



water affairs

Department:
Water Affairs
REPUBLIC OF SOUTH AFRICA

WATER RESOURCE INFORMATION MANAGEMENT

STATUS ON MONITORING &
SURFACE WATER LEVEL TRENDS
APRIL 2013 to SEPTEMBER 2013

D VILJOEN
DECEMBER 2013

GH4329



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1. EXECUTIVE SUMMARY

The majority of dams used in this report have more water than during the corresponding period last year. In the Luvuvhu / Letaba Water Management Area the **Middle Letaba Dam is at a storage capacity of 44.2%** and the Nsami Dam with storage of 60.4%.

In the Limpopo WMA the majority of dams have more water than the previous year: The only two dams with less storage are Mokolo Dam (93.3%) and Doorndraai Dam (86.3%). The average storage volume for the Limpopo WMA is 250.4 million cubic meters (89.3%) and is 26 million cubic meters more than the corresponding period last year (80%).

The average storage volume for the Luvuvhu / Letaba WMA is 529.1million cubic meters (80.2%) and is 144.4 million cubic meters more than the corresponding period last year (58.3%).

In the Sekhukune area the Flag Boshielo Dam is at a storage level of 76.5% ($141.7 \times 10^6\text{m}^3$) and 8.1% lower than the previous year, which means that the storage volume is 14.9 million cubic meters less than the corresponding period last year.

The average storage volume for the Olifants WMA is 735.1 million cubic meters (68.5%) and is 103.5 million cubic meters less than the corresponding period last year (78.2%). Numerous smaller dams (0.7 – 3.5 million cubic meter capacity) exist in this WMA but only two are equipped with Data Loggers namely Piet Gouws and Molepo Dams. No Real Time data is available from these dams and the obtaining of updated dam status observations are hampered by the remoteness thereof. Although provision has been made at some dams for the installation of Data logging equipment, funds for the purchasing thereof are lacking. The following dams falls within the Olifants WMA, but no status information is available: 1. Piet Gouws (3.94 million Cubic meters), Lola Montes (1.2 million Cubic meters), Makotswane (3.48 million Cubic meters), Spitskop (0.54million Cubic meters), Vergelegen (1.34million Cubic meters) Dr. Esselen (0.73million Cubic meters), Chunnies Poort (2.47million Cubic meters), Der Broggen, Lepellane and Mahlangu dams.

The average storage volume for the Inkomati WMA is 944.4 million cubic meters (90%) and is 30.8 million cubic meters more than the corresponding period last year (87%).

The challenge in all the WMAs discussed in this report is the fact that there are smaller dams, which supply water to communities that still need to be monitored. Owing to the lack of data these dams could not be included. Infrastructure at these dams are also a major concern and will have to be put in place before any form of water level monitoring can be considered.

Gauge plates have been installed at some of the smaller dams, but there are no observers to relay gauge plate readings to the Tzaneen Office. Hout River Dam has been equipped with near real-time data acquisitioning equipment.

The information presented in this report is based on the status of all the major dams in the province up to the end of September 2013.

2. MONITORING NETWORK

The hydrological monitoring network for the Limpopo Province consists of the following amount of gauging stations:
81 river flow gauging stations (excluding canals and pipelines)
21 dam gauging stations
16 evaporation stations

It is important to take cognizance of the fact that the hydrological gauging stations in the Crocodile-West and Olifants Water Management Areas (shared boundaries) are being managed by the hydrological offices of Gauteng and Mpumalanga respectively.

For the purpose of this report and owing to the strategic location and importance of certain dams in the Olifants and Inkomati Water Management Areas, information regarding their status is also attached.

3. OVERVIEW

No river flow gauging stations were used in this report as their importance will only play a role when inflow stream requirements have to be met or during big flood events.

Take note that that the following dams have been included under the provincial boundary of the Limpopo Province: Modjadji, Nandoni, Flag Boshielo, Klaserie, Rust De Winter, Tonteldoos, Tours, Vlugkraal and Warmbad. This results in the full supply storage capacity increasing from 767.6 million cubic meters to 1166.6 million cubic meters.

To give an indication of what the percentage of normal rainfall was for the period October 2012 up to September 2013, see attached map (page 11). For information purposes a graph depicting provincial rainfall for the current hydrological year is attached (page 12).

The National dam storage graph (page 13) has been attached to the report for additional information as well as the graphs of the two WMAs (page 14-15), indicates the current situation clearly. This information was obtained from Mr Elias Nel, National Office.

For information purposes a table indicating the comparison of water storage percentage for the different WMA's is attached on page 16.

Rainfall forecasts for October 2013 up to February 2014 are also attached see page 17. This information was obtained from the South African Weather Service.

The purpose for attaching graphs of individual dams (pages 18-42) is to give a broader picture of water storage and status in the sub drainage catchments.

4. LIMPOPO WATER MANAGEMENT AREA

The catchment consists of secondary drainage areas A4, A5, A6, A7 and A8.

A4 Drainage Area (Matlabas, Mokolo Rivers)

The Mokolo Dam (A4R001) was used as no other dam exists in the A4 hydrological monitoring network. The dam storage is at a storage level of 93.3% ($135.7 \times 10^6\text{m}^3$) and 2.5% lower than the previous year, which means that the storage volume is 3.45 million cubic meters less than the corresponding period last year. See attached graph!

4.2 A5 Drainage Area (Lephalala River)

Two small dams exist in the A5 hydrological network namely the Susandale Dam (A5R001) and the Vischgat Dam (A5R002). Owing to their relatively small storage volumes of approximately 0.6 million cubic meters in total, these dams have not been included in this report!

4.3 A6 Drainage Area (Nile, Sterk, Mogalakwena and Dorps Rivers)

The Doorndraai Dam (A6R001) and Glen Alpine Dam (A6R002) were used as no other dams exist in the A6 hydrological monitoring network. The Doorndraai Dam is at a storage level of 86.3% ($37.78 \times 10^6\text{m}^3$) and 4.2% lower than the previous year, which means that the storage volume is 1.82 million cubic meters less than the corresponding period last year. See attached graph!

Glen Alpine Dam is at a storage level of 57.2% ($10.81 \times 10^6\text{m}^3$) and 4.8% higher than the previous year, which means that the storage volume is 0.92 million cubic meters more than the corresponding period last year. See attached graph!

It must be noted that the full capacity storage of Glen Alpine Dam is only 18.889 million cubic and therefore the dam fills and empties much faster than Doorndraai Dam! The graph of Glen Alpine clearly indicates this!

Take note that the full supply capacity ($18.889 \times 10^6\text{m}^3$) as supplied in the National Weekly Dam Status report, was used for calculation purposes!

4.4 A7 Drainage Area (Sand, Blood, Diep, Hout, Dwars and Brak Rivers)

There are no existing dam monitoring stations in the hydrological network for this drainage area!

The Tzaneen Area Office in conjunction with the Hydrometry office is currently busy with the installation of gauge plates at dams in both of the Water Management Areas. Hout River Dam has been equipped with gauge plates, but a futile exercise at Mashashane Dam just reiterated the point that gauge plates should be installed once water levels are below lowest outlet levels! Data capturing and real-time equipment has been installed at Hout River Dam.

Seshego and Rietfontein Dams will be investigated, but due to high water levels and the lack of infrastructure, the installation of gauge plates remains a huge challenge. According to preliminary investigations it seems obvious that the installation of gauge plates will only be feasible when water levels at these dams are on or below lowest outlet levels!

4.5 A8 Drainage Area (Nwanedzi and Nzhelele Rivers)

The Nzhelele Dam (A8R001), Luphephe (A8R002), Nwanedzi (A8R003) and Mutshedzi (A8R004) Dams were used as indicators! The Nzhelele Dam is at a storage level of 91.5% ($46.88 \times 10^6\text{m}^3$) and 39.6% higher than the previous year, which means that the storage volume is 20.28 million cubic meters more than the corresponding period last year. See attached graph!

Luphephe and Nwanedzi Dams are at storage levels of 90.2% and 88.6% respectively. Their combined storage is at $17.17 \times 10^6\text{m}^3$. The combined storage for the corresponding period the previous year was $7.5 \times 10^6\text{m}^3$. (39.2% of storage volume) See attached graphs!

Mutshedzi Dam, is at a storage level of 100% ($2.04 \times 10^6\text{m}^3$) and 27.2% higher than the previous year, which means that the storage volume is 0.73 million cubic meters more than the corresponding period last year. See attached graph!

5. LUVUVHU / LETABA WATER MANAGEMENT AREA

The catchment consists of secondary drainage areas A9, B8 and B9.

5.1 A9 Drainage Area (Mutale, Luvuvhu Rivers)

The Albasini Dam (A9R001), Vondo Dam (A9R002) and Nandoni (A9R004) Dams were used as monitoring points in this report.

Albasini Dam is at a storage level of 85.1% ($24 \times 10^6\text{m}^3$) and 50.6% higher than the previous year, which means that the storage volume is 24.78 million cubic meters more than the corresponding period last year. See attached graph!

Vondo Dam is at a storage level of 91.8% ($27.95 \times 10^6\text{m}^3$) and 15.9% higher than the previous year, which means that the storage volume is 4.95 million cubic meters more than the corresponding period last year. See attached graph!

Nandoni Dam is at a storage level of 99.5% ($165.28 \times 10^6\text{m}^3$) and 12% higher than the previous year, which means that the storage volume is 20.17 million cubic meters more than the corresponding period last year. See attached graph!

5.2 B8 Drainage Area (Groot, Middle and Klein Letaba Rivers)

The Ebenezer Dam (B8R001), Magoebaskloof Dam (B8R003), Tzaneen Dam (B8R005), Middle-Letaba Dam (B8R007), Nsami Dam (B8R009) and Modjadji Dam (B8R011) were used as monitoring points in this report. The Dap Naudé Dam (B8R006) and Hans Merensky Dam (B8R002) are also being monitored, but were not included in this report!

Thapane Dam has been investigated but due to high water levels and the lack of infrastructure, the installation of gauge plates remains a huge challenge. According to preliminary investigations it seems obvious that the installation of gauge plates will only be feasible when the water level at this dam is on or below lowest outlet level!

The Ebenezer Dam is at a storage level of 99.2% ($68.6 \times 10^6\text{m}^3$) and 3.1% higher than the previous year, which means that the storage volume is 2.17 million cubic meters more than the corresponding period last year. See attached graph!

Magoebaskloof Dam is at a storage level of 100.4% ($4.857 \times 10^6\text{m}^3$) and 0.2% higher than the previous year, which means that the storage volume is virtually the same as the corresponding period last year. See attached graph! **Take note that the full supply capacity ($4.84 \times 10^6\text{m}^3$) as supplied in the National Weekly Dam Status report, was used for calculation purposes!**

Tzaneen Dam is at a storage level of 89.6% ($140.31 \times 10^6\text{m}^3$) and 12.1% higher than the previous year, which means that the storage volume is 18.9 million cubic meters more than the corresponding period last year. See attached graph! **Take note that the full supply capacity ($156.53 \times 10^6\text{m}^3$) as supplied in the National Weekly Dam Status report, was used for calculation purposes!**

Middle-Letaba Dam is at a storage level of 44.2% ($76.05 \times 10^6\text{m}^3$) and 43.5% higher than the previous year, which means that the storage volume is 74.86 million cubic meters more than the corresponding period last year. See attached graph!

The Nsami Dam is at a storage level of 60.4% ($13.2 \times 10^6\text{m}^3$) and 41.2% higher than the previous year, which means that the storage volume is 9.0 million cubic meters more than the corresponding period last year.

The Modjadji Dam is at a storage level of 78.6% ($5.65 \times 10^6\text{m}^3$) and 10.4% higher than the previous year, which means that the storage volume is 0.75 million cubic meters more than the corresponding period last year.

5.3 B9 Drainage Area (Shingwedzi, Phugwane and Mphongolo Rivers)

Only a limited part of this drainage area falls outside the Kruger National Park!
There are no existing dam monitoring stations in the hydrological network for this drainage area!

6. OLIFANTS WATER MANAGEMENT AREA

Monitoring points in the B3, B5, B6 and, B7 sub drainage areas were also included in this report owing to their strategic location and importance to operational matters in the Limpopo Province.

6.1 B3 Drainage Area (Olifants, Elands, Bloed and Selons Rivers)

For information as well as operational matters the status of Rust de Winter Dam (B3R001) and Loskop Dam (B3R002) has been included in this report.

Rust de Winter Dam is at a storage level of 90.9% ($25.62 \times 10^6\text{m}^3$) and 7.6% higher than the previous year, which means that the storage volume is 2.13 million cubic meters more than the corresponding period last year. See attached graph!

Loskop Dam is at a storage level of 70.4% ($254.39 \times 10^6\text{m}^3$) and 11.9% lower than the previous year, which means that the storage volume is 43 million cubic meters less than the corresponding period last year. See attached graph!

6.2 B5 Drainage Area (Olifants River)

For information as well as operational matters the status of Flag Boshielo Dam (B5R002) has been included in this report.

Flag Boshielo Dam is at a storage level of 76.5% ($141.71 \times 10^6\text{m}^3$) and 7.6% lower than the previous year, which means that the storage volume is 14 million cubic meters less than the corresponding period last year. See attached graph!

6.3 B6 Drainage Area (Blyde and Ohrigstad Rivers)

For information as well as operational matters the status of Ohrigstad Dam (B6R001) and Blyde Rivierspoort Dam (B6R003) has been included in this report.

Ohrigstad Dam is at a storage level of 83.7% ($11.26 \times 10^6\text{m}^3$) and 11.7% higher than the previous year, which means that the storage volume is 1.58 million cubic meters more than the corresponding period last year. See attached graph!

Take note that the full supply capacity ($13.448 \times 10^6\text{m}^3$) as supplied in the National Weekly Dam Status report, was used for calculation purposes!

Blyde Dam is at a storage level of 94.7% ($51.47 \times 10^6\text{m}^3$) and 5.4% lower than the previous year, which means that the storage volume is 2.95 million cubic meters less than the corresponding period last year. See attached graph!

Take note that the full supply capacity ($54.369 \times 10^6\text{m}^3$) as supplied in the National Weekly Dam Status report, was used for calculation purposes!

6.4 B7 Drainage Area (Klaserie and Olifants Rivers)

For information as well as operational matters the status of Klaserie Dam (B7R001) and Tours Dam (B7R003) has been included in this report.

Klaserie Dam is at a storage level of 95.9% ($5.37 \times 10^6\text{m}^3$) and 0.7% lower than the previous year, which means that the storage volume is 0.03 million cubic meters less than the corresponding period last year. See attached graph!

Tours Dam is at a storage level of 93% ($5.66 \times 10^6\text{m}^3$) and 2.4% lower than the previous year, which means that the storage volume is 0.14 million cubic meters less than the corresponding period last year. See attached graph!

Take note that the full supply capacities ($5.604 \times 10^6\text{m}^3$ and $6.084 \times 10^6\text{m}^3$) Klaserie and Tours Dams respectively, as supplied in the National Weekly Dam Status report, were used for calculation purposes!

7. NKOMATI WATER MANAGEMENT AREA

7.1 X2 Drainage Area (Crocodile River)

For information as well as operational matters the status of Kwena Dam (X2R005) has been included in this report.

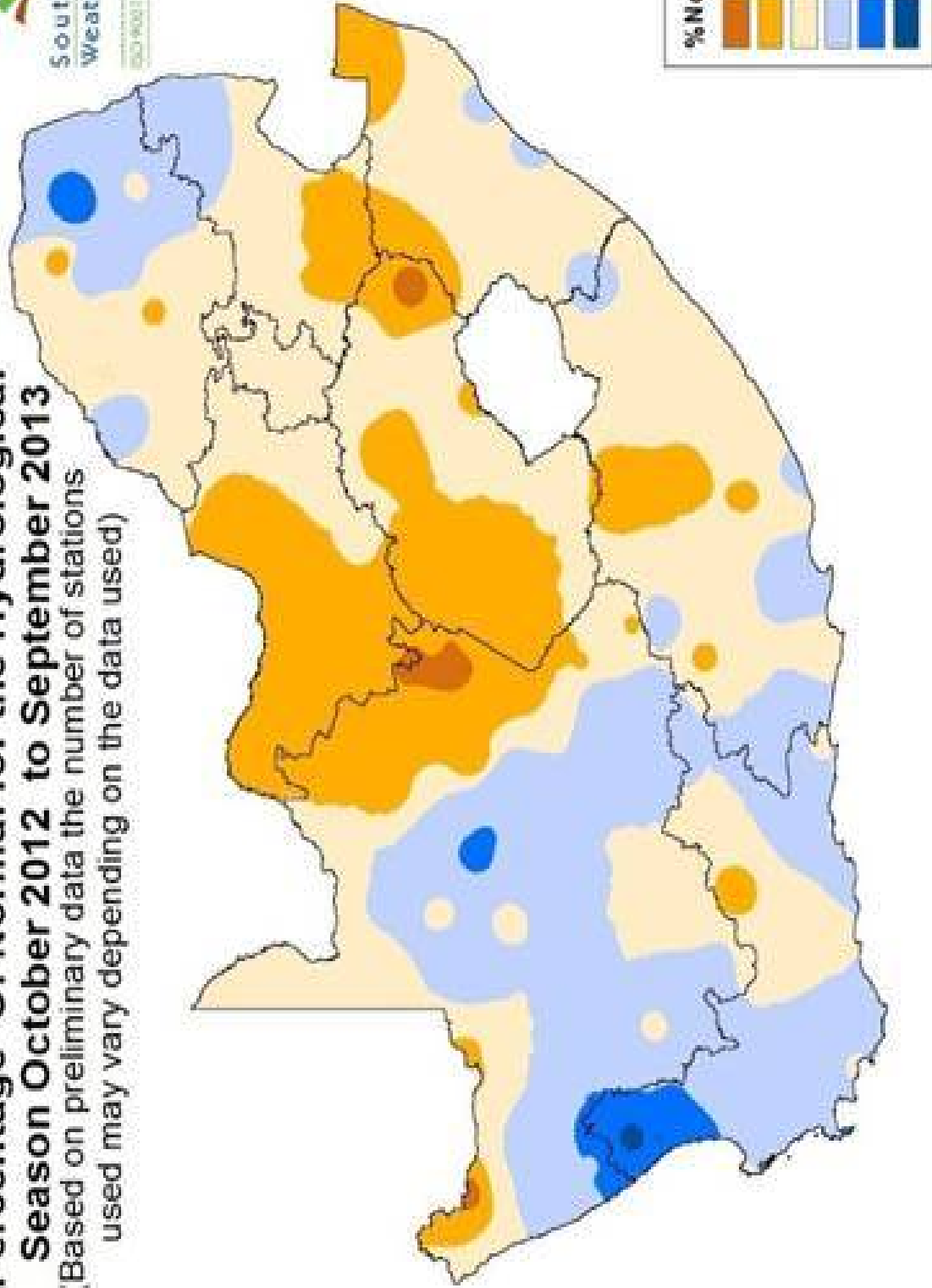
Kwena Dam is at a storage level of 94.4% ($150.07 \times 10^6\text{m}^3$) and 2.1% lower than the previous year, which means that the storage volume is 3.39 million cubic meters less than the corresponding period last year. See attached graph!

7.2 X3 Drainage Area (Mariti River)

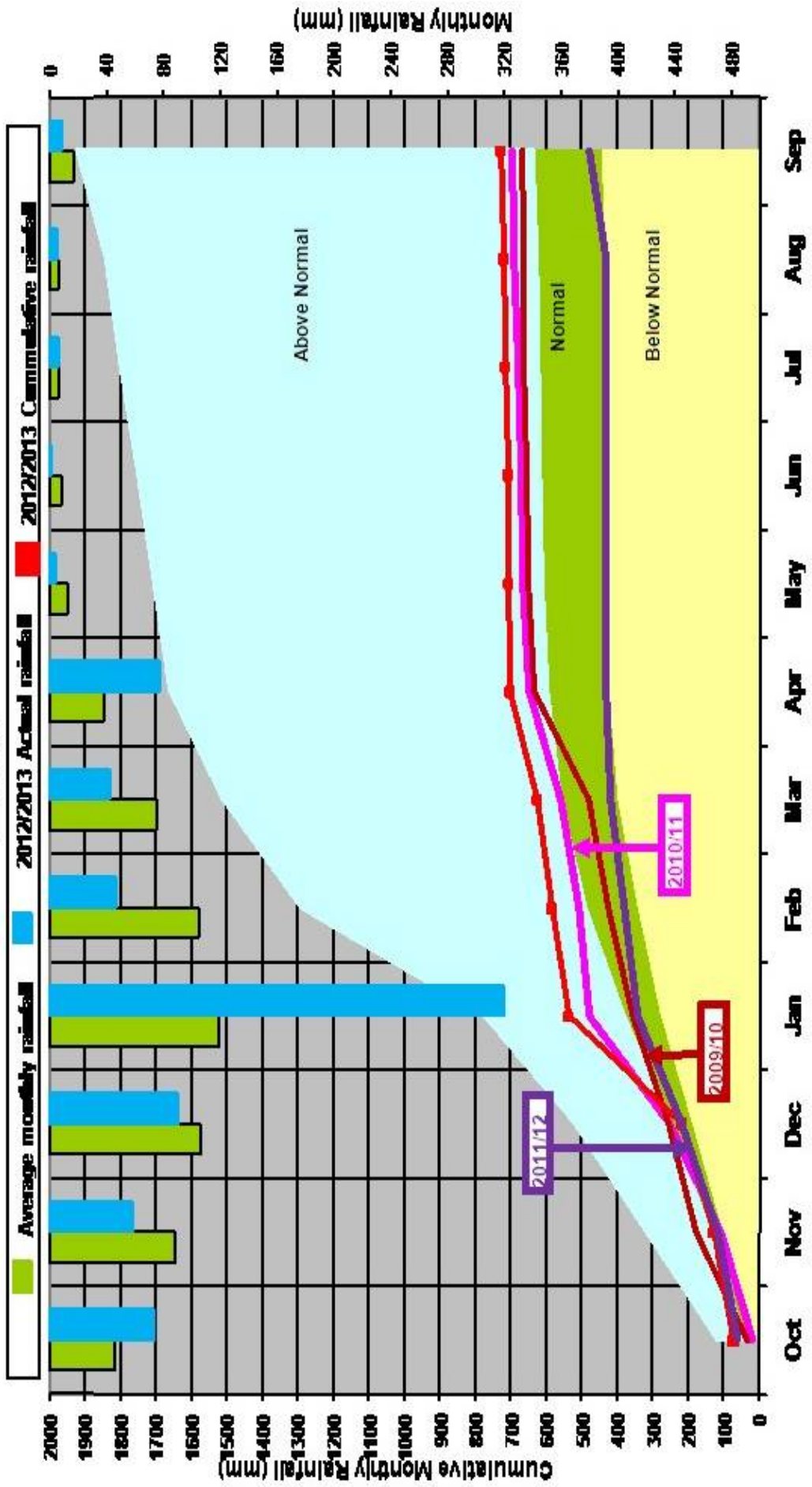
For information as well as operational matters the status of Inyaka Dam (X3R002) has been included in this report.

Inyaka Dam is at a storage level of 99.1% ($122.53 \times 10^6\text{m}^3$) and 0.5% higher than the previous year, which means that the storage volume is 0.65 million cubic meters more than the corresponding period last year. See attached graph!

**Percentage Of Normal for the Hydrological
Season October 2012 to September 2013**
(Based on preliminary data the number of stations
used may vary depending on the data used)

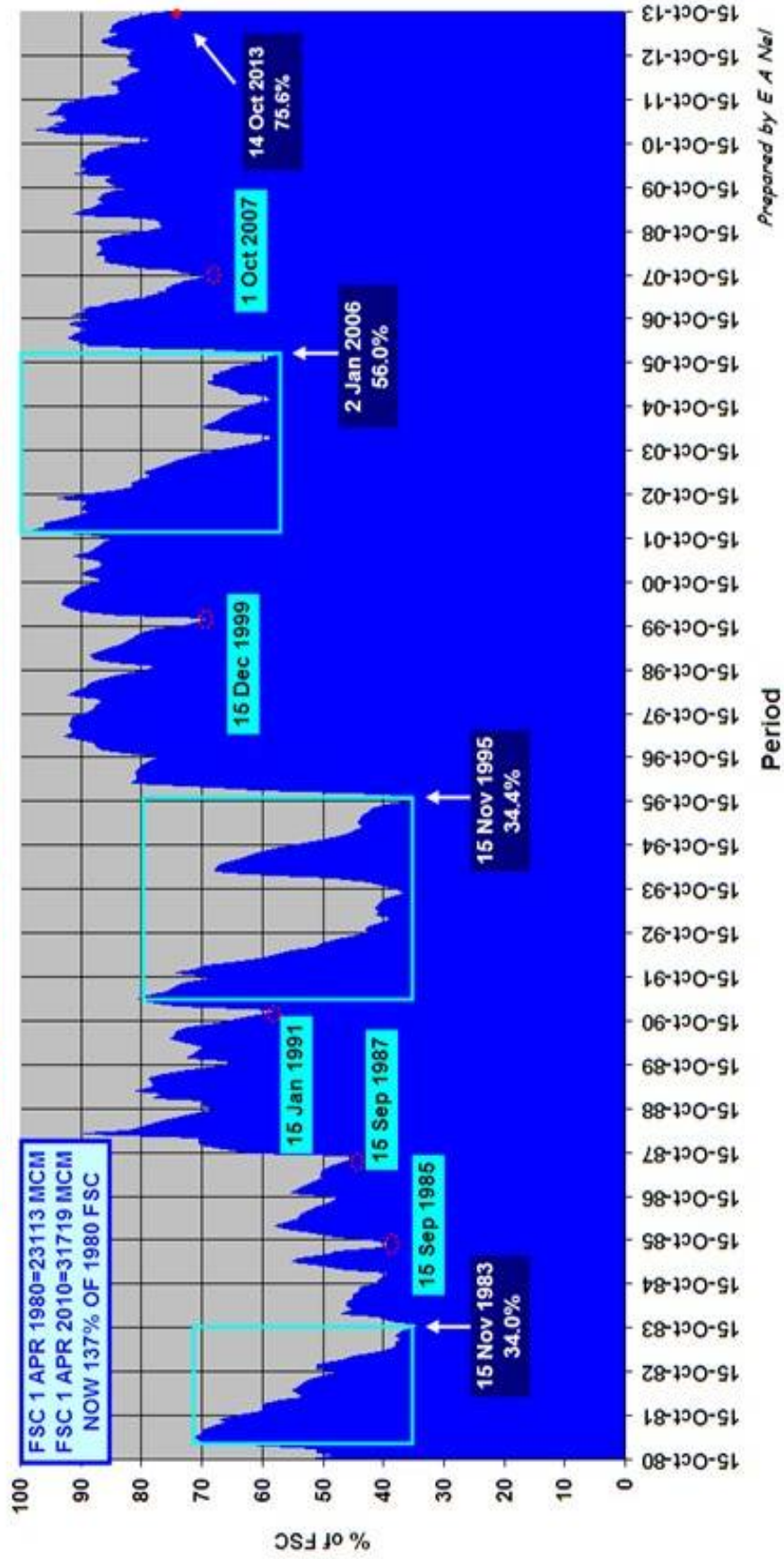


LIMPOPO

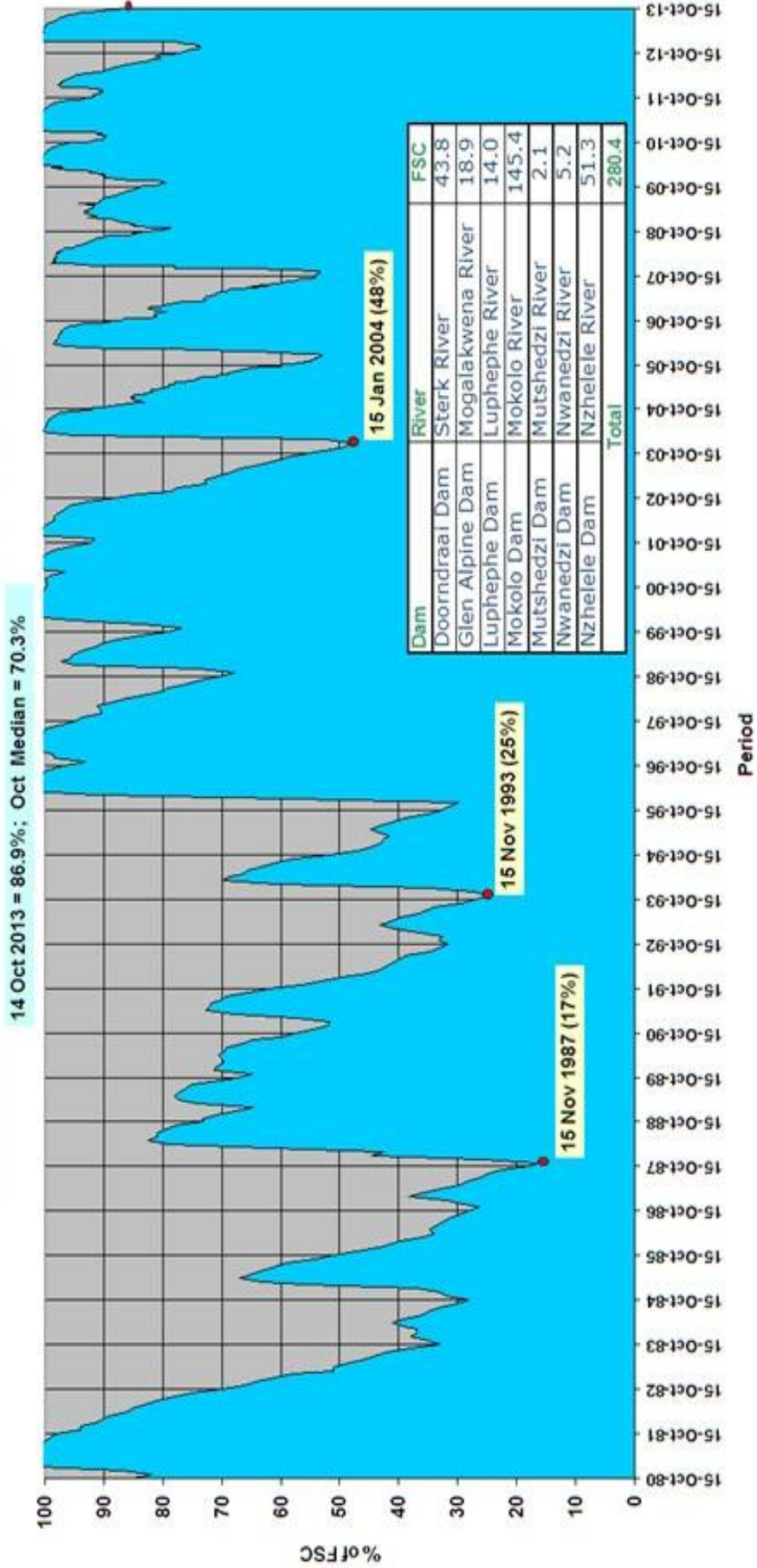


National Dams: Water Storage: The Storage for 14 Oct 2013 is the 13th highest on record (34 years) for Oct since Oct 1981 to 14 Oct 2013 (Weekly values since 4/10/04)

14 Oct 2013: STORAGE = 75.6% FSC; Median for Oct since 1980 = 66.9% FSC

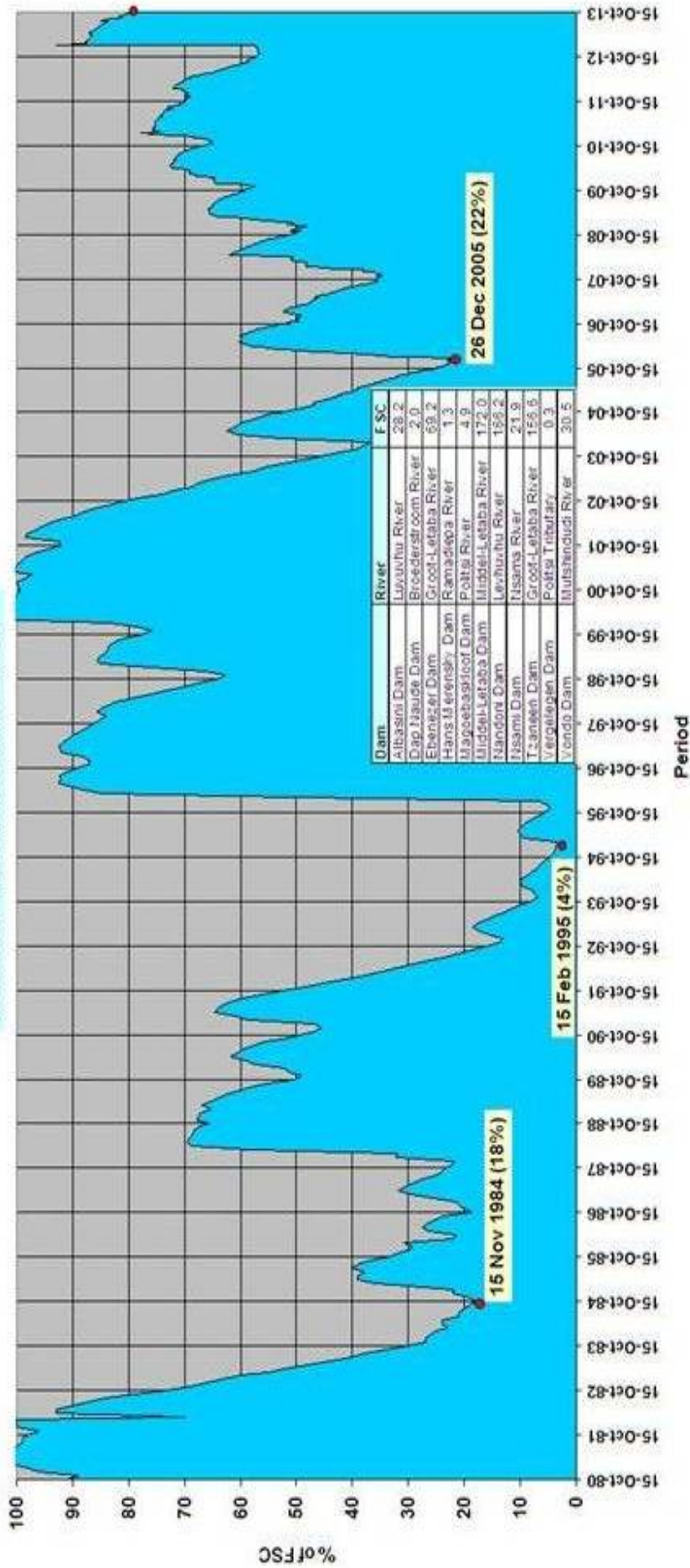


WMA 1: Limpopo (Weekly values since 4/10/04) up to 14 Oct 2013



WMA 2: Luvuvhu & Letaba (Weekly values since 4/10/04) up to 14 Oct 2013

14 Oct 2013 = 79.2%; Oct Median = 51.5%

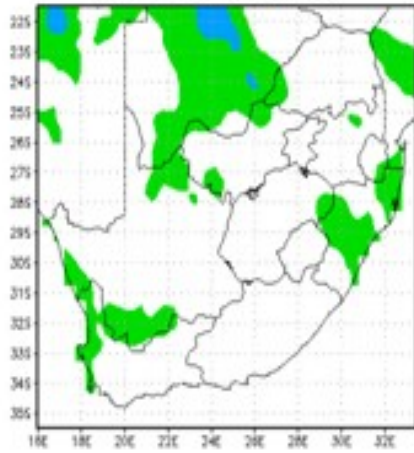


Summary WMA		Full Supply Capacity 10 ⁶ M ³	Water in Storage 10 ⁶ M ³	Last Year %Full	Last Week %Full	This Week %Full
1	Limpopo	280.4	250.4	80.1	90.1	89.3
2	Luvubu/Letaba	652.5	523.5	58.2	80.7	80.2
3	Crocodile (West) Marico	807.3	486.3	76.2	62.0	60.2
4	Olifants	1073.9	735.1	78.2	70.0	68.5
5	Inkomati	1049.5	944.4	87.0	90.9	90.0
6	Usutu/Mhlatuze	3276.2	2677.7	66.7	82.1	81.7
7	Thukela	1115.3	1020.0	90.6	91.9	91.5
8	Upper Vaal	5659.2	4677.9	82.0	83.0	82.7
9	Middle Vaal	1671.6	524.1	63.6	33.0	31.4
10	Lower Vaal	108.5	73.4	80.5	70.3	67.6
11	Mvoti/Umzimkulu	801.9	728.3	83.6	93.3	90.8
12	Mzimvubu/Keiskamma	1083.1	905.8	86.1	84.5	83.6
13	Upper Orange	11428.3	8998.3	89.2	79.7	78.7
14	Lower Orange	36.1	37.6	105.1	106.2	104.4
15	Fish/Tsitsikamma	725.2	407.6	69.6	56.5	56.2
16	Gouritz	268.8	205.0	87.8	78.0	76.2
17	Olifants/Doorn	128.2	124.4	100.1	97.5	97.0
18	Breede	1044.6	945.7	89.5	92.1	90.5
19	Berg	416.5	419.6	101.1	102.2	100.7
GRAND TOTAL		31627.2	24685.0	82.3	79.0	78.0

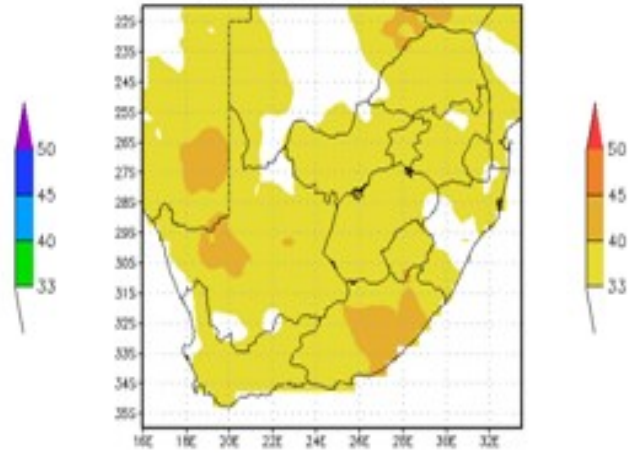
Please note that the above summaries are not representative of all dams within any of the Provinces or Water Management Areas.
The summaries only reflect the storages for those dams listed in the Weekly State of Reservoirs Report.

MONTHLY FORECAST OCT 2013 – FEB 2014

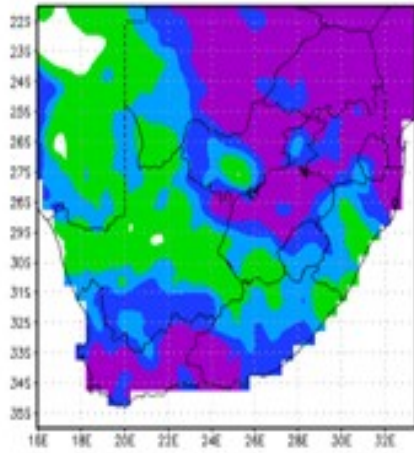
OCTOBER–NOVEMBER–DECEMBER 2013
Above-Normal Rainfall



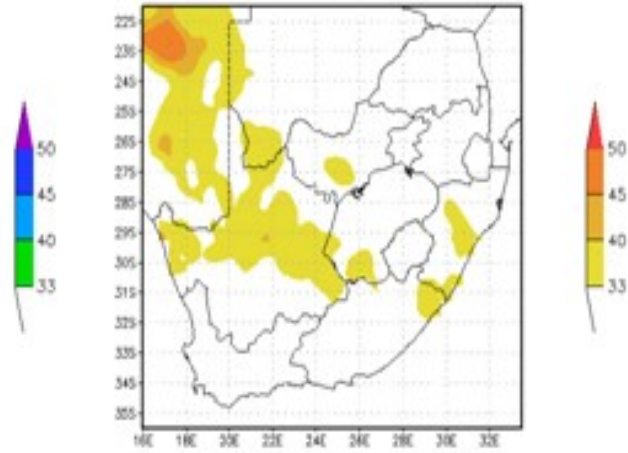
OCTOBER–NOVEMBER–DECEMBER 2013
Below-Normal Rainfall



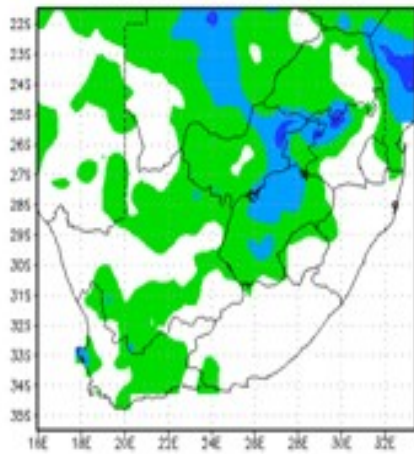
NOVEMBER–DECEMBER–JANUARY 2014
Above-Normal Rainfall



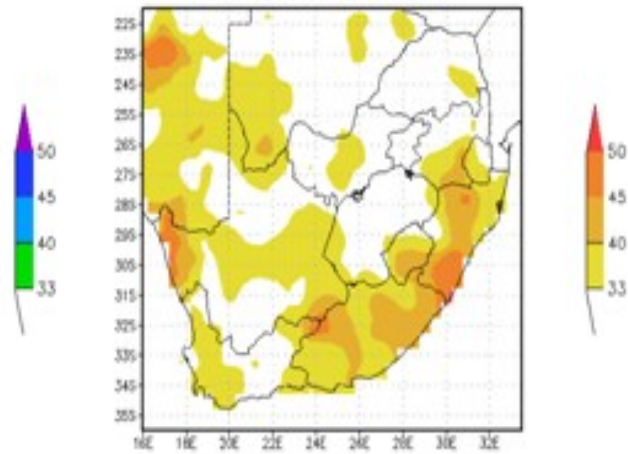
NOVEMBER–DECEMBER–JANUARY 2014
Below-Normal Rainfall

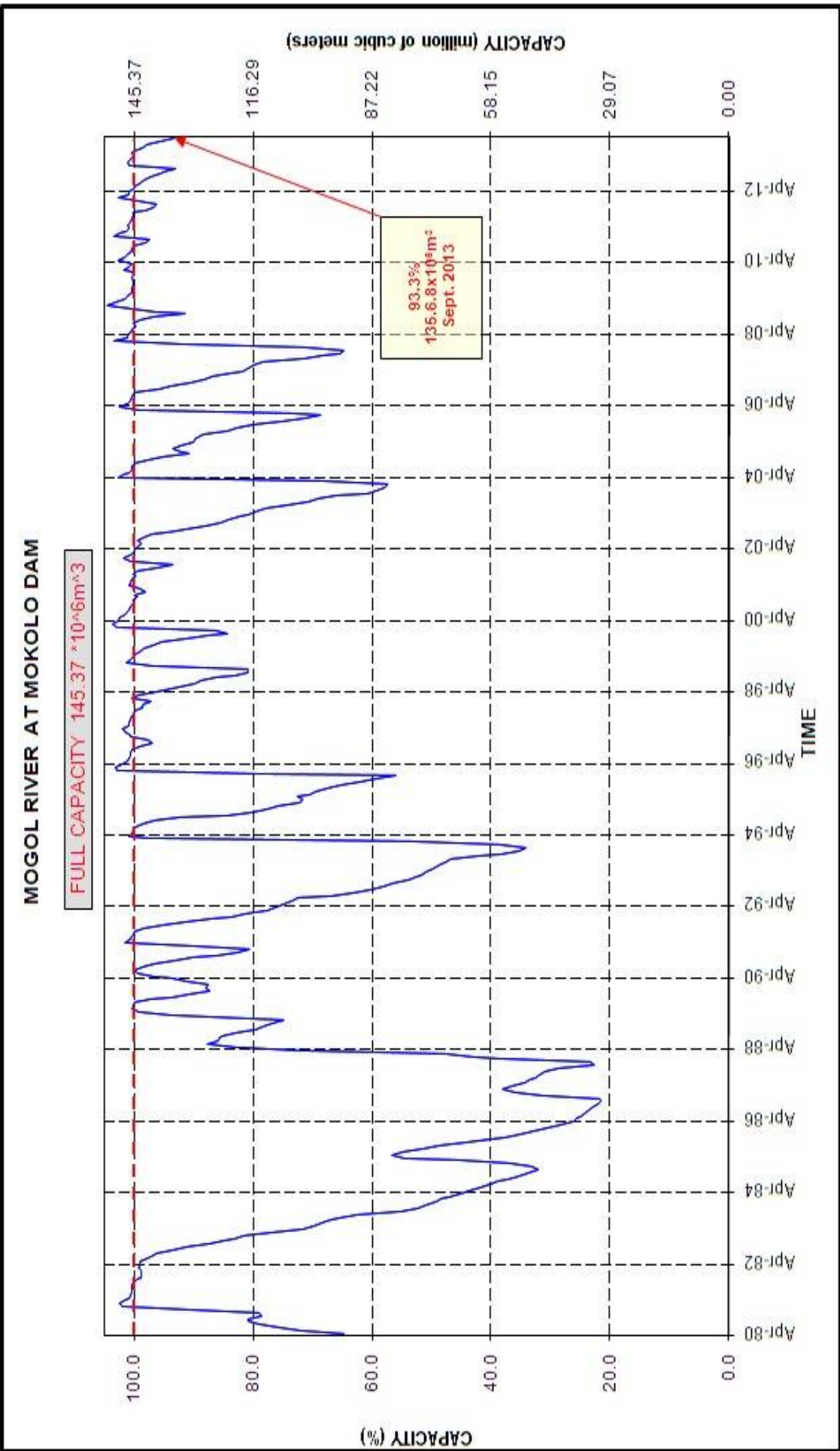


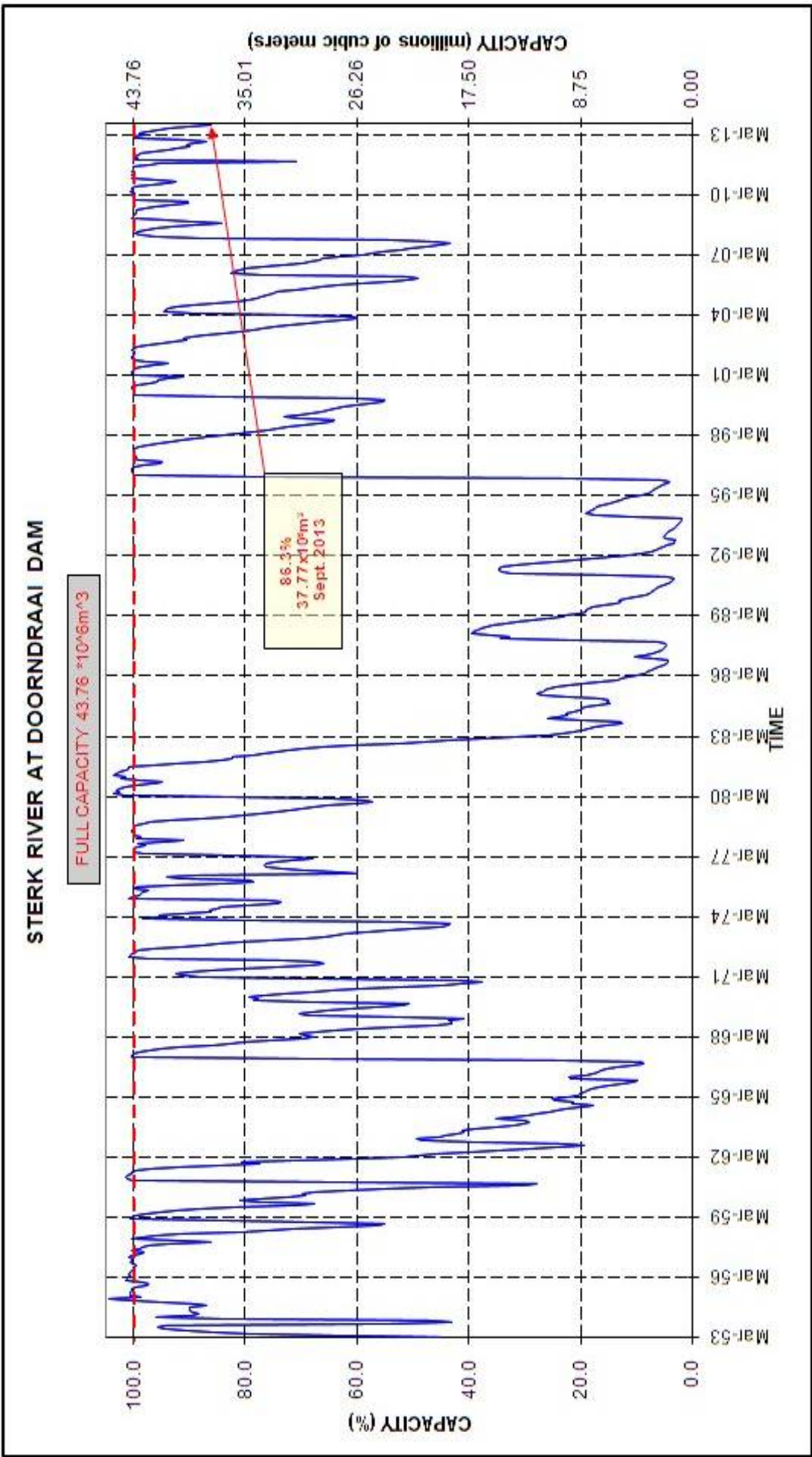
DECEMBER–JANUARY–FEBRUARY 2014
Above-Normal Rainfall



DECEMBER–JANUARY–FEBRUARY 2014
Below-Normal Rainfall

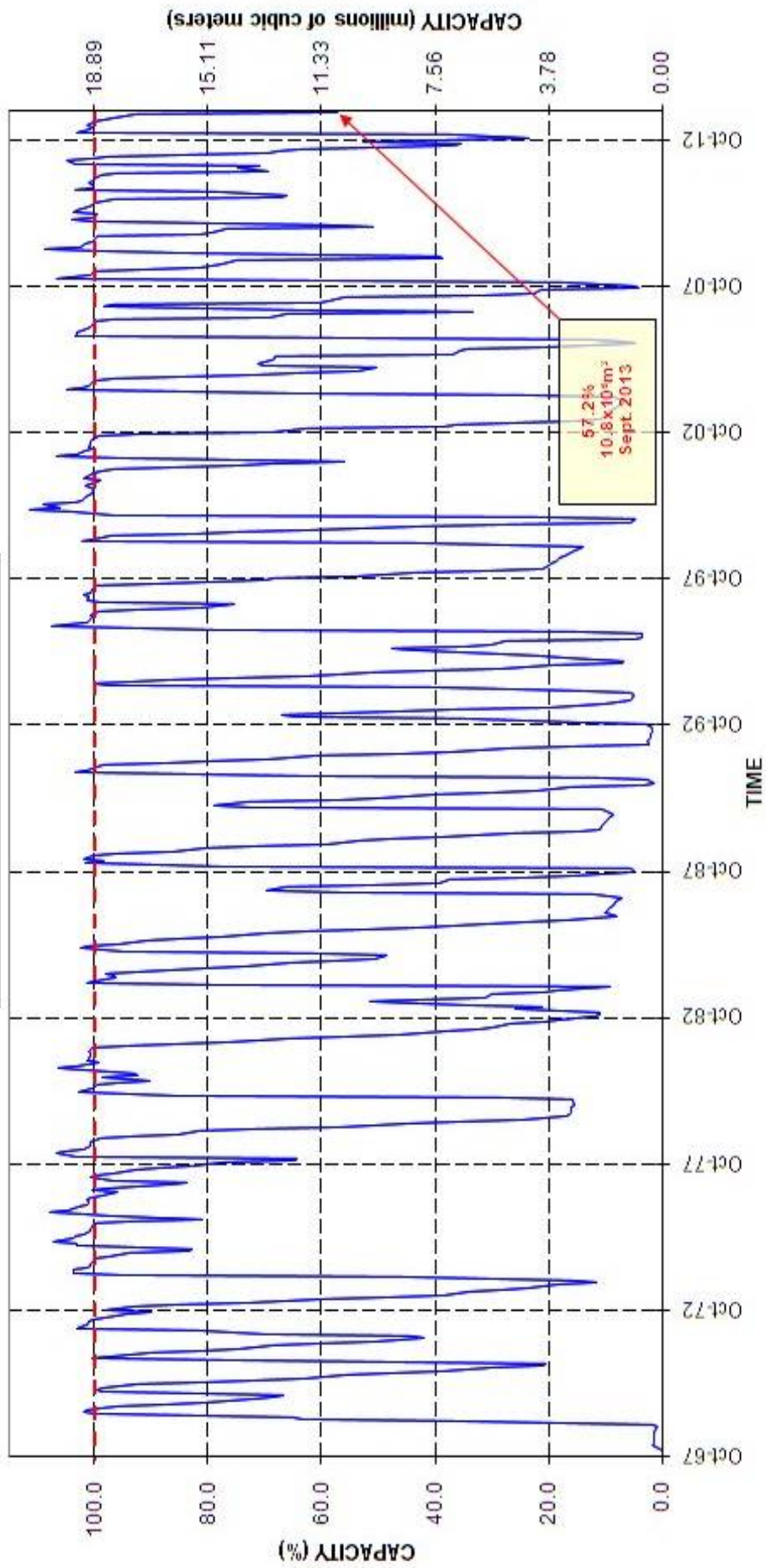






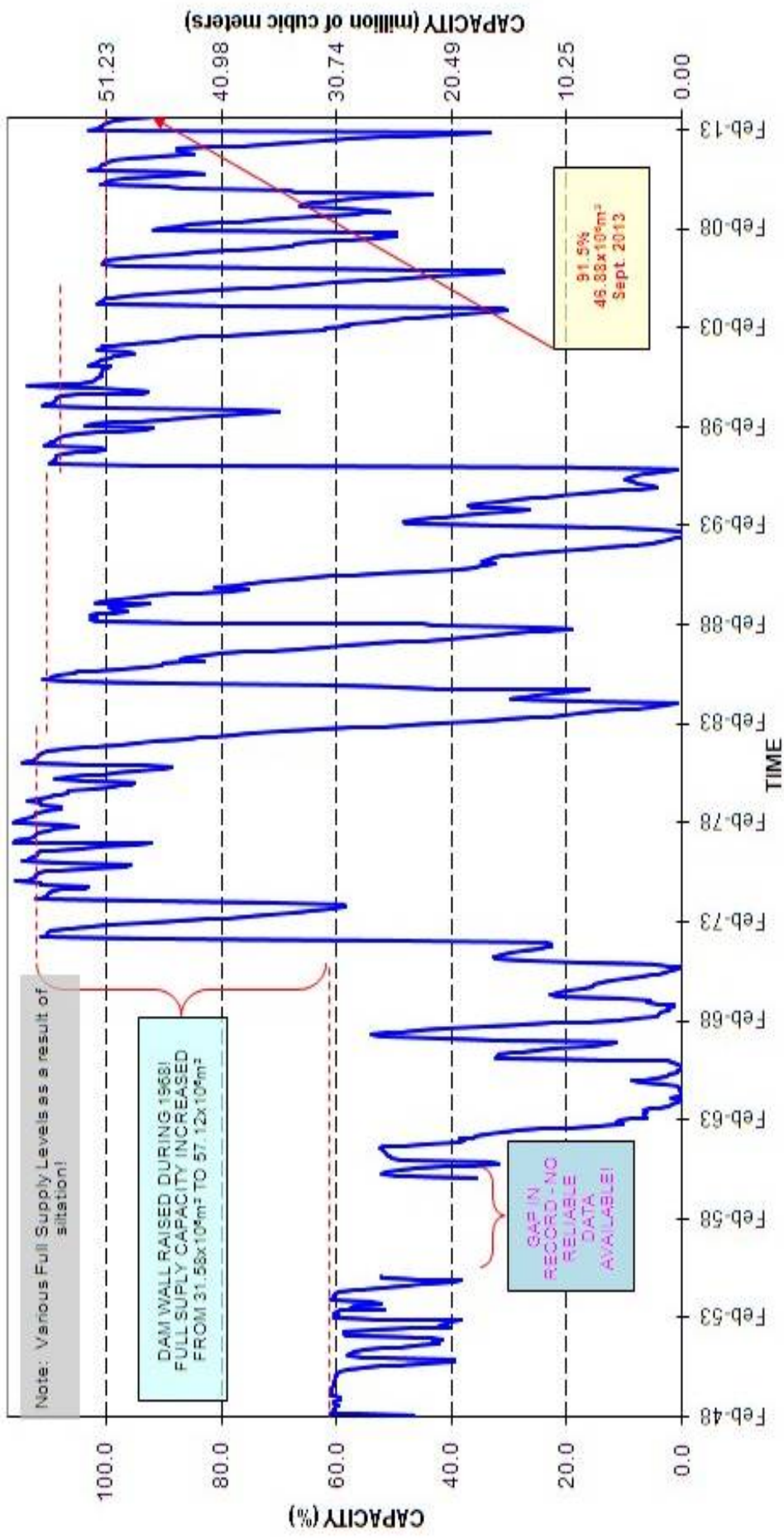
MOKGALAKWENA RIVER AT GLEN ALPINE DAM

FULL CAPACITY: 18.89 *10⁶m³



NZHELELE RIVER AT NZHELELE DAM

FULL CAPACITY: $51.23 \times 10^6 \text{ m}^3$



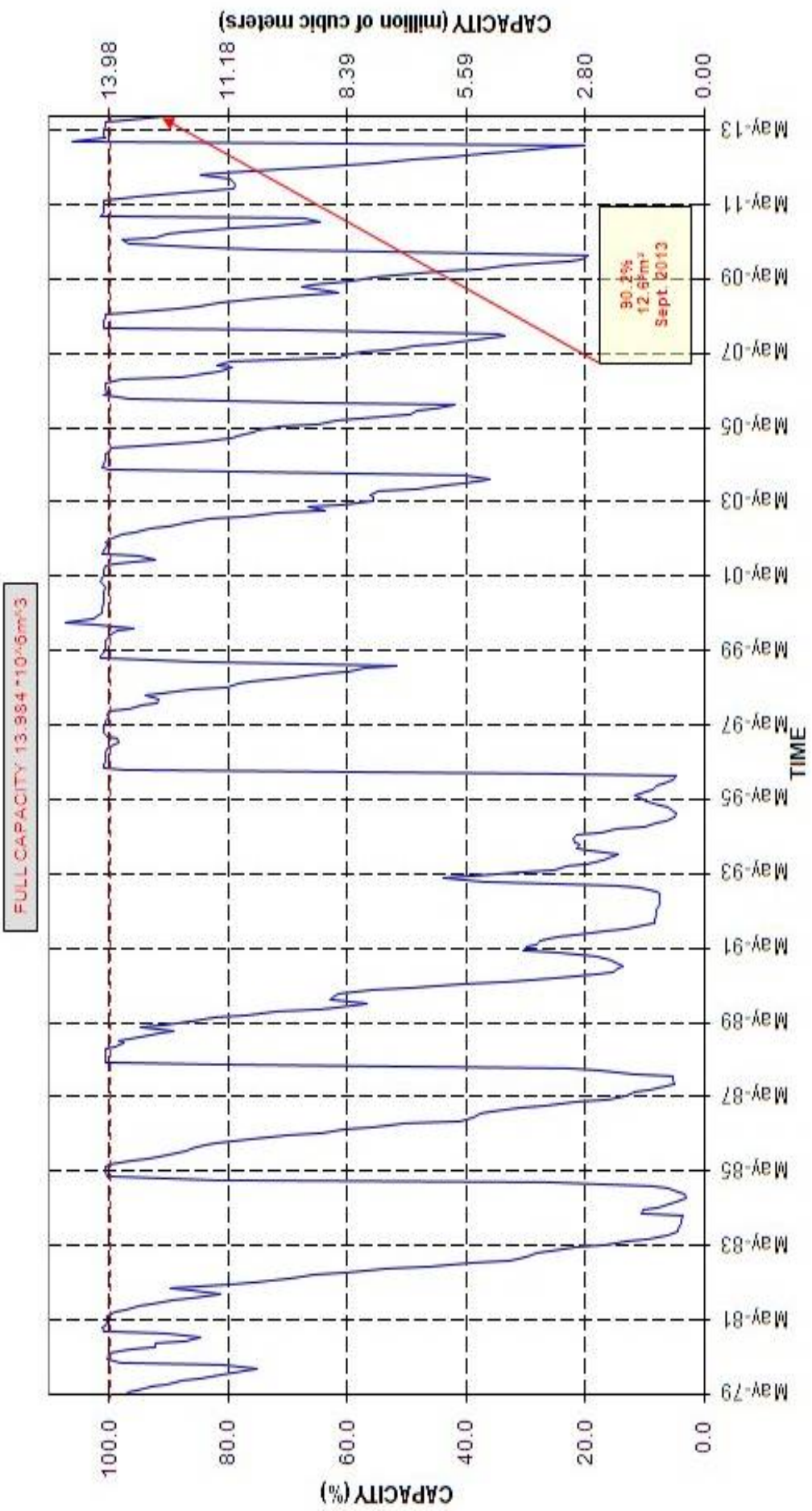
Note: Various Full Supply Levels as a result of siltation!

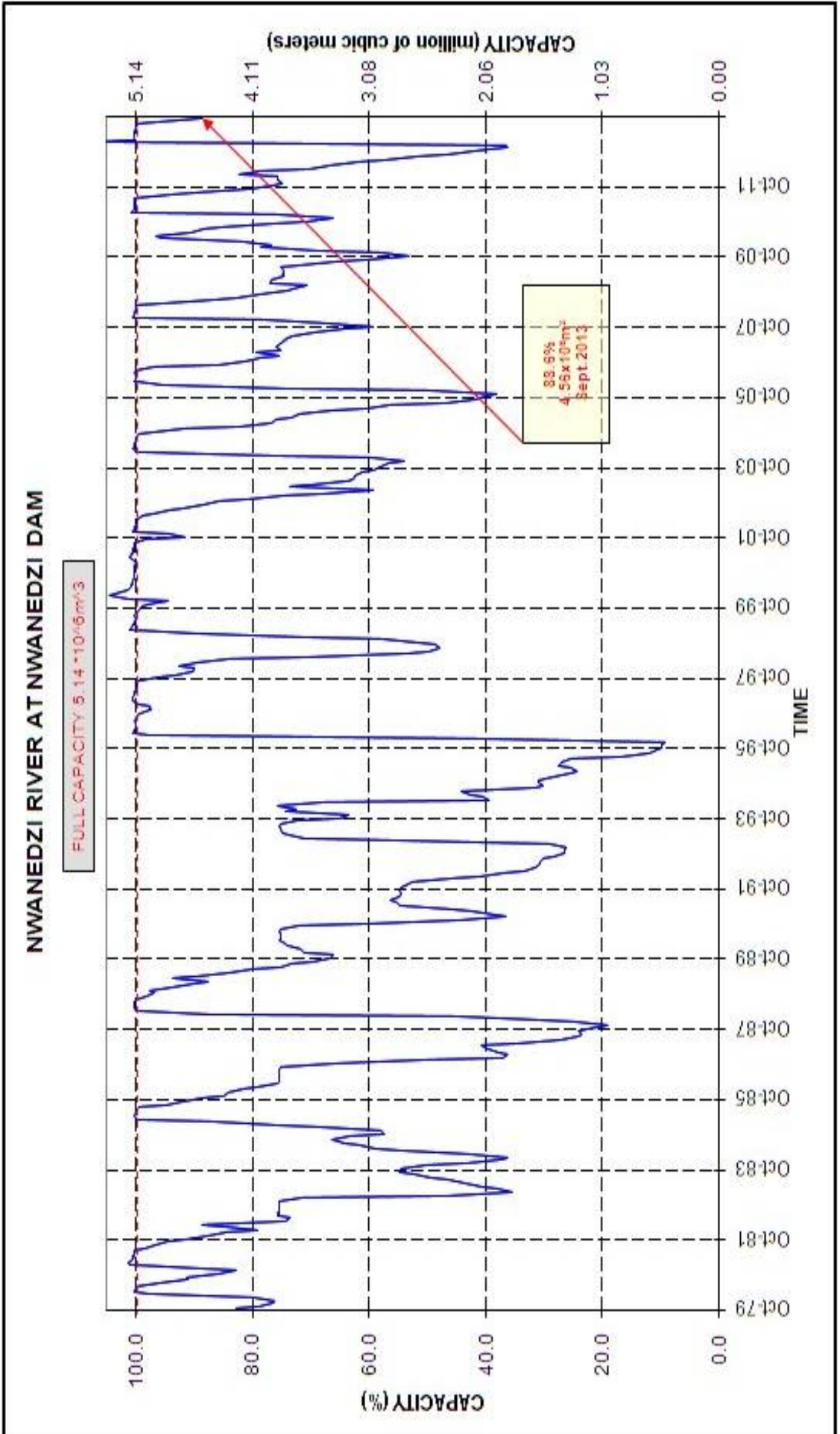
DAM WALL RAISED DURING 1968!
FULL SUPPLY CAPACITY INCREASED
FROM $31.58 \times 10^6 \text{ m}^3$ TO $57.12 \times 10^6 \text{ m}^3$

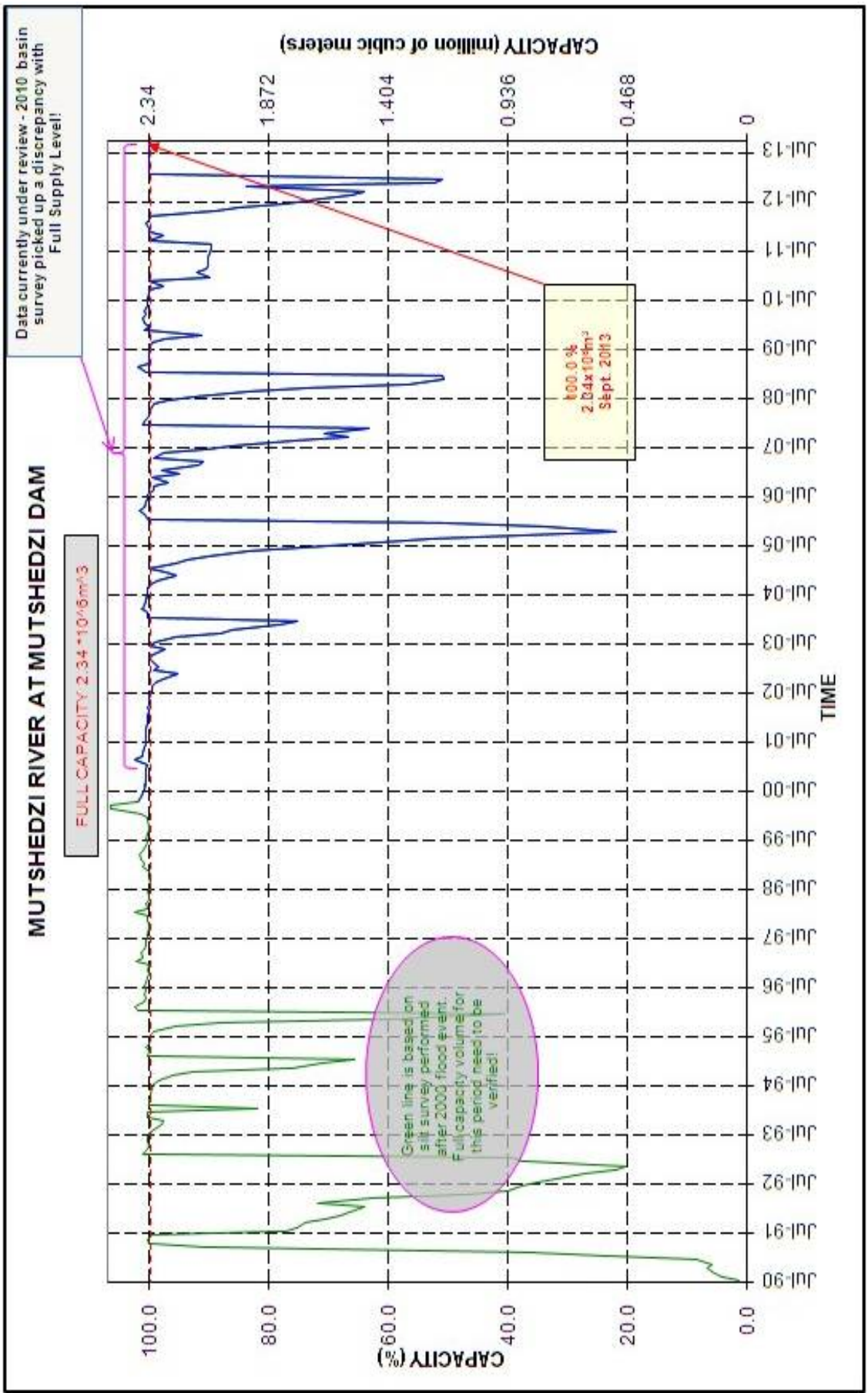
GAP IN RECORD - NO RELIABLE DATA AVAILABLE!

91.5%
 $46.88 \times 10^6 \text{ m}^3$
Sept. 2013

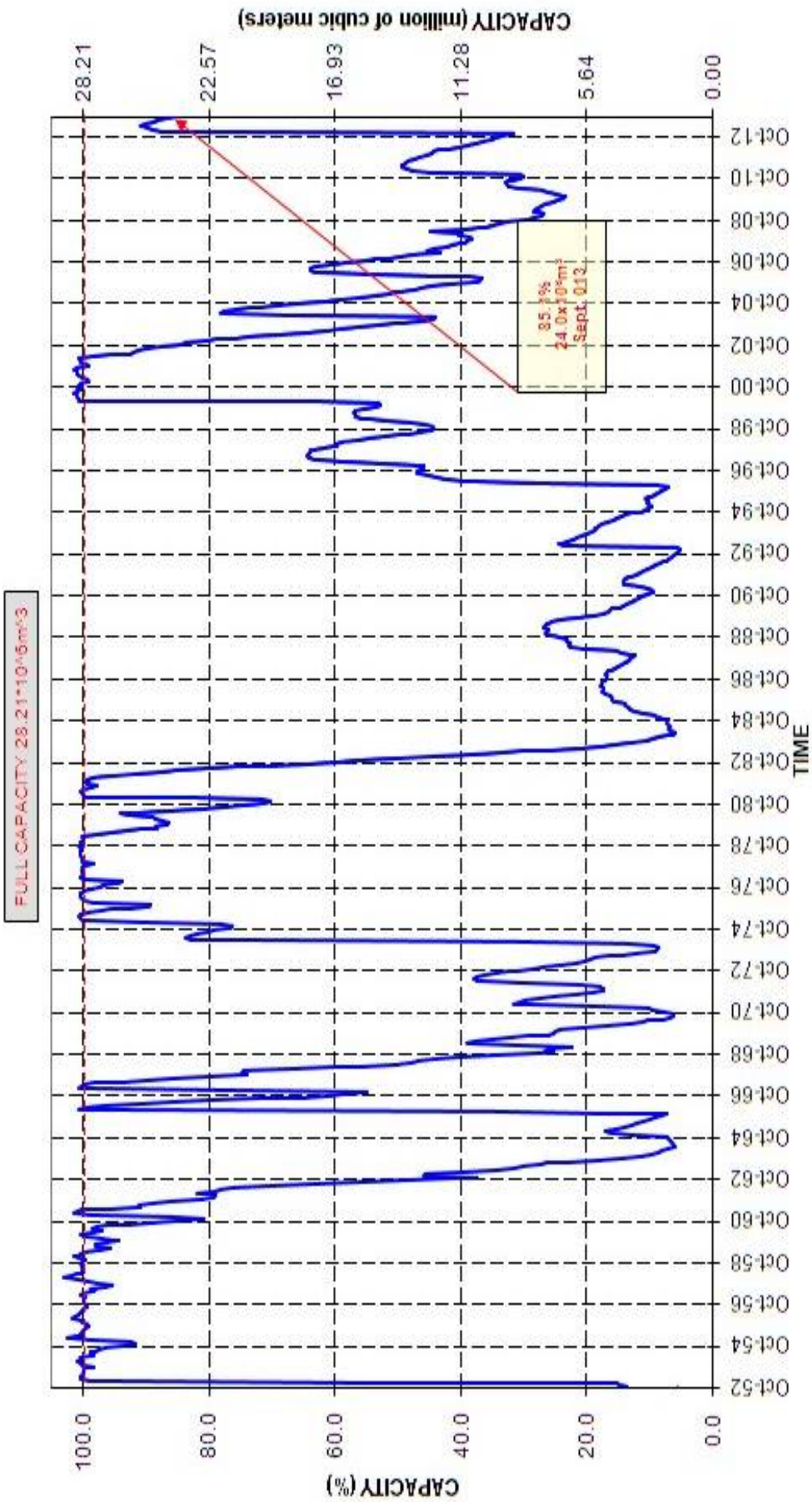
LUPHEPHE RIVER AT LUPHEPHE DAM

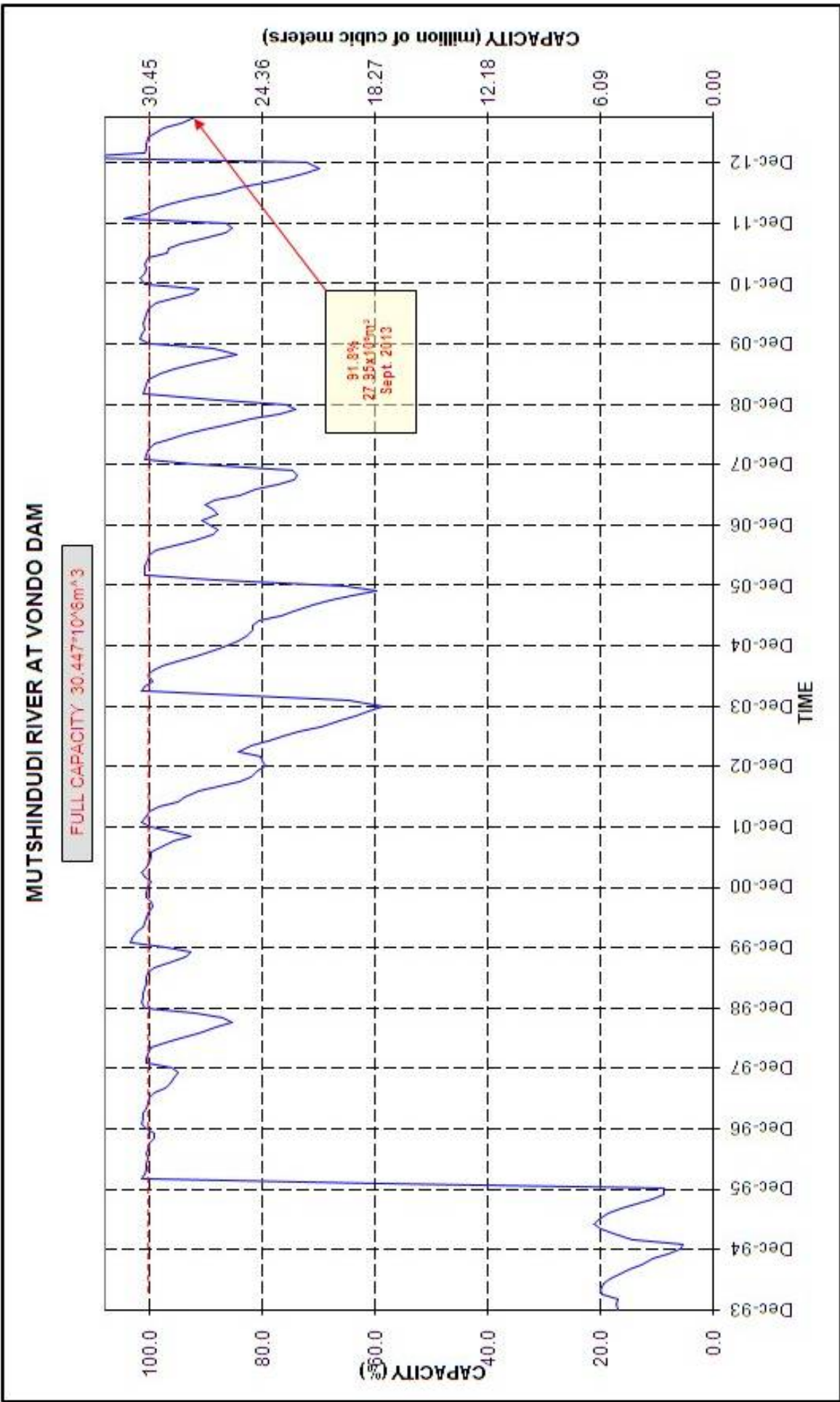






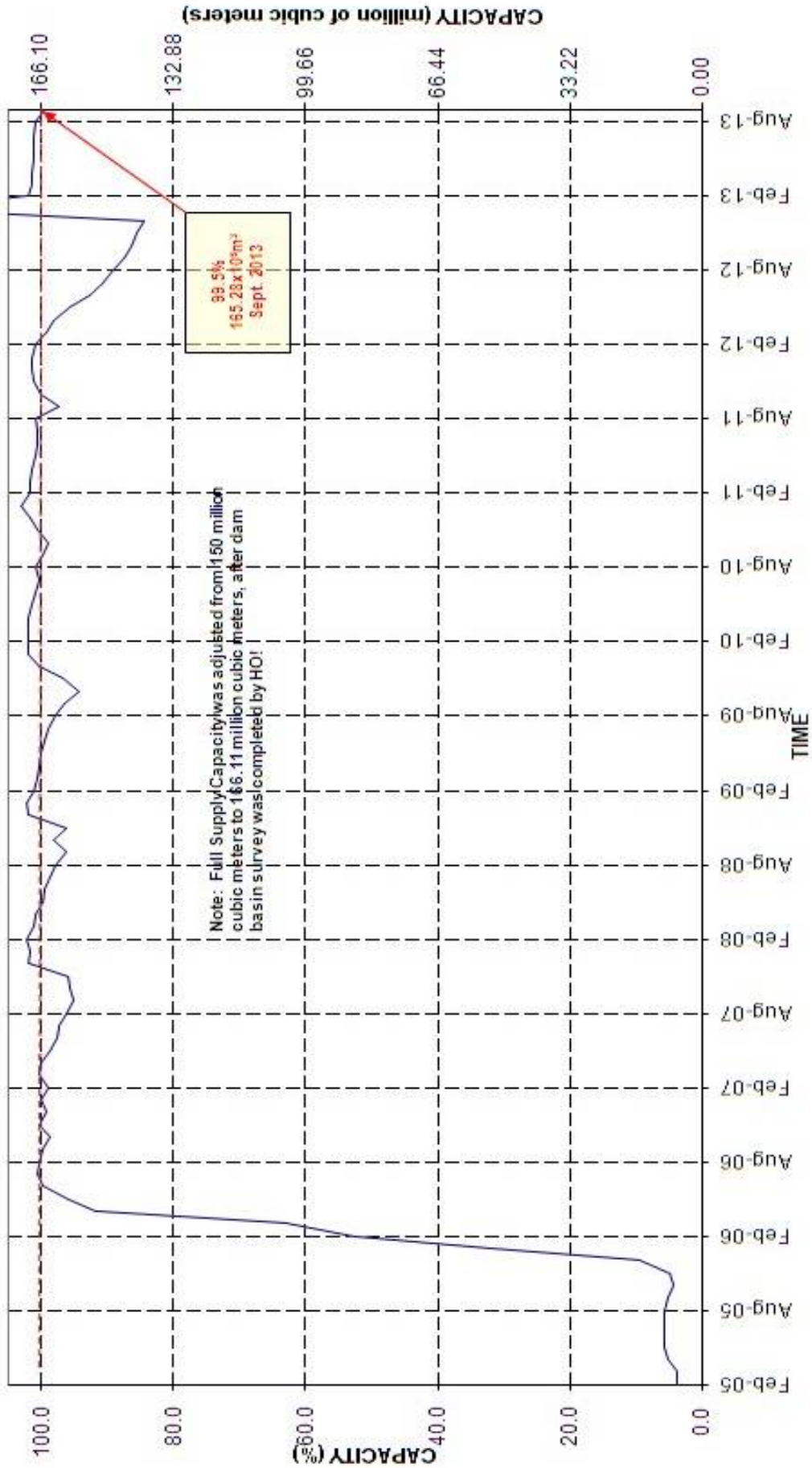
LUVUVHU RIVER AT ALBA SINI DAM





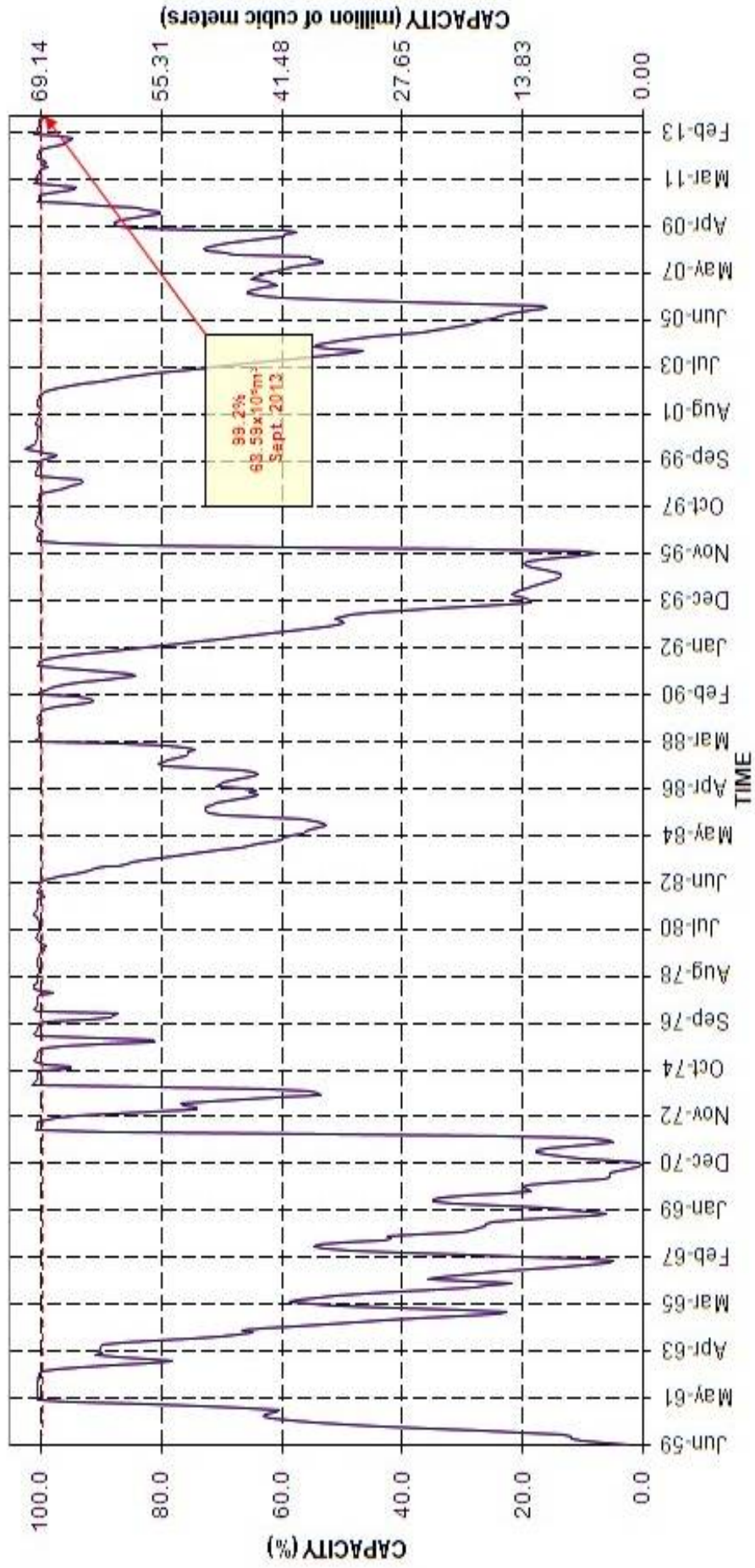
LUVUVHU RIVER AT NANDONI DAM

FULL CAPACITY: $166.11 \times 10^6 \text{ m}^3$



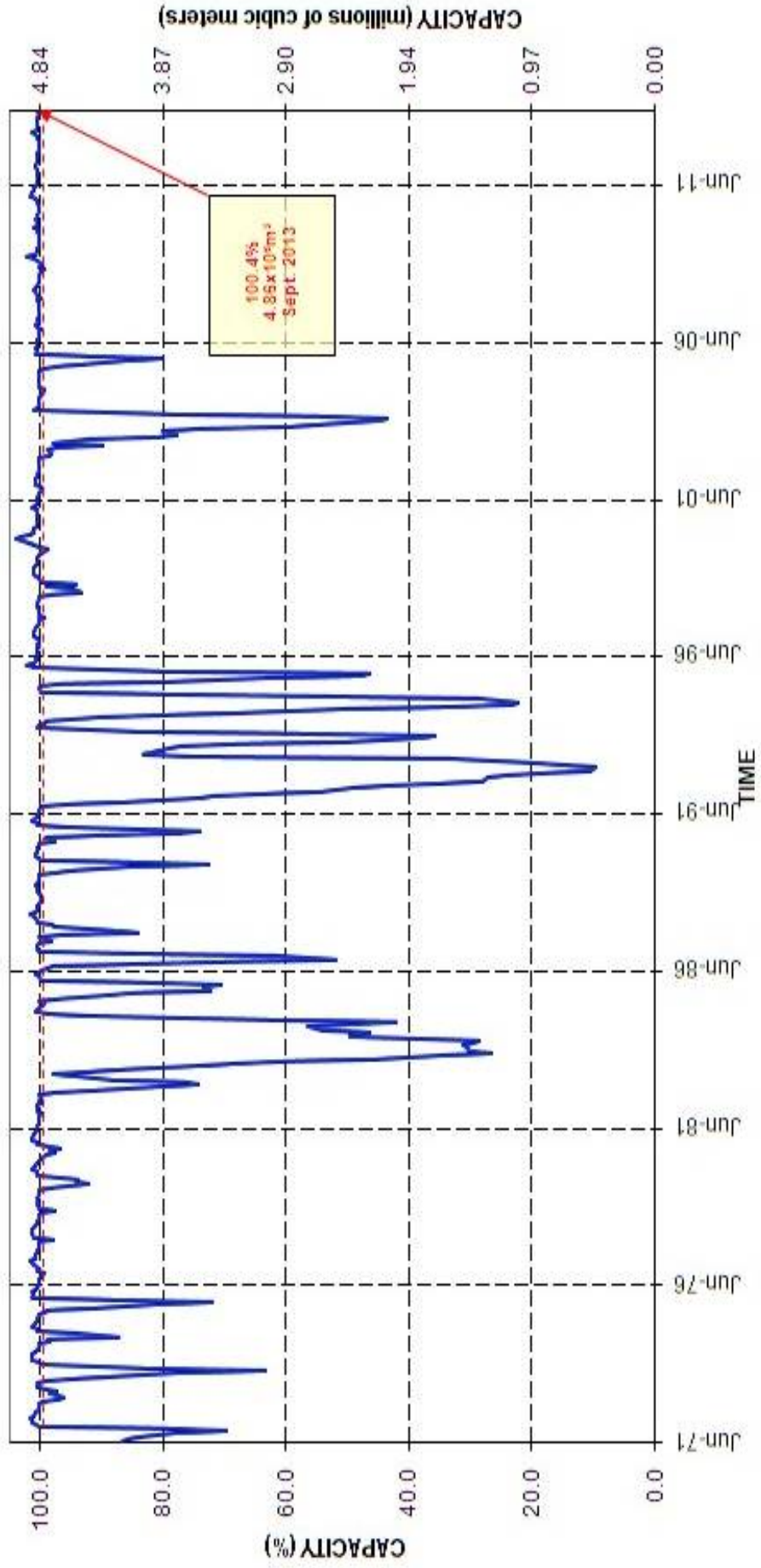
GREAT LETABA RIVER AT EBENEZER DAM

FULL CAPACITY 69.139 × 10⁶m³



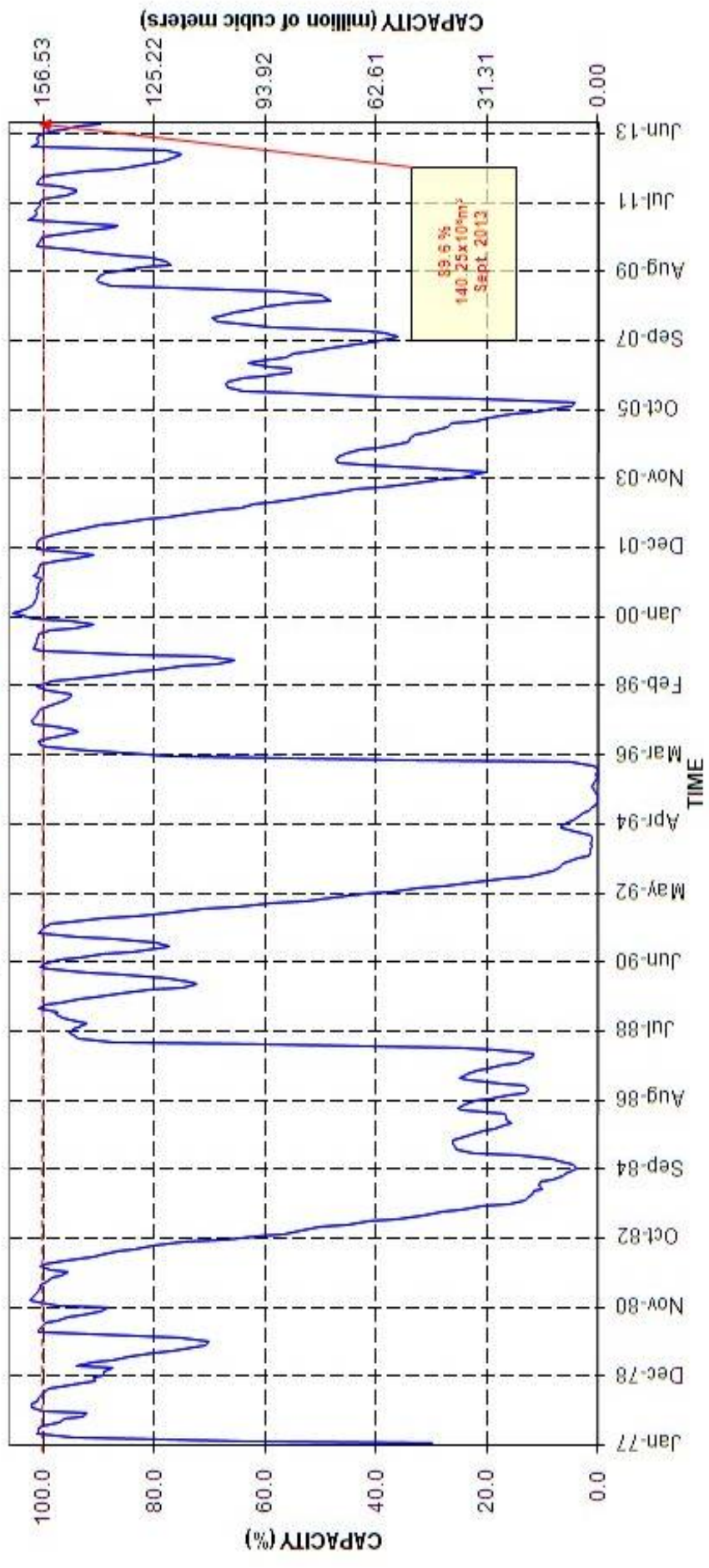
POLITSI RIVER AT MAGOEBA SKLOOF DAM

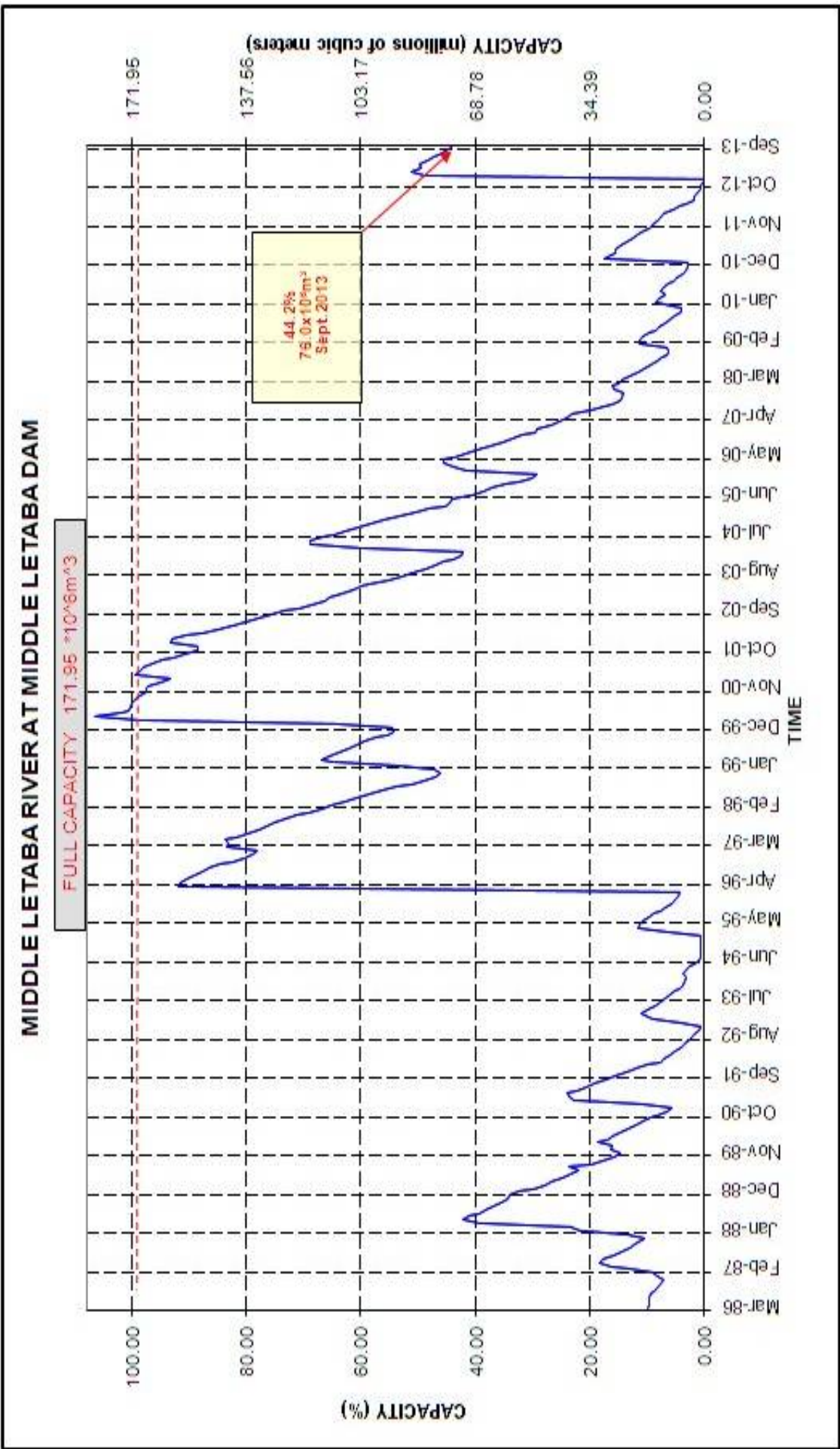
FULL CAPACITY $4.840 \times 10^6 \text{m}^3$

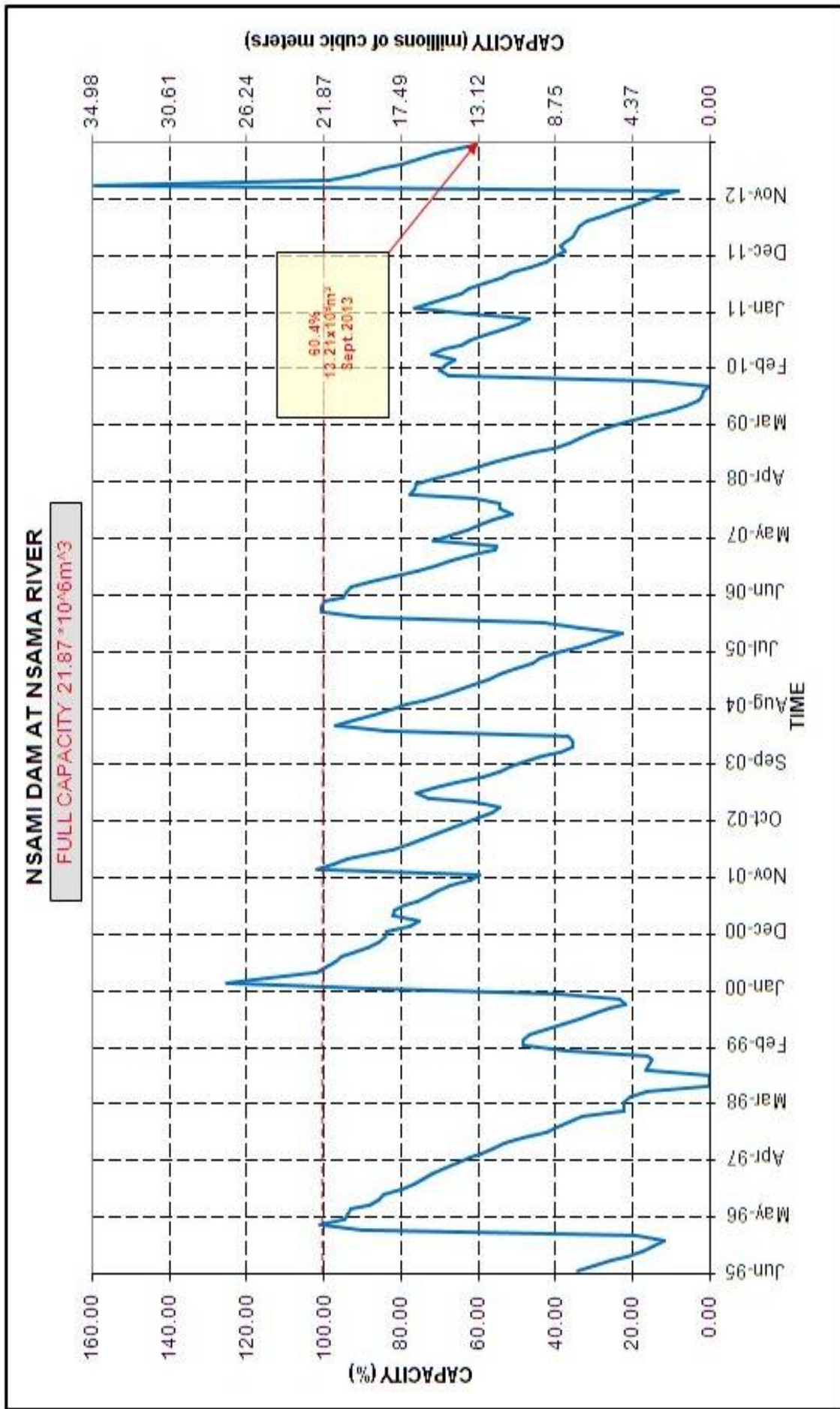


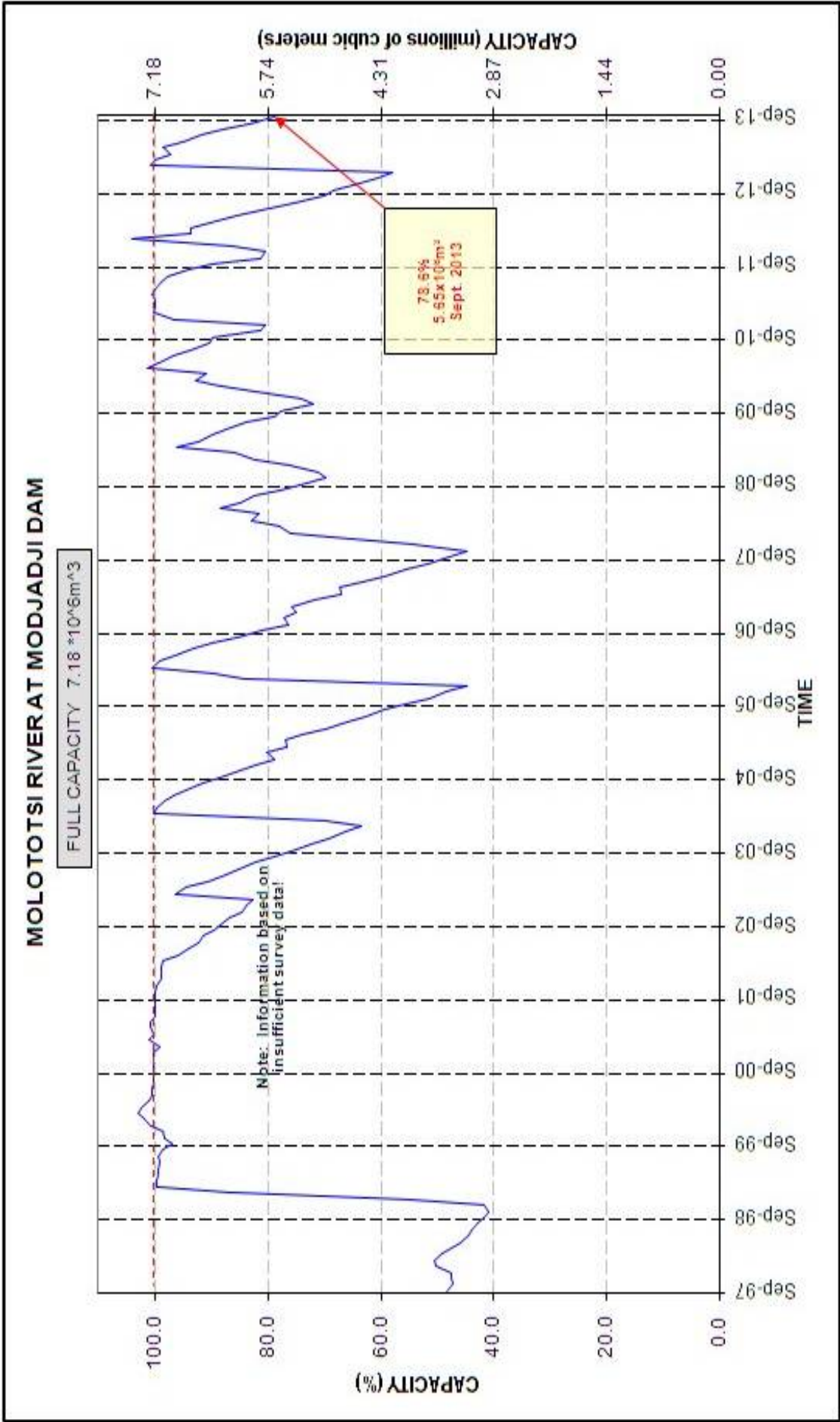
GREAT LETABA RIVER AT TZANEEN DAM

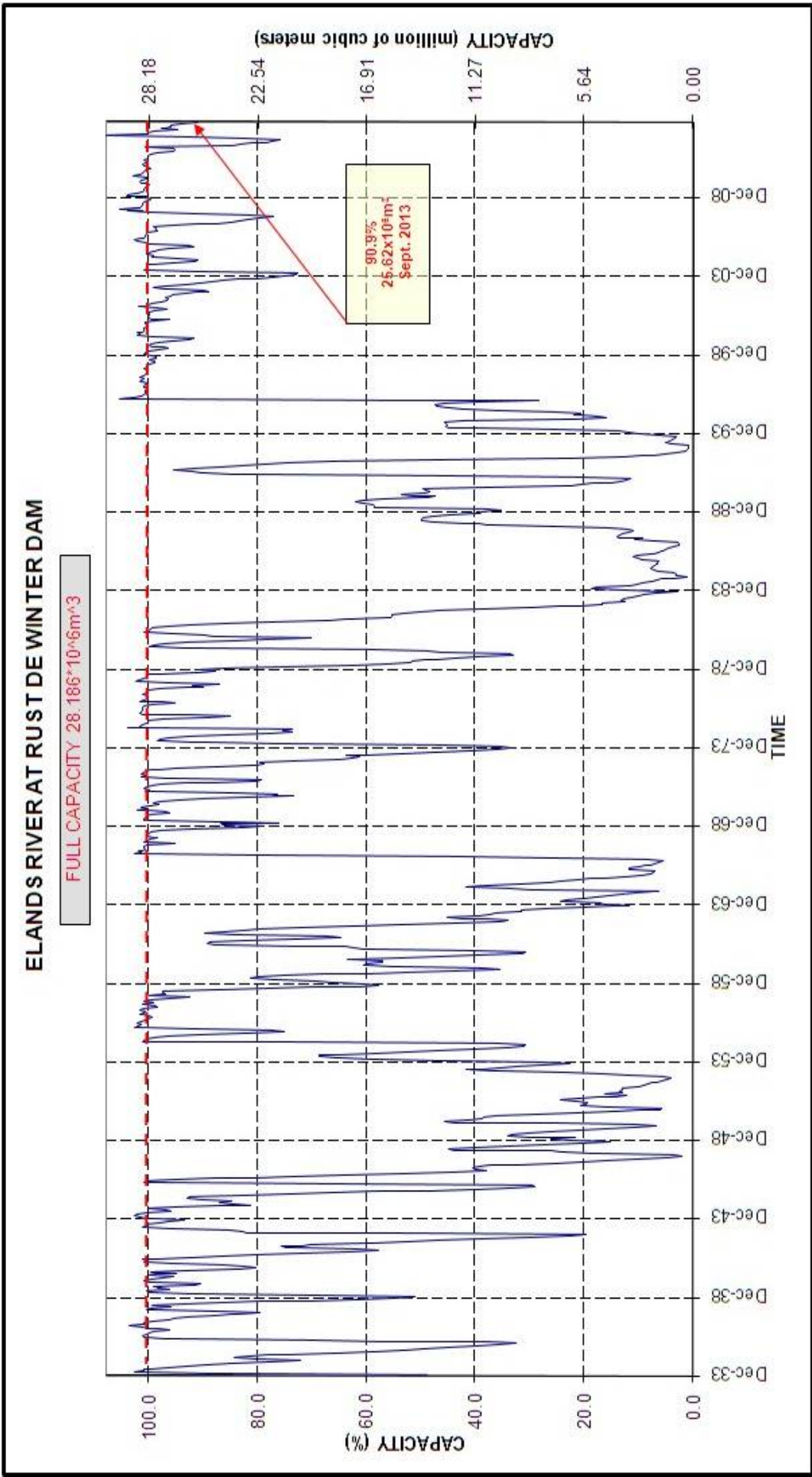
FULL CAPACITY 156.53 $\times 10^6 \text{m}^3$





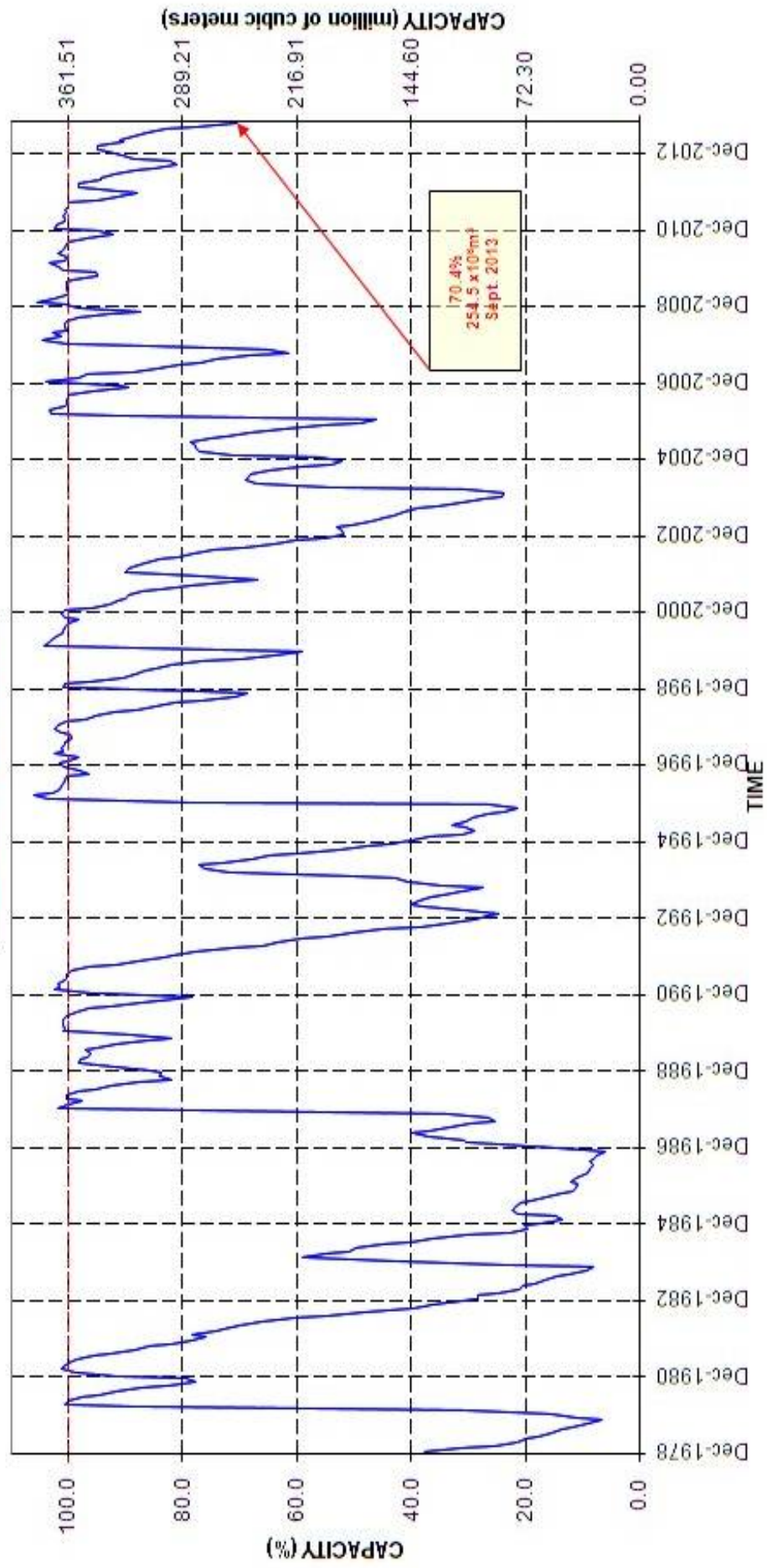






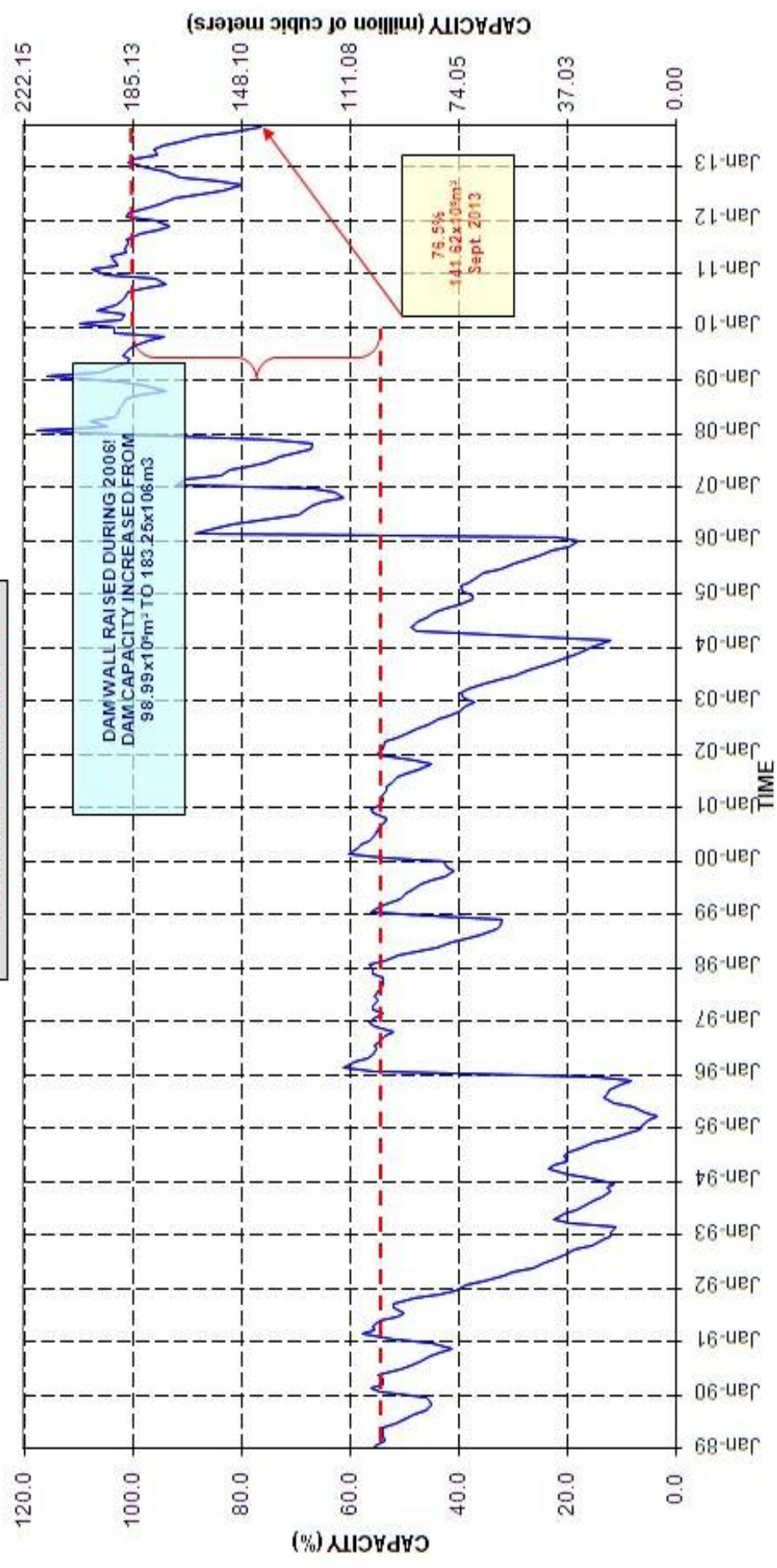
OLIFANTS RIVER AT LOSKOP DAM

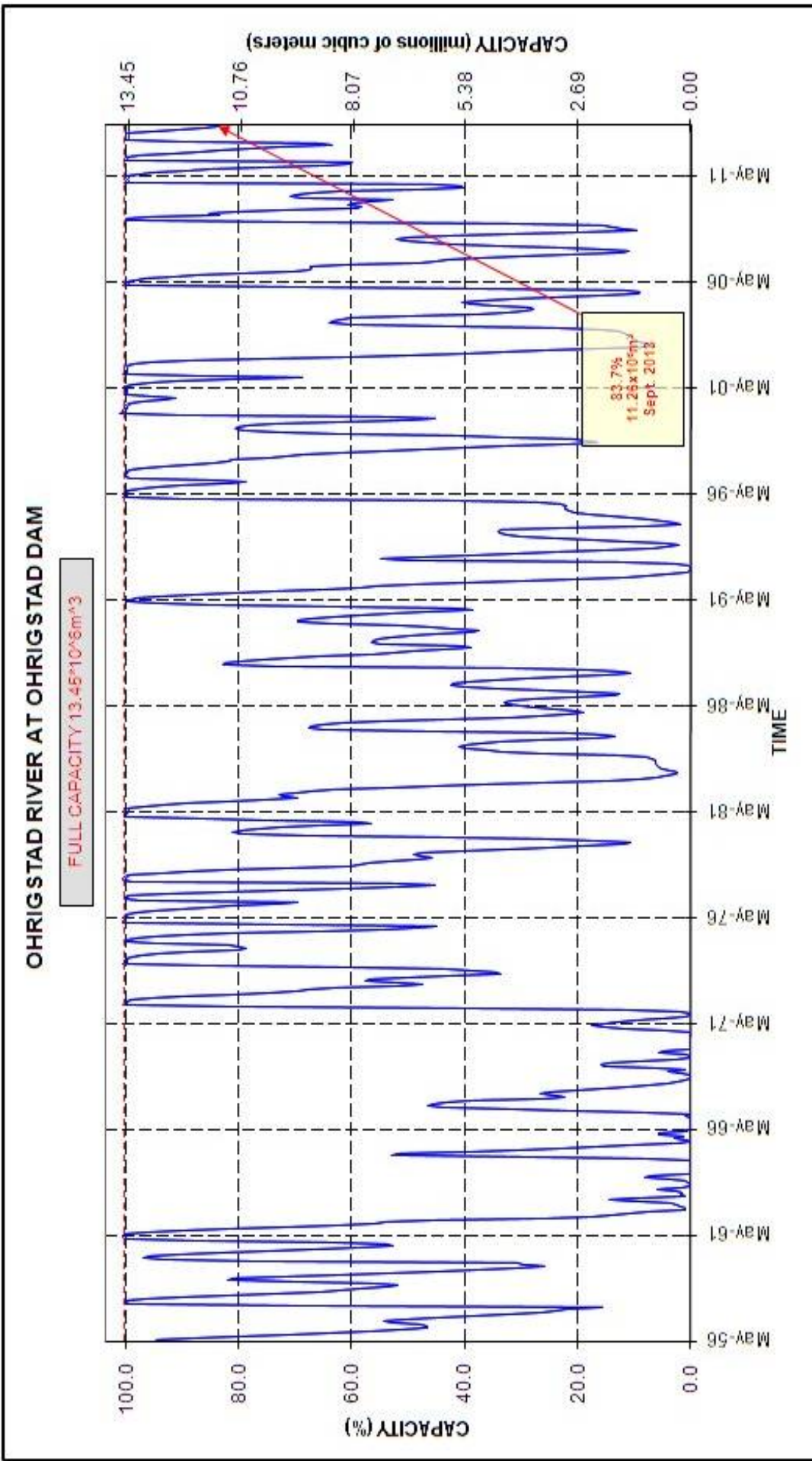
FULL CAPACITY 361.51*10⁶m³



OLIFANTS RIVER AT FLAG BOSHIELO DAM

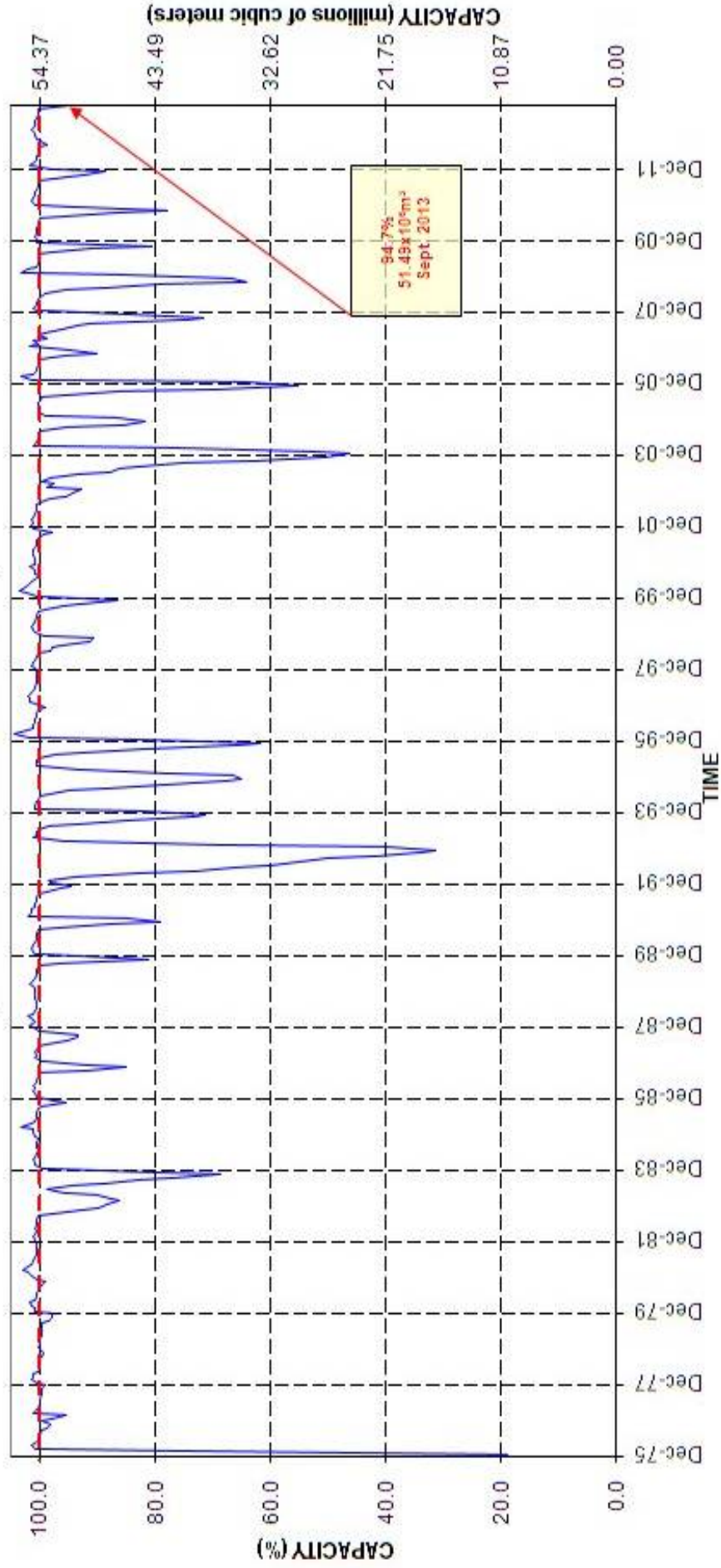
FULL CAPACITY 185.13*10⁶m³





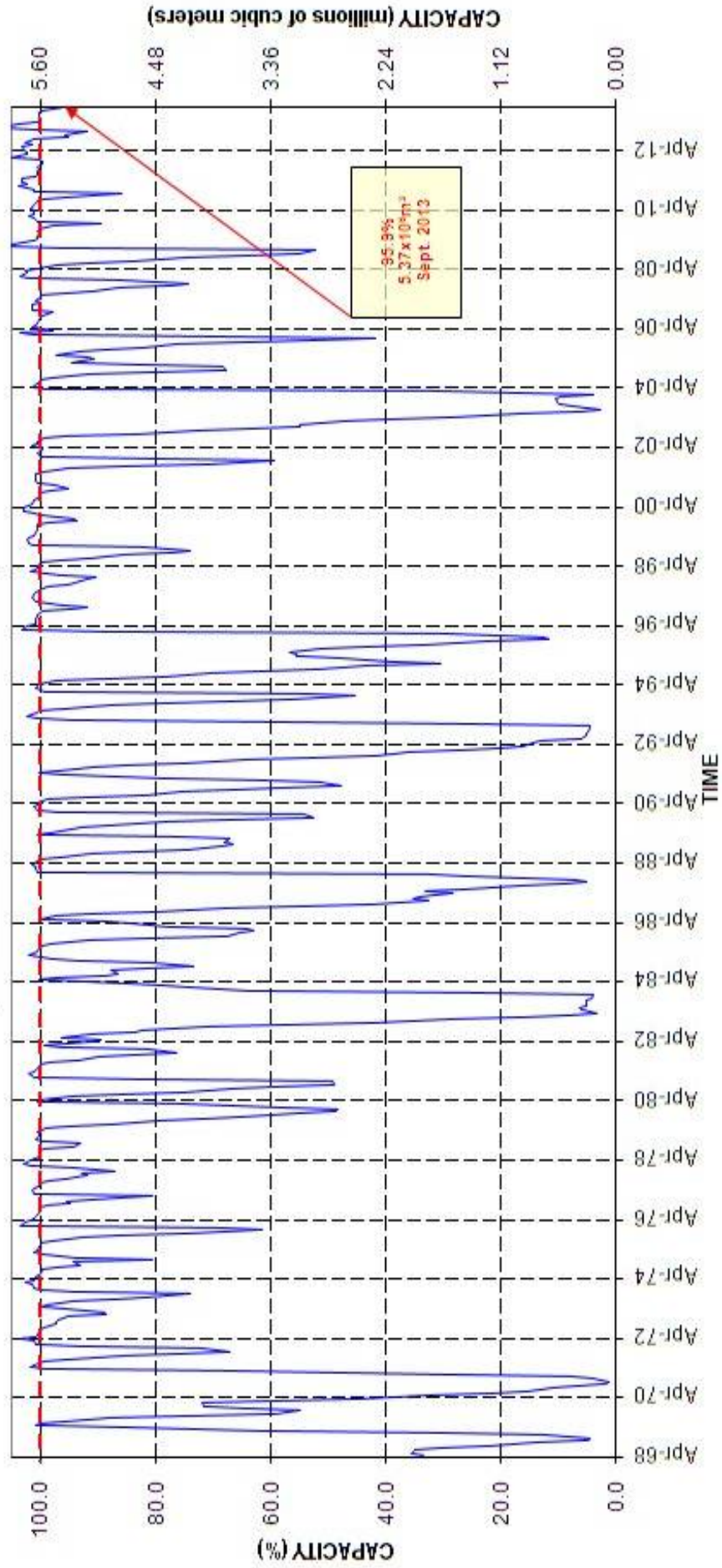
BLYDE RIVER AT BLYDE RIVIERSPOORT DAM

FULL CAPACITY: $54.389 \times 10^6 \text{m}^3$



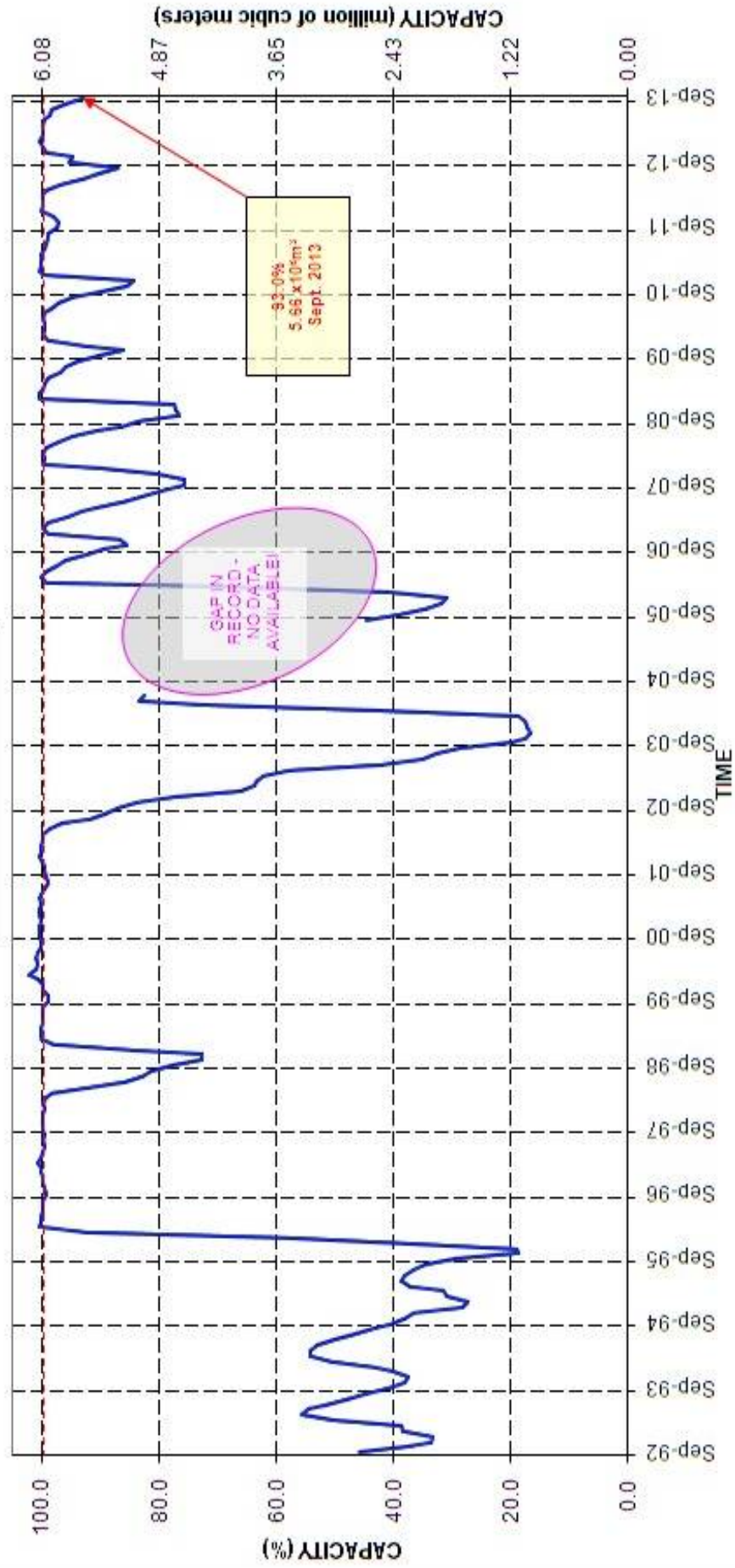
KLASERIE RIVER AT KLASERIE DAM

FULL CAPACITY 5.604*10⁶m³



NGWABITSI RIVER AT TOURS DAM

FULL CAPACITY 6.084*10⁶m³



CROCODILE RIVER AT KWENA DAM

