumalanga (-13.3%); Northern Cape (-18.7%), and North West (-21.8%). The Kingdom of Eswatini has also shown significant declines of -29.5% in dam storage over the past 12 months.

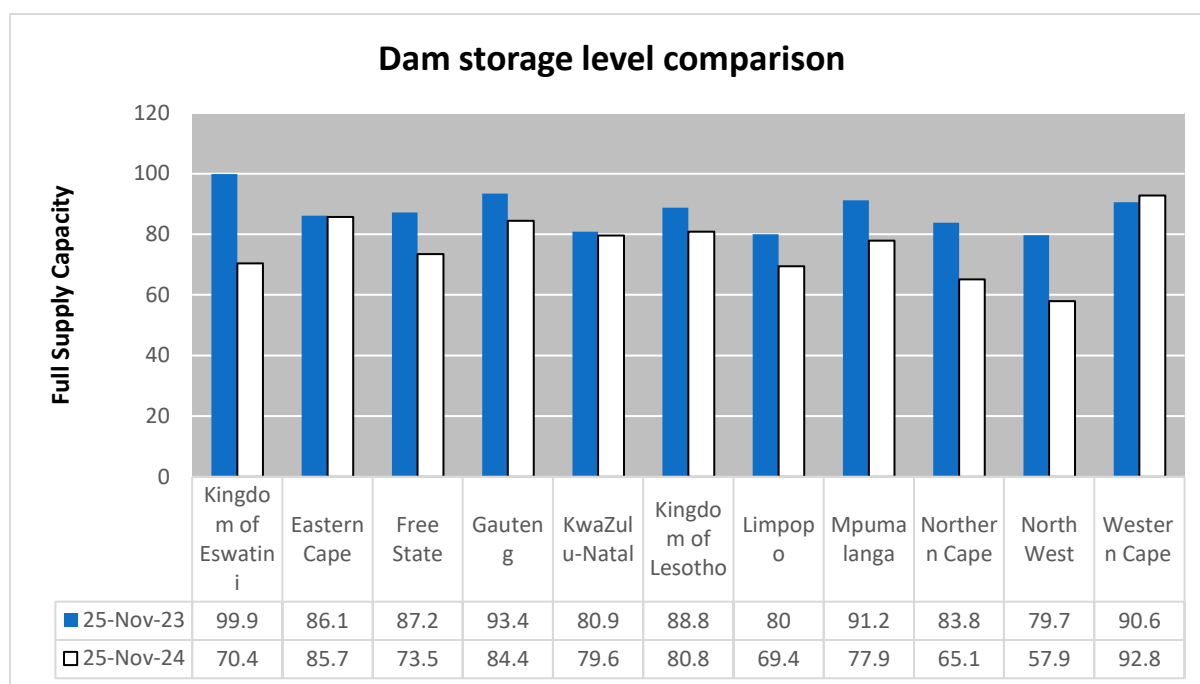


Figure 6: Water Storage Levels November 2023 vs. November 2024

An exception to the declining trend in dam levels Nationally is the Western Cape Province, which could indicate significant and above-normal rainfall received this winter.

District Municipalities

The year-on-year comparison of water storage levels per district municipality is presented in Figure 7. Only the Garden Route DM experienced a significant increase ($>10\%$) in dam storage levels compared to last year. There are six district municipalities which experienced significant declines ($>-20\%$) in dam levels compared to the same time last year, namely, Fezile Dabi DM, Bojanala DM, Ngaka Modiri Molema DM, Sedibeng DM, Alfred Nzo DM, and Francis Baard DM. Furthermore, Capricorn and Namakwa DMs have been shown to experience severe drought status on the 24-month SPI. Meanwhile, Ngaka Modiri Molema and Sedibeng DMs are experiencing moderate drought status on the 24-month SPI.

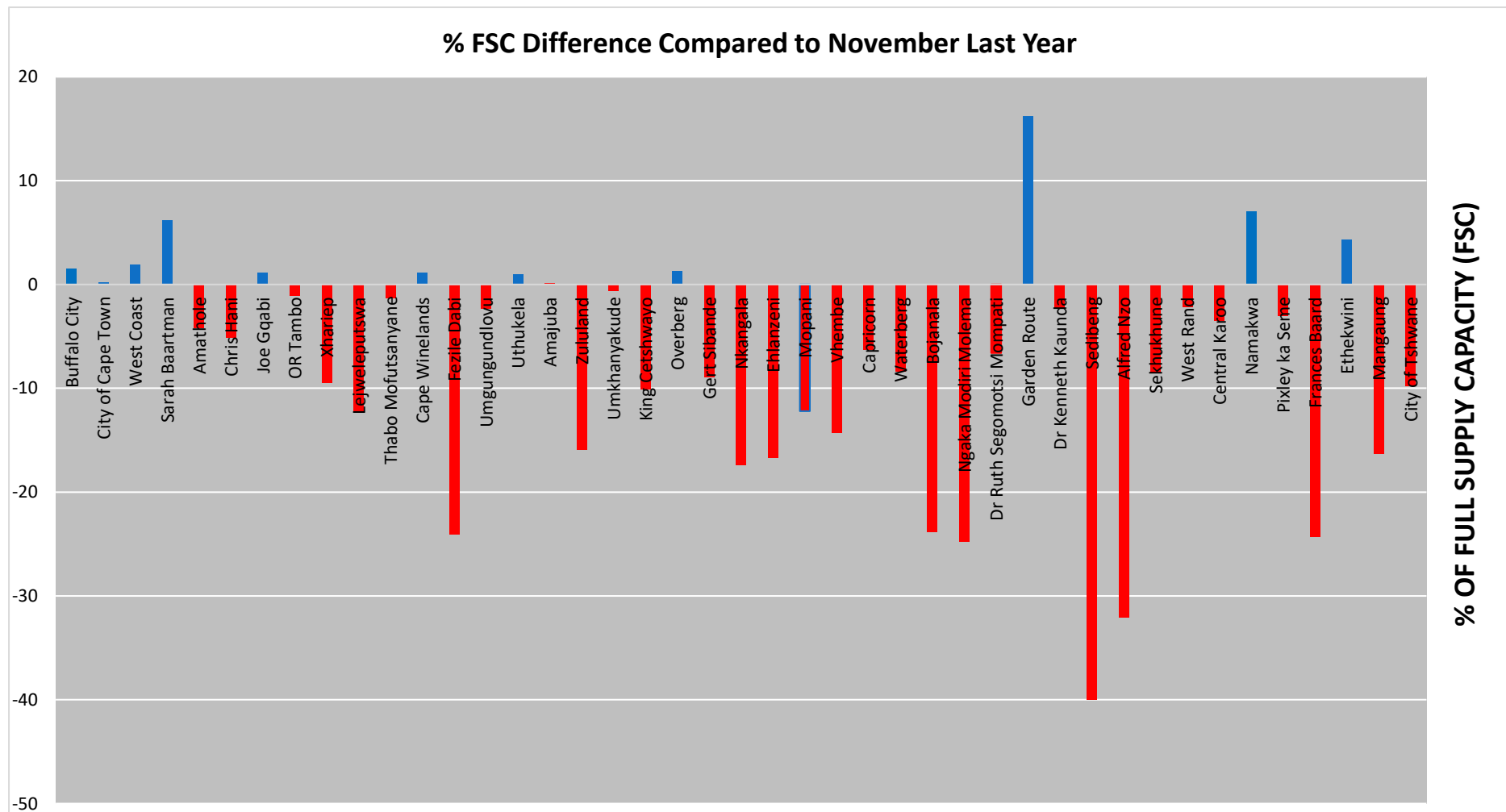


Figure 7: Comparison of water storage levels per District Municipality November 2023 vs November 2024

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.

The water supply systems with restrictions are given in Table 4. Due to infrastructure limitations, permanent restrictions are applicable for the Polokwane and Bloemfontein WSSs

Table 3: Water Supply Systems storage levels

Water Supply Systems/clusters	Capacity in 10 ⁶ m ³	25 November 2023 (% FSC)	18 November 2024 (% FSC)	25 November 2024 (% FSC)	System Description
Algoa	282	79.0	84.6	84.7	<u>The following 5 dams serve the Nelson Mandela Bay Metro, Sarah Baartman (SB) DM, Kouga LM and Gamtoos Irrigation:</u> 1. Kromrivier Dam 2. Impofu Dam 3. Kouga Dam 4. Loerie Dam 5. Groendal Dam
Amathole	241	100.9	102.2	101.9	<u>The following 6 dams serve Bisho & Buffalo City, East London:</u> 1. Laing Dam 2. Rooikrans Dam 3. Bridle Drift Dam 4. Nahoon Dam 5. Gubu Dam 6. Wiggleswade Dam
Klipplaat	57	93.7	91.6	91.8	<u>The following 3 dams serve Queenstown (Chris Hani DM, Enoch Ngijima LM):</u> 1. Boesmanskrantz Dam 2. Waterdown Dam 3. Ockraal Dam
Butterworth	14	99.4	86.8	95.5	<u>Xilinx Dam and Gcuwa weirs serve Butterworth</u>
Integrated Vaal River	10 546	86.5	72.3	72.2	<u>The following 14 dams serve Gauteng, Sasol, and ESKOM:</u> 1. Vaal Dam 2. Grootdraai Dam 3. Sterkfontein Dam 4. Bloemhof Dam

					5. Katse Dam 6. Mohale Dam 7. Woodstock Dam 8. Zaaihoek Dam 9. Jericho Dam 10. Westoe Dam 11. Morgenstond Dam 12. Heyshope Dam 13. Nooitgedacht Dam 14. Vygeboom Dam
Luvuvhu	225	95.5	89.1	88.3	<u>The following 3 dams serve Thohoyandou etc:</u> 1. Albasini Dam 2. Vondo Dam 3. Nandoni Dam
Bloemfontein	219	92.5	75.8	75.4	<u>The following 4 dams serve Bloemfontein, Botshabelo and Thaba Nchu:</u> 1. Rustfontein Dam 2. Groothoek Dam 3. Welbedacht Dam 4. Knellpoort Dam
Polokwane	254.27	91.8	80.2	79.3	<u>The following 2 dams serve Polokwane</u> 1. Flag Boshielo Dam 2. Ebenezer Dam
Crocodile West	444	94.7	75.9	75.6	<u>The Following 7 dams serve Tshwane up to Rustenburg:</u> 1. Hartbeespoort Dam 2. Rietvlei Dam 3. Bospoort Dam 4. Roodeplaat Dam 5. Klipvoor Dam 6. Vaalkop Dam 7. Roodekopjes Dam
uMgeni	923	87.6	84.8	86.1	<u>The following 5 dams serve Ethekwini, iLembe & Msunduzi:</u> 1. Midmar Dam 2. Nagle Dam 3. Albert Falls Dam 4. Inanda Dam 5. Spring Grove Dam
Cape Town	889	96.3	98.4	97.2	<u>The following 6 dams serve the City of Cape Town:</u> 1. Voelvlei Dam 2. Wemmershoek Dam 3. Berg River Dam

					4. Steenbras-Lower Dam 5. Steenbras-Upper Dam 6. Theewaterskloof Dam
Crocodile East	159	83.5	64.3	63.3	<u>Kwena Dam supplies Nelspruit, Kanyamazane, Matsulu, Malelane and Komatipoort areas & Surroundings</u>
Orange	7 996	88.9	79.1	79.6	<u>The Following two dams service parts of the Freestate, Northern, and Eastern Cape Provinces:</u> 1. Gariep Dam 2. Vanderkloof Dam
uMhlathuze	301	99.9	89.9	89.8	<u>Goedertrouw Dam supplies Richards Bay, Empangeni Towns, small towns, surrounding rural areas, industries and irrigators, supported by lakes and transfer from Thukela River</u>

Table 4: Water Supply Systems with Restrictions

Water Supply Systems	Restrictions
Algoa WSS	The decision date was changed from 1 June to 1 November 2023, therefore new AOA was conducted, and water restrictions were imposed as from 1 November 2023, Urban (Domestic and Industrial) = 5%, Irrigation = 15% for Kouga Sub-system and Urban (Domestic and Industrial) = 40%, Irrigation = 50% for the Kromme Sub-system, 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

LESOTHO HIGHLANDS TUNNEL CLOSURE

The collaborative maintenance operation being carried out by the Trans Caledon Tunnel Authority (TCTA) and the Lesotho Highlands Development Agency (LHDA) is currently in progress, commencing after the closure of the tunnel system on 1 October 2024. This essential undertaking aims to ensure the long-term functionality and safety of the tunnel infrastructure, which plays a vital role in the region's water supply.

The TCTA is specifically managing the maintenance work on the Delivery Tunnel North, located in South Africa, while the LHDA is focused on the transfer tunnels connected to the Muela hydropower station in the scenic highlands of Lesotho. According to a 2024 Department of Water and Sanitation (DWS) report, the previous maintenance shutdown in 2019 revealed alarming issues, such as extensive wear and tear on the steel liners of the tunnels, necessitating urgent repairs on both the South African and the Lesotho sides.

The scope of the current work is significant and comprehensive. It includes grit-blasting the steel-lined sections around the entire circumference of the tunnels, which aims to remove corrosion and prepare the surfaces for reapplication of protective coatings. This crucial step, along with various other maintenance and repair activities identified during the 2019 shutdown, is planned to take ample time. The goal is to reinforce the infrastructure to withstand the test of time and ensure reliable operation for the next 20 to 30 years.

However, this extensive shutdown comes with considerable implications for water supply among users along the Liebenbergsvlei River and its many tributaries. The Liebenbergsvlei River, which is fed directly by outflows from the tunnel, is crucial for the towns of Bethlehem, Reitz, and Tweeling, as well as for local licensed irrigators who depend on its waters. Due to the reduced flow resulting from the tunnel closure, these communities are anticipated to face challenges in their water supply. To mitigate this situation, preparations are to fill the Saulspoort Dam at the onset of the shutdown. DWS analysis shows that a fully stocked Saulspoort Dam will be capable of meeting local water demands—including those of Bethlehem, Reitz, and Tweeling—for an impressive duration of up to nine months, which comfortably exceeds the expected six-month closure of the tunnel.

In a positive turn of events, on 13 November 2024, it was reported in a DWS stakeholder meeting that October brought some much-needed rainfall to the catchment area, amounting to 66 mm. This precipitation resulted in a rise in the water levels of the Saulspoort Dam and provided some flow along the river, offering temporary relief to water users. Furthermore, an additional 27 mm of rain was recorded on 10 November, further enhancing the water supply situation for the affected areas.

Developments regarding the Saulspoort Dam are driven by significant rainfall. At the time of writing this report, a notable increase of 2.7% had been observed in the dam's water level, which is promising for the water resources. Initially, a controlled water release was planned for 14 November; however, with the substantial inflows experienced, this release is now deemed unnecessary.

Figure 8 shows the gauging stations located in the Liebenbergsvlei area upstream of the abstraction point. Two significant events have been identified: At gauging station C8H020, where water abstraction occurs. Following the recent rainfall, the water levels have risen dramatically. On 11 November, a remarkable inflow rate of 19.3 cubic meters per second was recorded at this gauging point, indicating a robust addition to the dam's water supply (Figure 9).



Figure 8: Upper Vaal Flow Monitoring sites (Green Dot – Towns, Blue Dot – Standalone Dams, Red Dot – Flow monitoring Point). Source <https://www.dws.gov.za/hydrology/Unverified/Home/OrangeVaal>

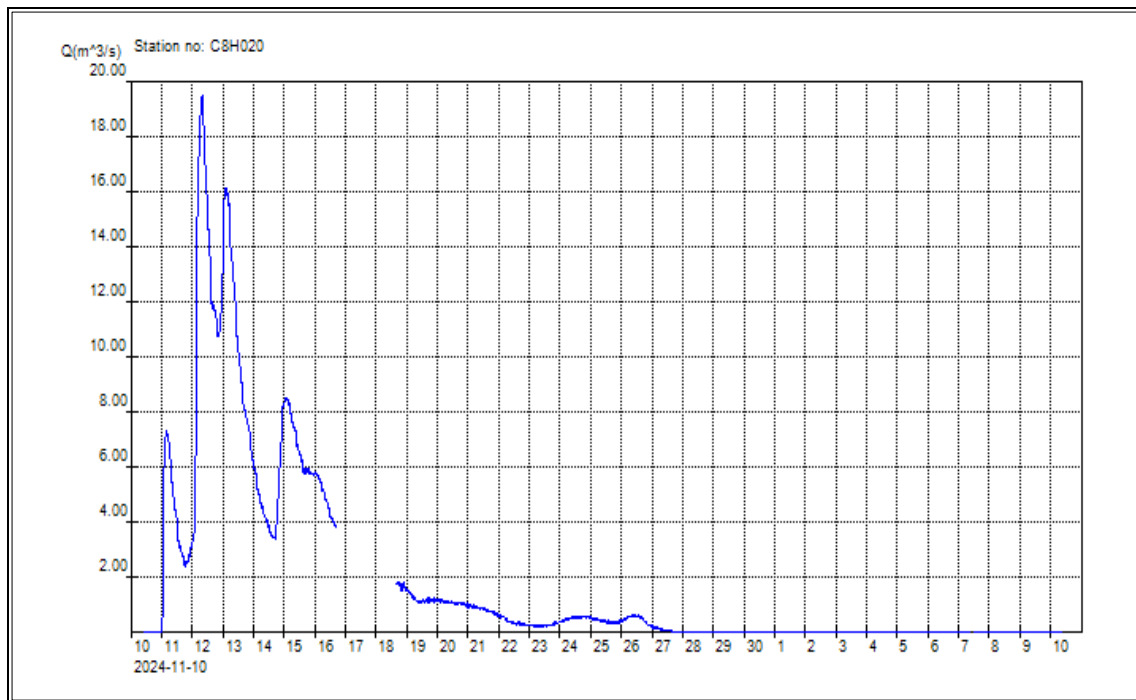


Figure 9: Liebenberg River st Roodekraal Source:

<https://www.dws.gov.za/Hydrology/Unverified/Home/OvFlowGraph/2300>

At gauging station **C8H027**, as shown in Figure 10, the recent rains in the catchment area have contributed approximately 6.8 cubic meters of water flowing into the river. This influx is helping to support the overall storage levels slightly.

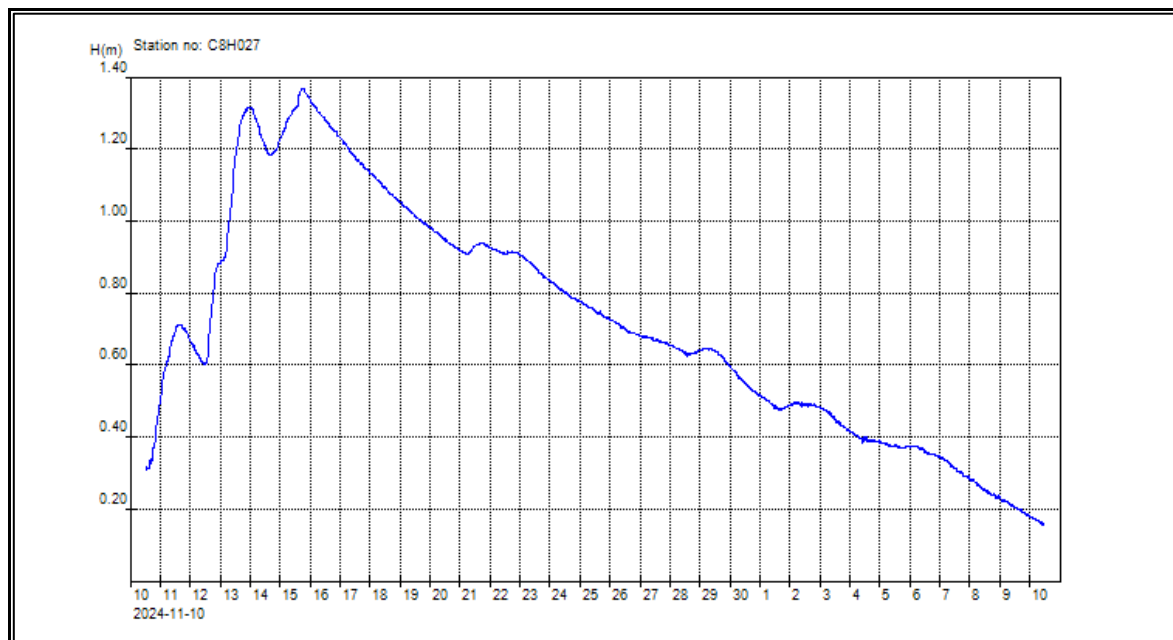


Figure 10: Wilge at Ballingtomp. Source

<https://www.dws.gov.za/Hydrology/Unverified/Home/OvFlowGraph/2252>

TCTA Update: Progress on the South African Side

Significant progress has been achieved on the South African side. The team has started sandblasting the steel lining, and early tests show it is very effective, as shown in Figure 11 and Figure 12.

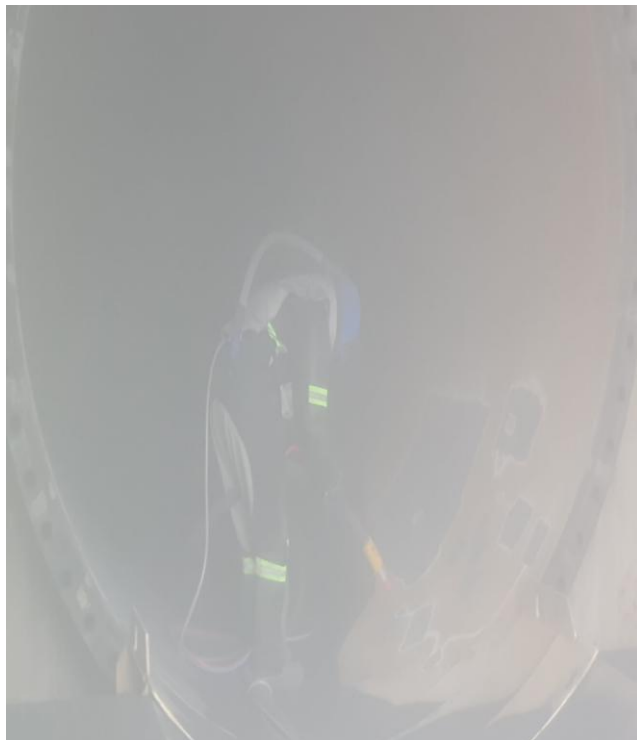


Figure 11: Sandblasting



Figure 12: Coating removed from steel

Regarding the outfall, photographs have been included that show the tunnel right after it was closed for cleaning. Figure 13 provides a wider view of the tunnel, where much of the cleaning is already done. Figure 14 shows images during the removal of the domes. Figure 15 shows a large amount of debris inside the tunnel after opening the dome. Another image shows the cleaning process as the mud was removed, and more debris was uncovered that we needed to address. It is important to keep the steel sections clean and safe for navigation, and Figure 16 shows the management of the muddy conditions.

Figure 17 provides a wider view of the tunnel, where much of the cleaning is already done, and Figure 18 shows the ash river erosion.

Given the rising concern of declining dam levels of the Vaal Dam in the Integrated Vaal River System (IVRS) due to primarily the closure of the Lesotho Highlands Water Project (LHWP) Tunnel closure and below-normal rainfall received at the beginning of the rainy season, a summary of the IVRS system operations process flow and the system operating rules for the low flow season is presented in Figure 19.



Figure 13: Inside the tunnel



Figure 14: Opening of the dome



Figure 15: debris inside the tunnel



Figure 16: Removing mud inside the tunnel

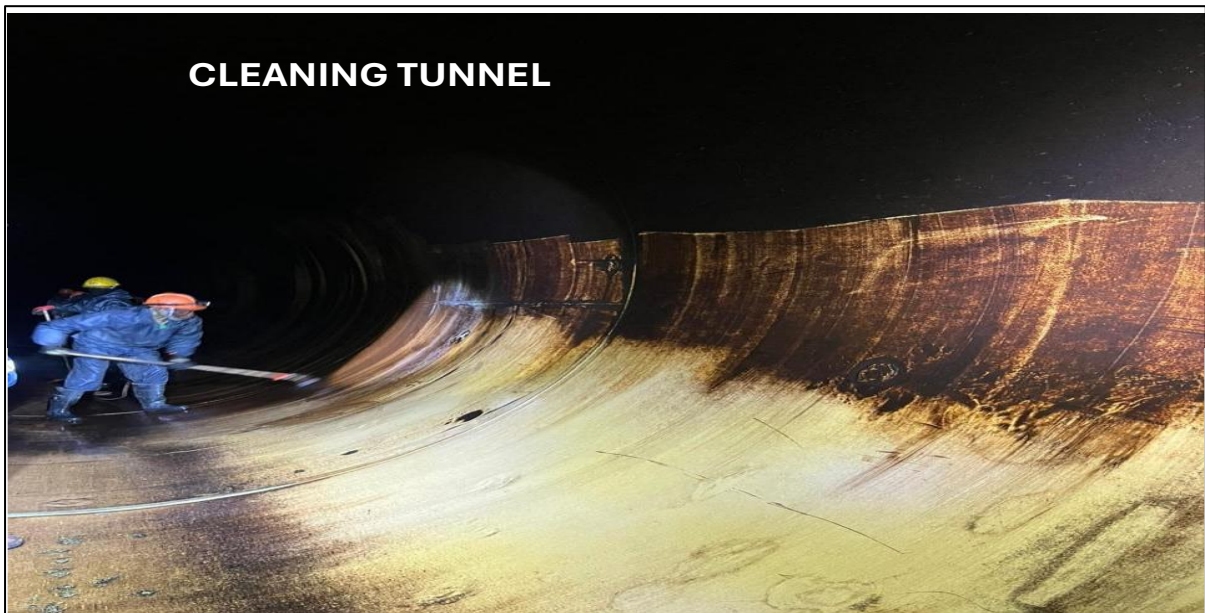


Figure 17: Cleaning the Tunnel



Figure 18: Ash River Erosion

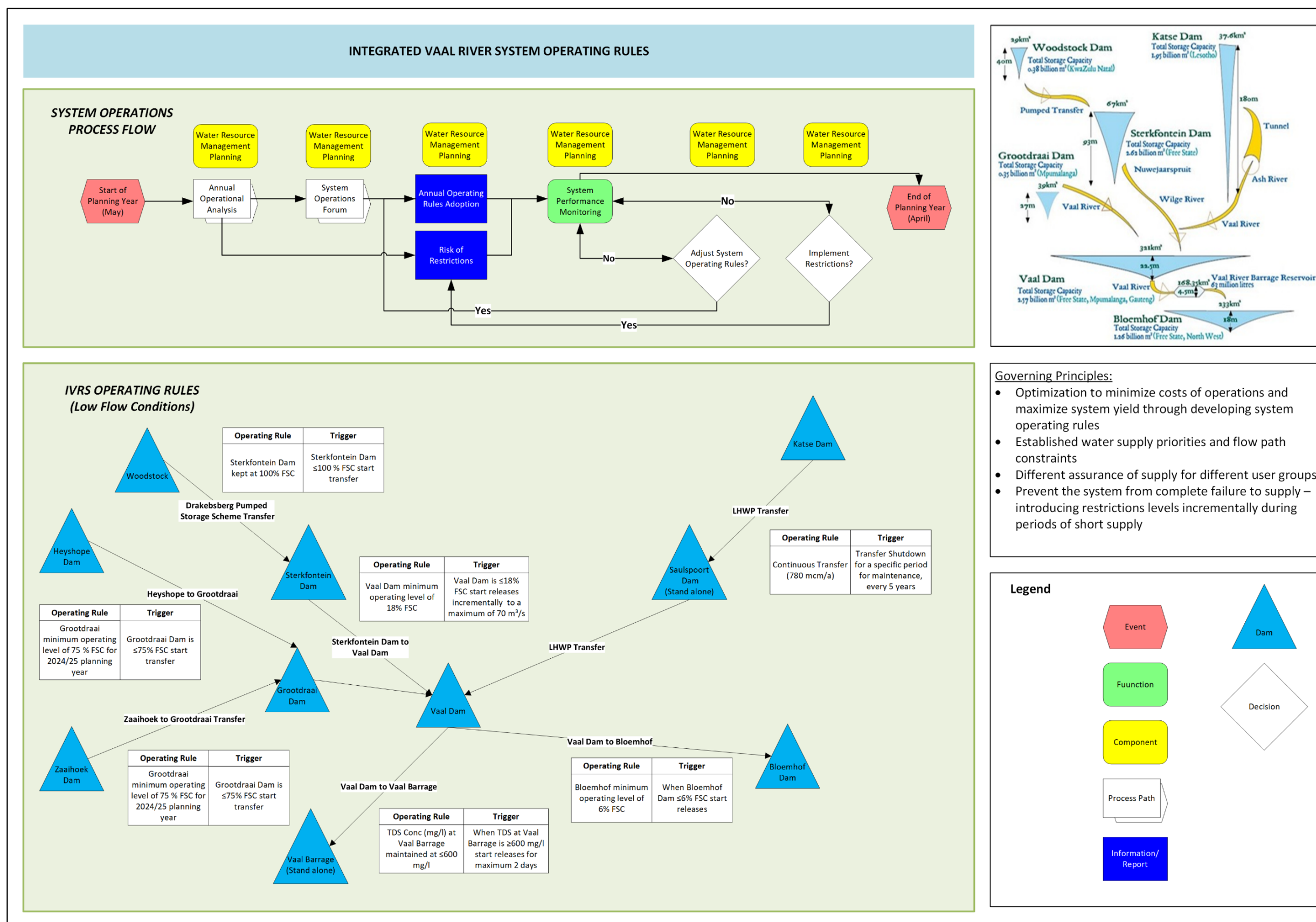


Figure 19 Summary of the Integrated Vaal River System Operating Rules for planning year May 2024 – April 2025

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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
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

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