



DEPARTMENT OF WATER AFFAIRS AND FORESTRY
LIMPOPO PROVINCE
WATER RESOURCE INFORMATION

STATUS ON MONITORING &
SURFACE WATER LEVEL TRENDS
October 2011 to March 2012

D VILJOEN
June 2012

GH4325



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1. EXECUTIVE SUMMARY

The majority of dams used in this report have less water than during the corresponding period last year. In the Luvuvhu / Letaba Water Management Area **the Middle Letaba Dam is at 5.5%, Nsami Dam at 35.3% and the Albasini Dam with a storage level of 41.8% give reason for concern.**

The average storage volume for the Limpopo WMA is 267.7 million cubic meters (95.5%) and is 14.7 million cubic meters less than the corresponding period last year (100.7%).

The average storage volume for the Luvuvhu / Letaba WMA is 465.21 million cubic meters (70.5%) and is 32.67 million cubic meters less than the corresponding period last year (75.5%).

The average storage volume for the Olifants WMA is 972.8 million cubic meters (90.6%) and is 105.6 million cubic meters less than the corresponding period last year (100.4%). 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 1006.6 million cubic meters (95.9%) and is 47.6 million cubic meters less than the corresponding period last year (100.4%).

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 March 2011.

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

15 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 Nkomati Water Management Areas, information regarding their status is also attached.

3. OVERVIEW

No river flow gauging stations graphs have been attached but a few peak flows worth mentioning is listed below:

2.1 Peak flows measured at gauging stations during the past rainy season up to the end of March 2012.

RIVER AND PLACE	DATE, TIME AND HEIGHT	FLOW (m³/s)
Limpopo at Beit Bridge	2012/01/06 17h12 0.771	162
Mokolo at Dwaalhoek (just upstream of Mokolo Dam)	2012/01/23 17h32 1.221	94
Mokolo at Mokolo Dam	2012/12/25 12h48 42.51 2012/01/24 01h24 42.42	91.9 63.7
Great Letaba at Tzaneen Dam	2012/01/20 13h48 30.413	172
Great Letaba at Engelhardt Dam (before confluence with Olifants River at Letaba Camp in the KNP)	2012/01/18 13h19 2.607	2446
Olifants at Mamba (Approximately 8 km inside the western border of the Kruger National Park at Phalaborwa)	2012/01/17 14h30 8.082	3745
Olifants at Oxford (Mica)	2012/01/18 16h24 8.240	3500
Olifants at Balule (Note: Flood in Olifants River highest on record) estimated to be between a 100-200 year event)	2012/01/19 04h00 9.760	Approx. 10 420

2.2 Rainfall figures for the Limpopo WMA based on daily readings indicated on monthly returns.

DAM	OCT'11 (mm)	NOV'11 (mm)	DEC'11 (mm)	JAN'12 (mm)	FEB'12 (mm)	MAR'12 (mm)	TOTAL (mm)
Mokolo	73.5	66.3	396.2	182.4	15.5	93	826.9
Doorndraai	73.6	40.6	196.3	78.9	33.9	25.2	448.5
Glen Alpine	125.8	26.9	166.4	139	5.2	43.6	506.9
Nwanedzi	11.4	195.9	23.8	48.5	91.6	1.3	372.5

2.3 Rainfall figures for the Levhuvhu / Letaba WMA based on daily readings indicated on monthly returns.

DAM	OCT'11 (mm)	NOV'11 (mm)	DEC'11 (mm)	JAN'12 (mm)	FEB'12 (mm)	MAR'12 (mm)	TOTAL (mm)
Albasini	64.6	54.1	72.6	139	62.9	17.3	410.5
Ebenezer	124	205.98	100.8	273.7	187.3	48.7	940.48
Magoebaskloof	94.3	157.7	323.8	234	83.1	132	1024.9
Tzaneen	122	55.6	84.9	276.98	23.9	115.9	679.28
Middle-Letaba	40	47	10	48	41	0	186
Nandoni	36.3	91	112.5	72.3	32.9	3.2	348.2

2.4 Rainfall figures for the Olifants WMA based on daily readings indicated on monthly returns.

DAM	OCT'11 (mm)	NOV'11 (mm)	DEC'11 (mm)	JAN'12 (mm)	FEB'12 (mm)	MAR'12 (mm)	TOTAL (mm)
Loskop	35.0	37.2	129.2	62.6	5.6	21.4	291.0
Flag Boshielo	65.7	25.7	137.9	95.8	63.8	48.0	436.9

2.5 Rainfall figures for the Inkomati WMA based on daily readings indicated on monthly returns

DAM	OCT'11 (mm)	NOV'11 (mm)	DEC'11 (mm)	JAN'12 (mm)	FEB'12 (mm)	MAR'12 (mm)	TOTAL (mm)
Kwena	126.4	16.4	147.0	239.8	33.8	73.2	636.6
Inyaka	104.6	113.2	173.0	419.2	117.8	50.4	978.2

To give an indication of what the percentage of normal rainfall was for the period July 2010 up to March 2011, see attached map (page 11). For information purposes a graph depicting provincial rainfall for the current hydrological year is attached (page 12). Rainfall forecasts for April 2011 up to July 2011 are also attached see page 17. This information was obtained from the South African Weather Service.

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

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

The purpose for attaching graphs of individual dams 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 is at a storage level of 101% ($146.78 \times 10^6 \text{m}^3$) and is on the same level as the previous year, See attached graph!

4.2 A5 Drainage Area (Lephalala River)

Two small dams exists 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 99.2% ($43.427 \times 10^6 \text{m}^3$) and 0.7% lower than the previous year. See attached graph!

Glen Alpine Dam is at a storage level of 97.6% ($18.889 \times 10^6 \text{m}^3$) and 2.4% lower than the previous year.

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!

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 iterated 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 81.8% ($41.894 \times 10^6 \text{m}^3$) and 19.3% lower than the previous year, which means that the storage volume is 9.83 million cubic meters less than the corresponding period last year. See attached graph!

Luphephe and Nwanedzi Dams are at storage levels of 81% and 78.5% respectively. Their combined storage is at $15.37 \times 10^6 \text{m}^3$. The combined storage for the corresponding period the previous year was $19.25 \times 10^6 \text{m}^3$. (100.64% of storage volume) See attached graphs!

Mutshedzi Dam, is at a storage level of 99.8% ($2.33 \times 10^6 \text{m}^3$) and 9.6% higher than the previous year. **Take note that the data from February 2000 up to date is currently under review! This was initiated as a result of a basin survey conducted in 2010, which indicated a discrepancy with the current Full Supply Level of the dam. Data will be rectified as soon as FSL has been verified!**

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 41.8% ($11.79 \times 10^6 \text{m}^3$) and 6.7% lower than the previous year, which means that the storage volume is 1.88 million cubic meters less than the corresponding period last year. See attached graph!

Vondo Dam is at a storage level of 98.6% ($30.02 \times 10^6 \text{m}^3$) and 2.1% lower than the previous year. See attached graph!

Nandoni Dam is at a storage level of 99.2% ($164.78 \times 10^6 \text{m}^3$) and 2.4% lower than the previous 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 100.5% ($69.487 \times 10^6\text{m}^3$) and on the same level than the previous year. See attached graph!

Magoebaskloof Dam is at a storage level of 100.6% ($4.87 \times 10^6\text{m}^3$) and 0.6% lower than the previous year. See attached graph!

Tzaneen Dam is at a storage level of 100.3% ($157 \times 10^6\text{m}^3$) and 0.9% lower than the previous year, which means that the storage volume is 1.33 million cubic meters less than the corresponding period last year. See attached graph!

Middle-Letaba Dam is at a storage level of 5.5% ($9.46 \times 10^6\text{m}^3$) and 10% lower than the previous year, which means that the storage volume is 17.12 million cubic meters less than the corresponding period last year. See attached graph!

The Nsami Dam is at a storage level of 35.3% ($7.72 \times 10^6\text{m}^3$) and 32.5% lower than the previous year, which means that the storage volume is 7.11 million cubic meters less than the corresponding period last year.

The Modjadji Dam is at a storage level of 93.5% ($6.71 \times 10^6\text{m}^3$) and 6.5% lower than the previous year, which means that the storage volume is 0.47 million cubic meters less 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 84.6% ($23.85 \times 10^6\text{m}^3$) and 15.7% lower than the previous year. See attached graph!

Loskop Dam is at a storage level of 94.4% ($341.27 \times 10^6\text{m}^3$) and 6.3% lower than the previous 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 96.9% ($179.39 \times 10^6\text{m}^3$) and 6.3% lower than the previous 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 100.1% ($13.46 \times 10^6\text{m}^3$) and at the same level than the previous year, which See attached graph! 100.2%

Blyde Dam is at a storage level of 100.7% ($54.75 \times 10^6\text{m}^3$) and 0.3% lower than the previous year. See attached graph!

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 102.42% ($5.738 \times 10^6\text{m}^3$) and 0.8% lower than the previous year. See attached graph!

Tours Dam is at a storage level of 99.8% ($6.072 \times 10^6\text{m}^3$) and 0.5% 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!

7. INKOMATI 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 100.4% ($159.53 \times 10^6\text{m}^3$) and 0.2% lower than the previous year. See attached graph!

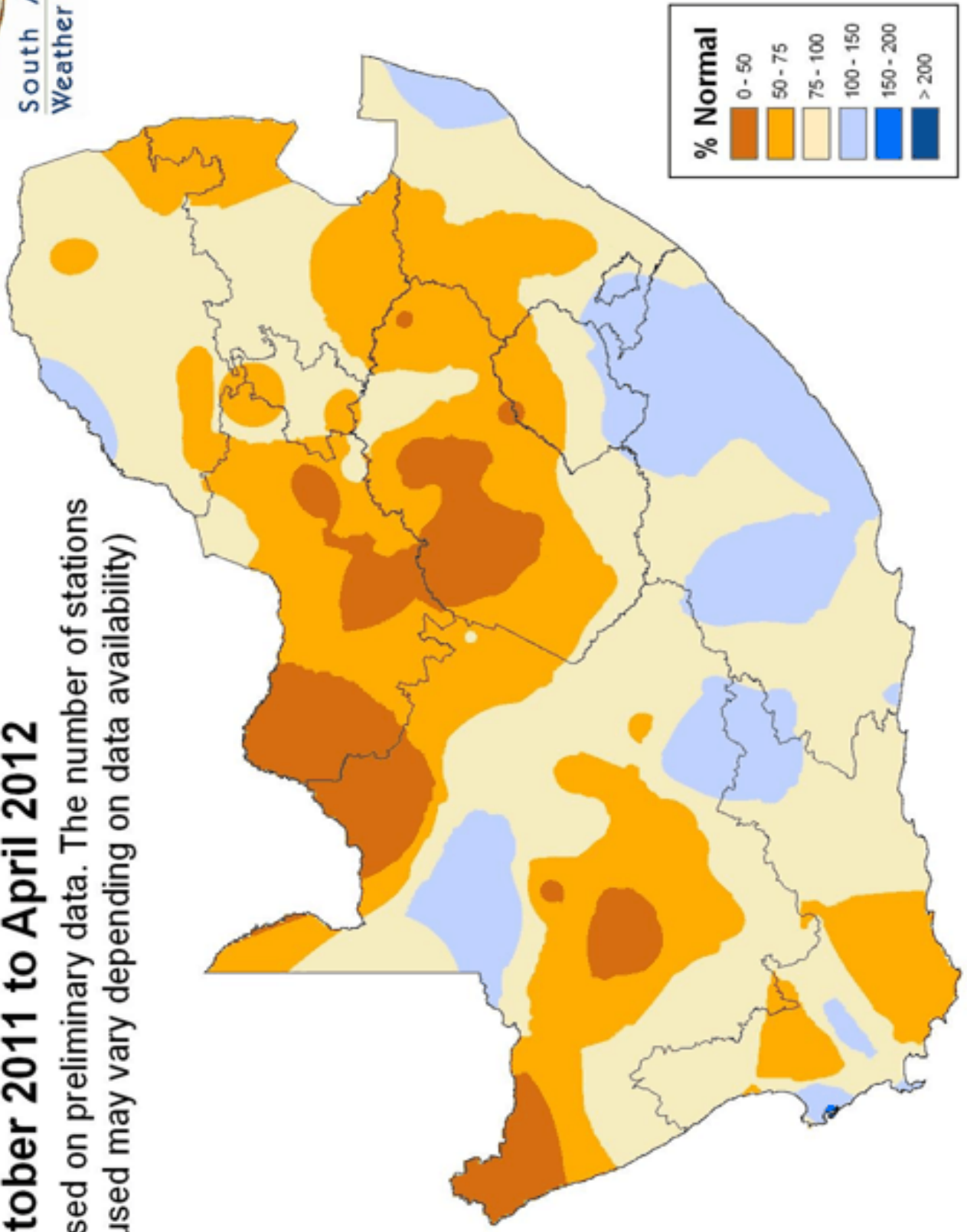
7.2 X3 Drainage Area (Mariti River)

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

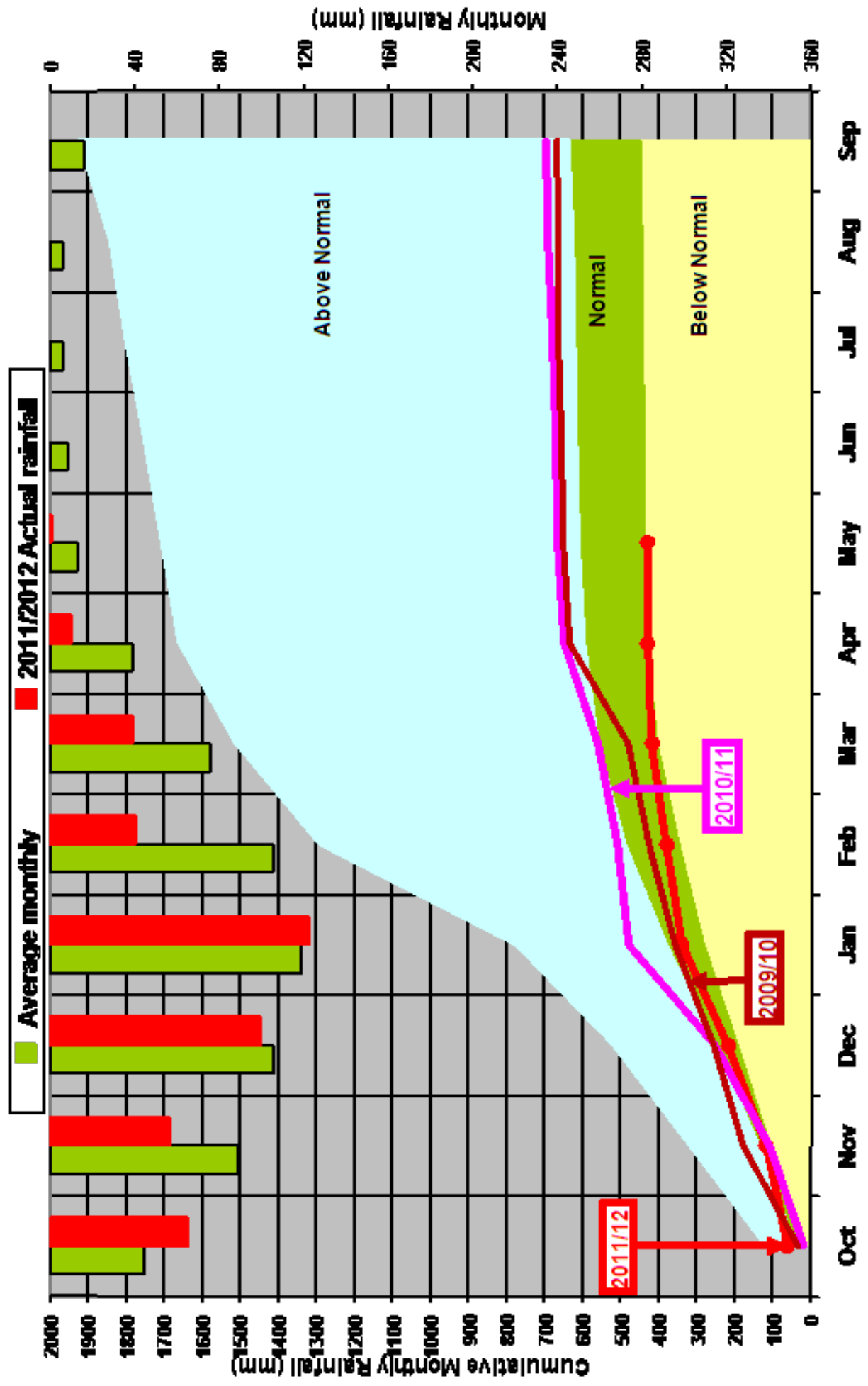
Inyaka Dam is at a storage level of 100.3% ($124.03 \times 10^6\text{m}^3$) and 0.4% lower than the previous year. See attached graph!

Percentage of Normal for the Hydrological Season October 2011 to April 2012

(based on preliminary data. The number of stations used may vary depending on data availability)

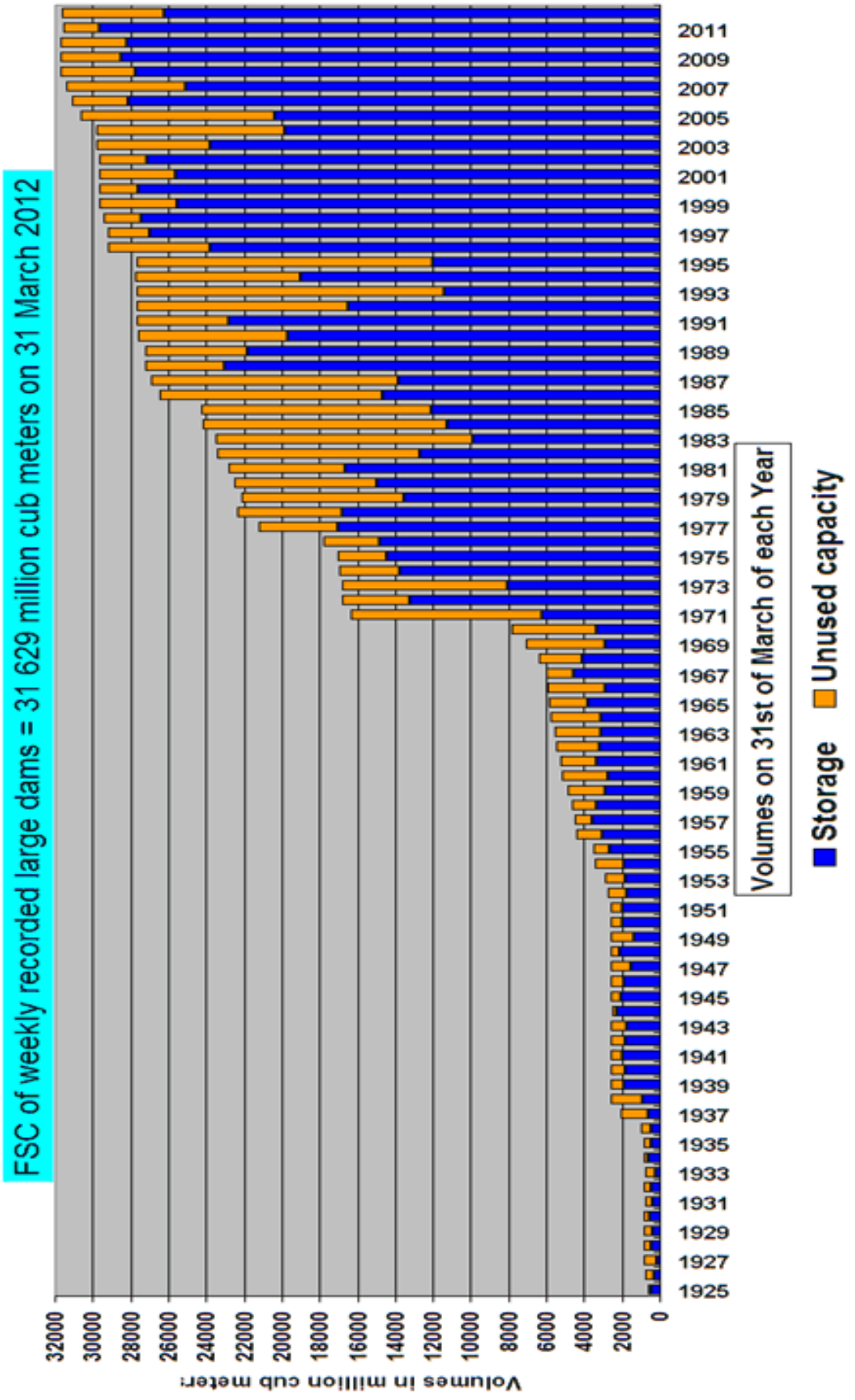


LIMPOPO

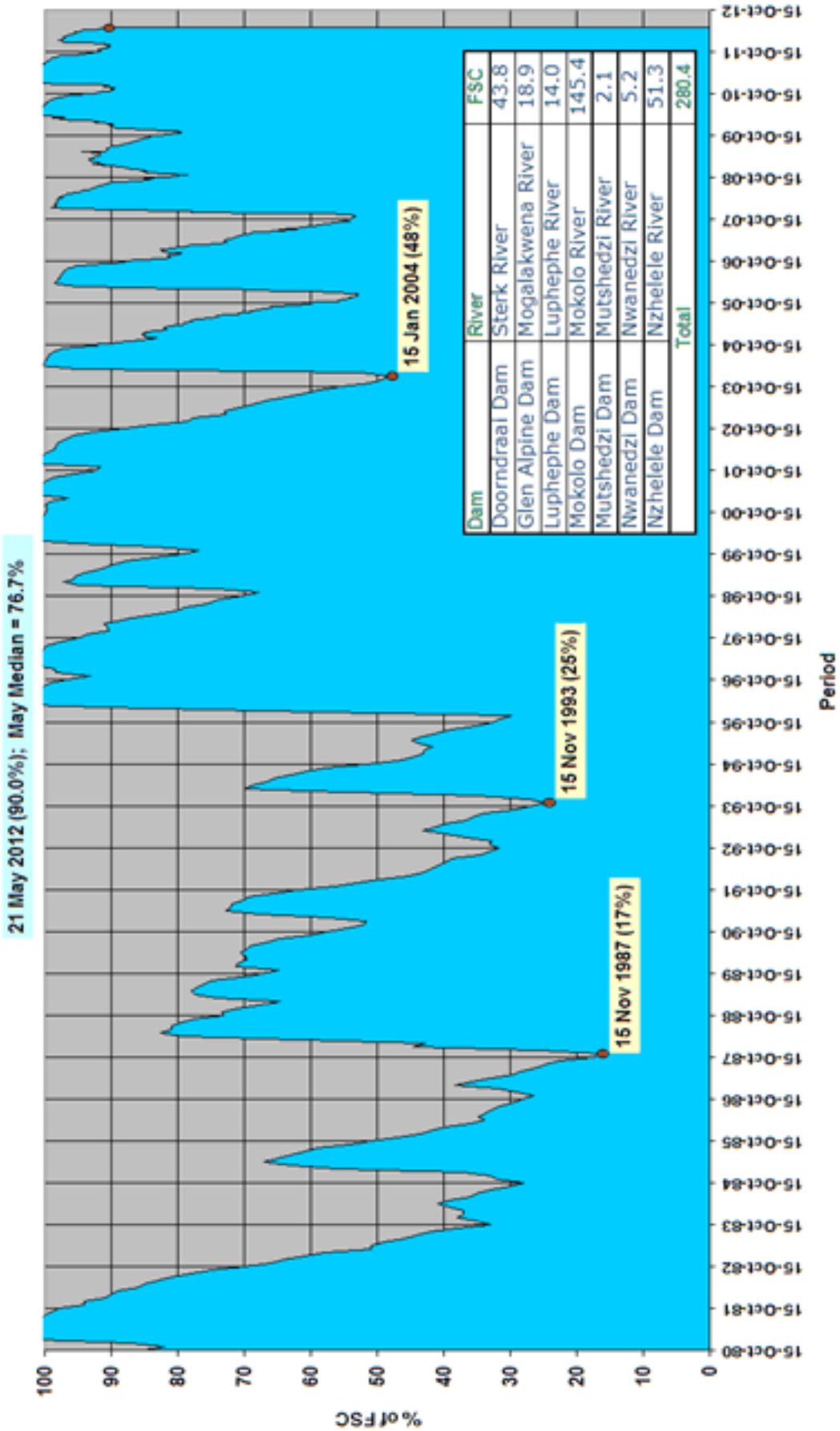


Water Storage in Major RSA Dams

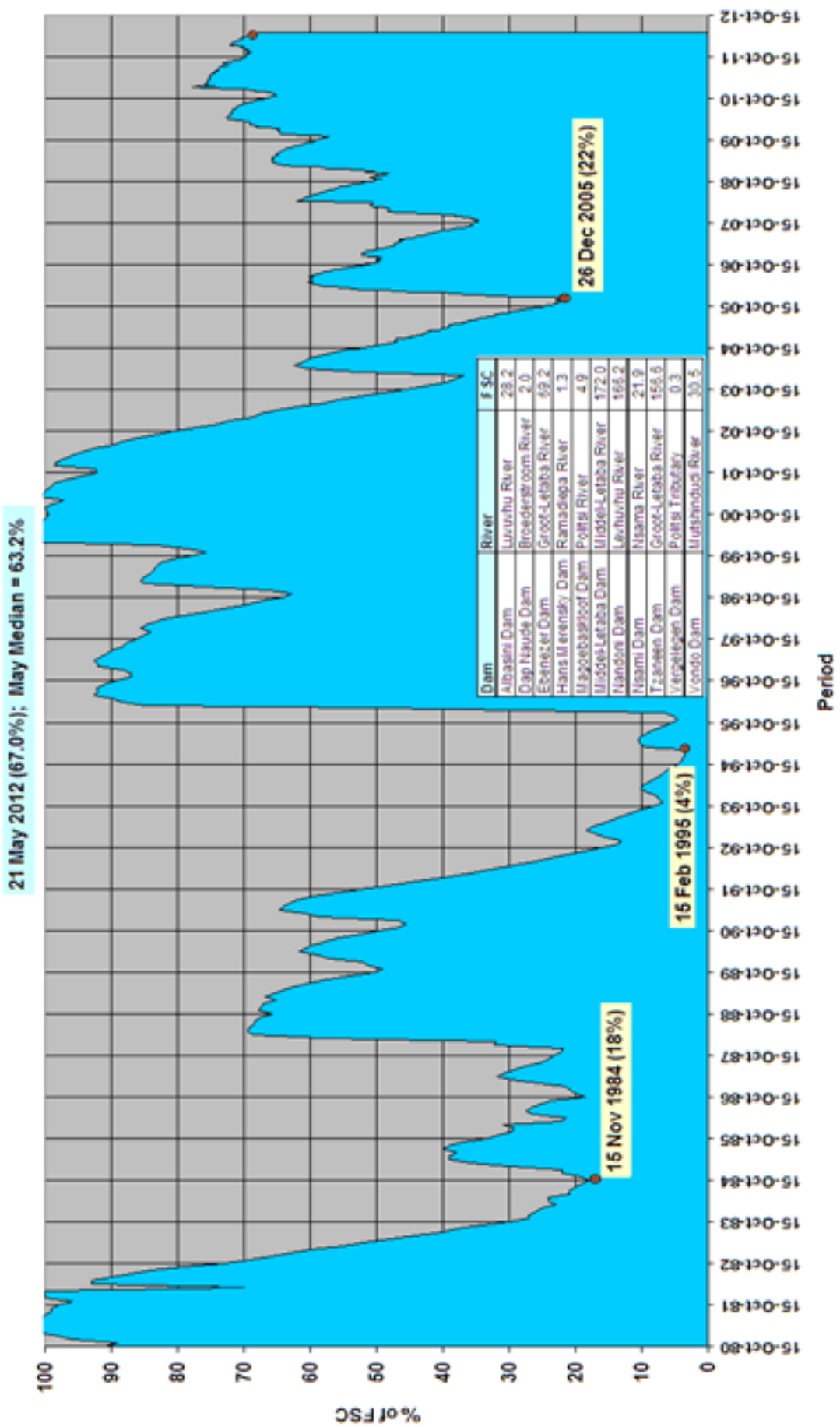
Volume Water Storage and Volume Available Capacity (31 March 1925 to 31 March 2012)



WMA 1: Limpopo (Weekly values since 4/10/04) up to 21 May 2012



WMA 2: Luvuvhu & Letaba (Weekly values since 4/10/04) up to 21 May 2012



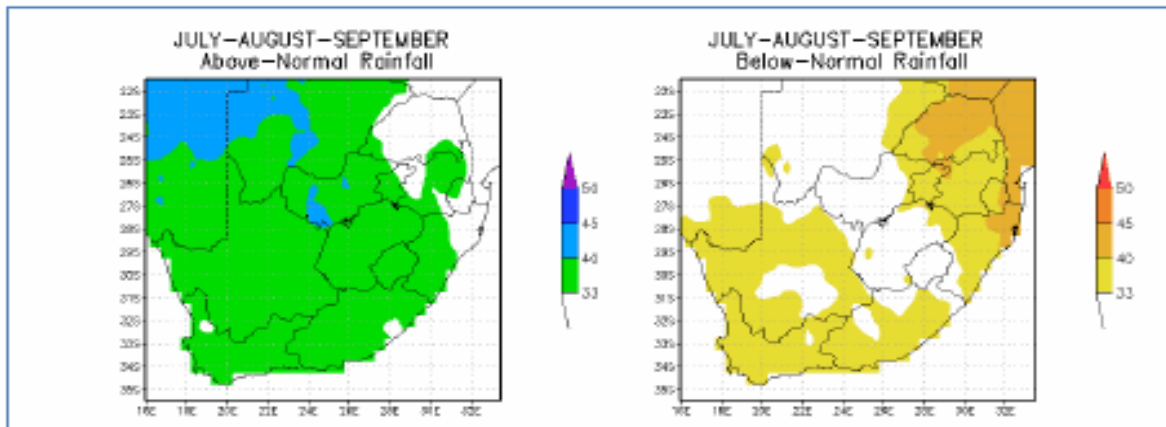
02/04/2012

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	267.7	100.7	95.3	95.5
2 Luvubu/Letaba	652.5	458.5	75.2	70.1	70.3
3 Crocodile (West) Marico	813.8	676.0	90.9	81.8	83.1
4 Olifants	1073.9	972.8	100.4	90.7	90.6
5 Inkomati	1049.5	1006.6	100.5	96.1	95.9
6 Usutu/Mhlatuze	3276.2	2372.2	83.6	72.7	72.4
7 Thukela	1115.3	1055.1	98.5	93.4	94.6
8 Upper Vaal	5659.2	5092.0	99.1	90.3	90.0
9 Middle Vaal	1671.6	1221.8	100.6	73.3	73.1
10 Lower Vaal	108.5	95.4	100.3	90.1	87.9
11 Mvoti/Umzimkulu	802.1	756.5	87.0	94.0	94.3
12 Mzimvubu/Keiskamma	1085.0	1115.9	95.3	99.9	102.8
13 Upper Orange	11425.6	9828.3	101.9	86.2	86.0
14 Lower Orange	36.1	40.6	137.5	109.1	112.5
15 Fish/Tsitsikamma	727.3	442.2	43.8	58.9	60.8
16 Gouritz	269.3	142.5	41.8	53.1	52.9
17 Olifants/Doom	127.5	28.4	29.1	25.5	22.2
18 Breede	1038.9	457.3	47.2	45.1	44.0
19 Berg	416.5	223.6	60.5	55.3	53.7
GRAND TOTAL	31629.1	26253.2	93.3	83.0	83.0

Please note that these summaries are not representative of all dams within any of the Provinces or Water Management Areas.

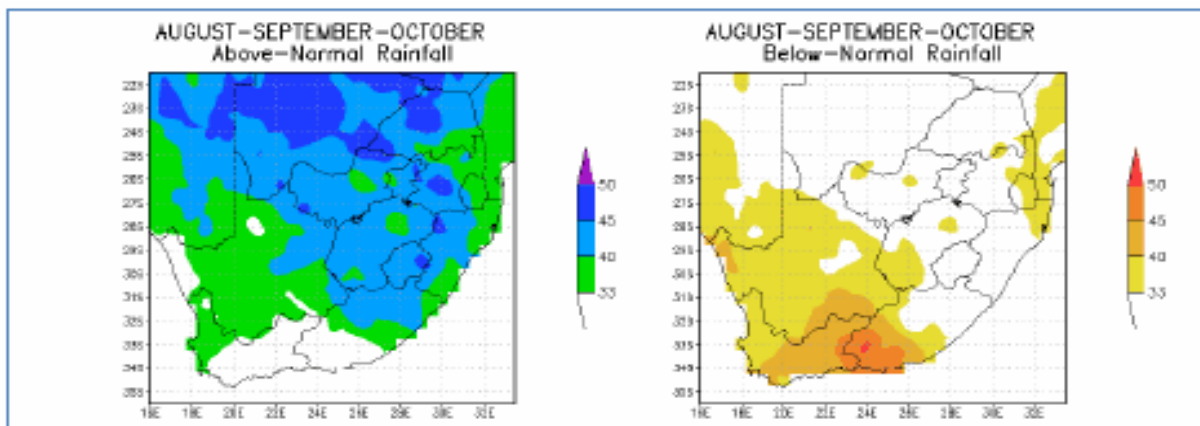
The summaries only reflect the storages for those dams listed in the Weekly State of Reservoirs Report.

2. Rainfall Forecast (July 2012 to November 2012)



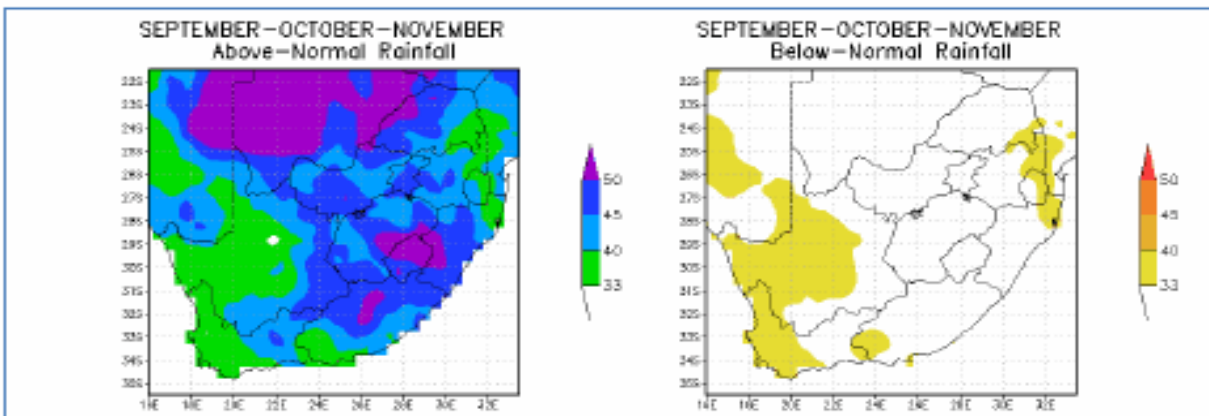
July-August-September

No Enhanced probabilities for above- or below-normal rainfall totals are expected for South Africa.



August-September-October

Enhanced probabilities for above-normal rainfall totals are expected for parts of Limpopo, North-West, Gauteng, Mpumalanga and KwaZulu-Natal. Enhanced probabilities for below-normal rainfall totals are expected for parts of Eastern Cape.

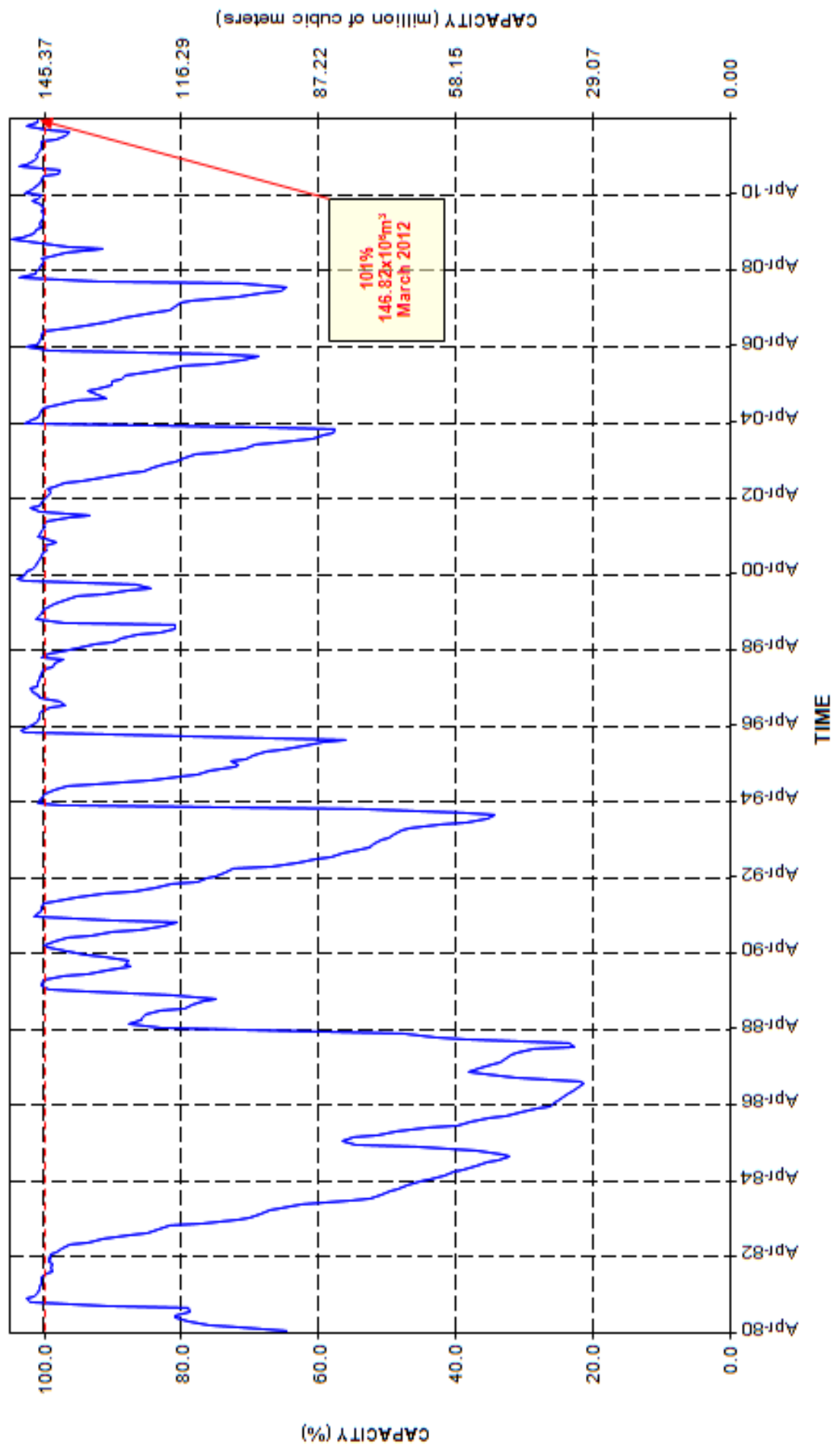


September-October-November

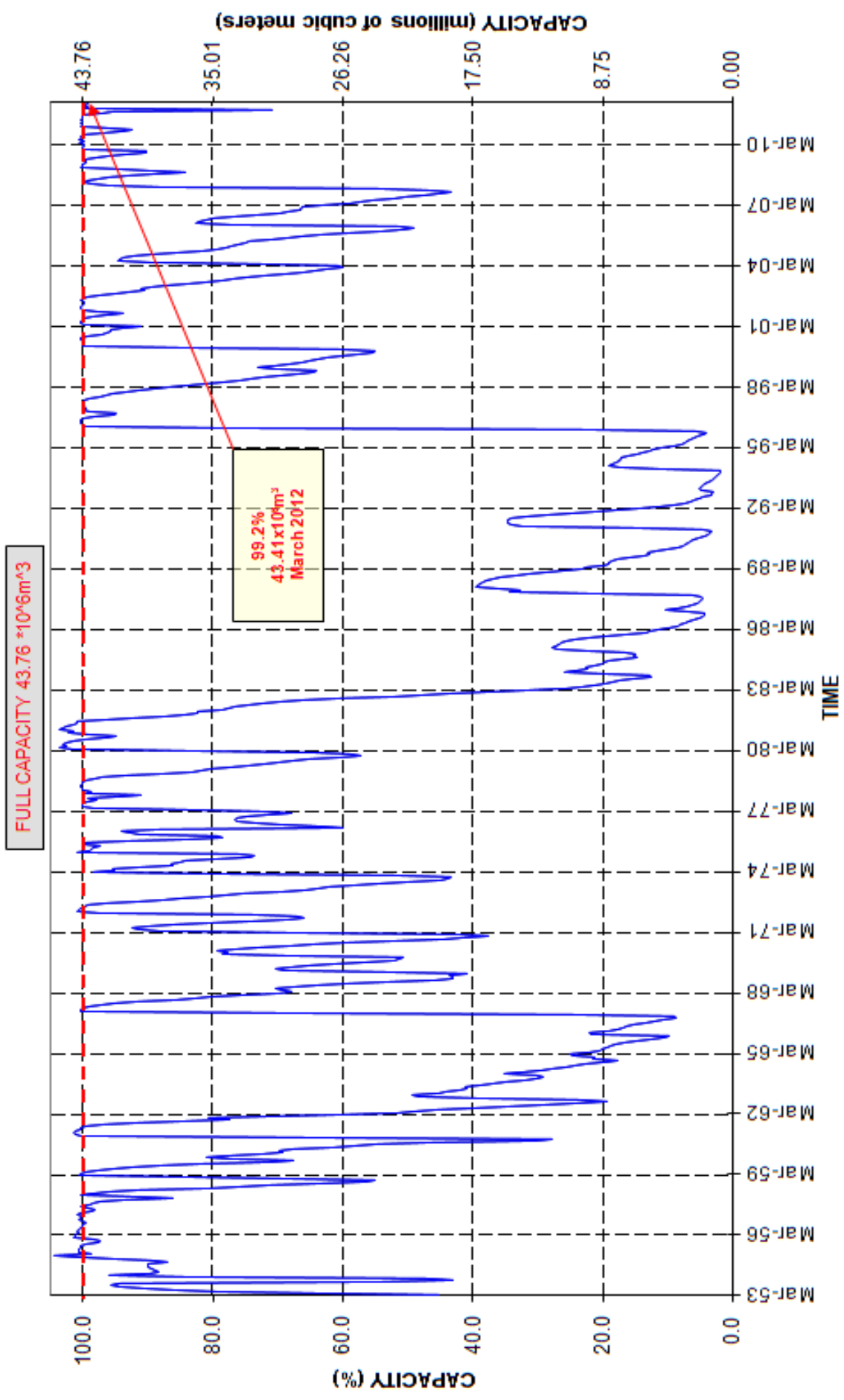
Enhanced probabilities for above-normal rainfall totals are expected for most parts of South Africa.

MOGOL RIVER AT MOKOLO DAM

FULL CAPACITY 145.37 *10^6m^3

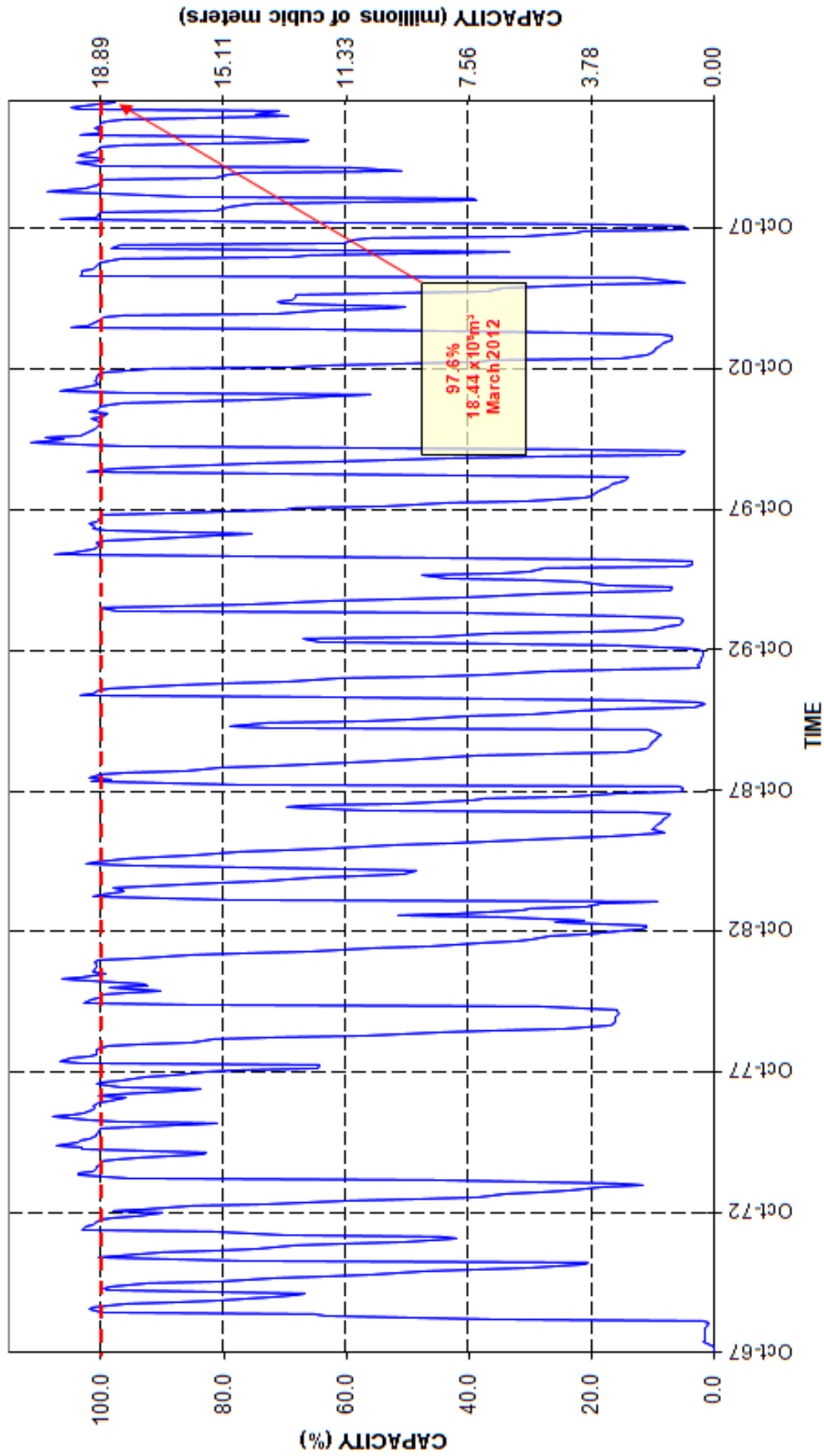


STERK RIVER AT DOORNDRAAI DAM



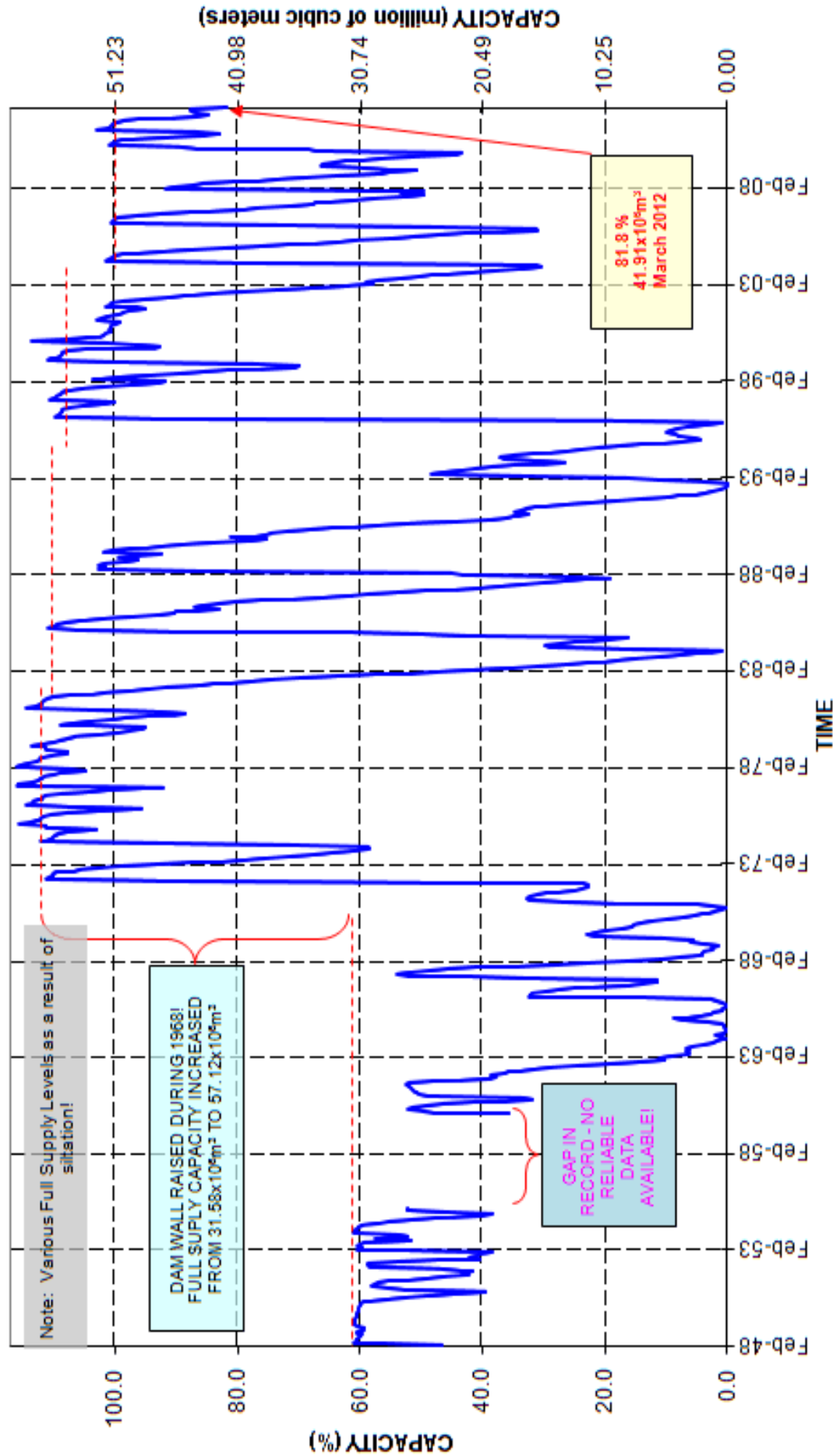
MOKGALAKWENA RIVER AT GLEN ALPINE DAM

FULL CAPACITY 18.89 *10⁶m³



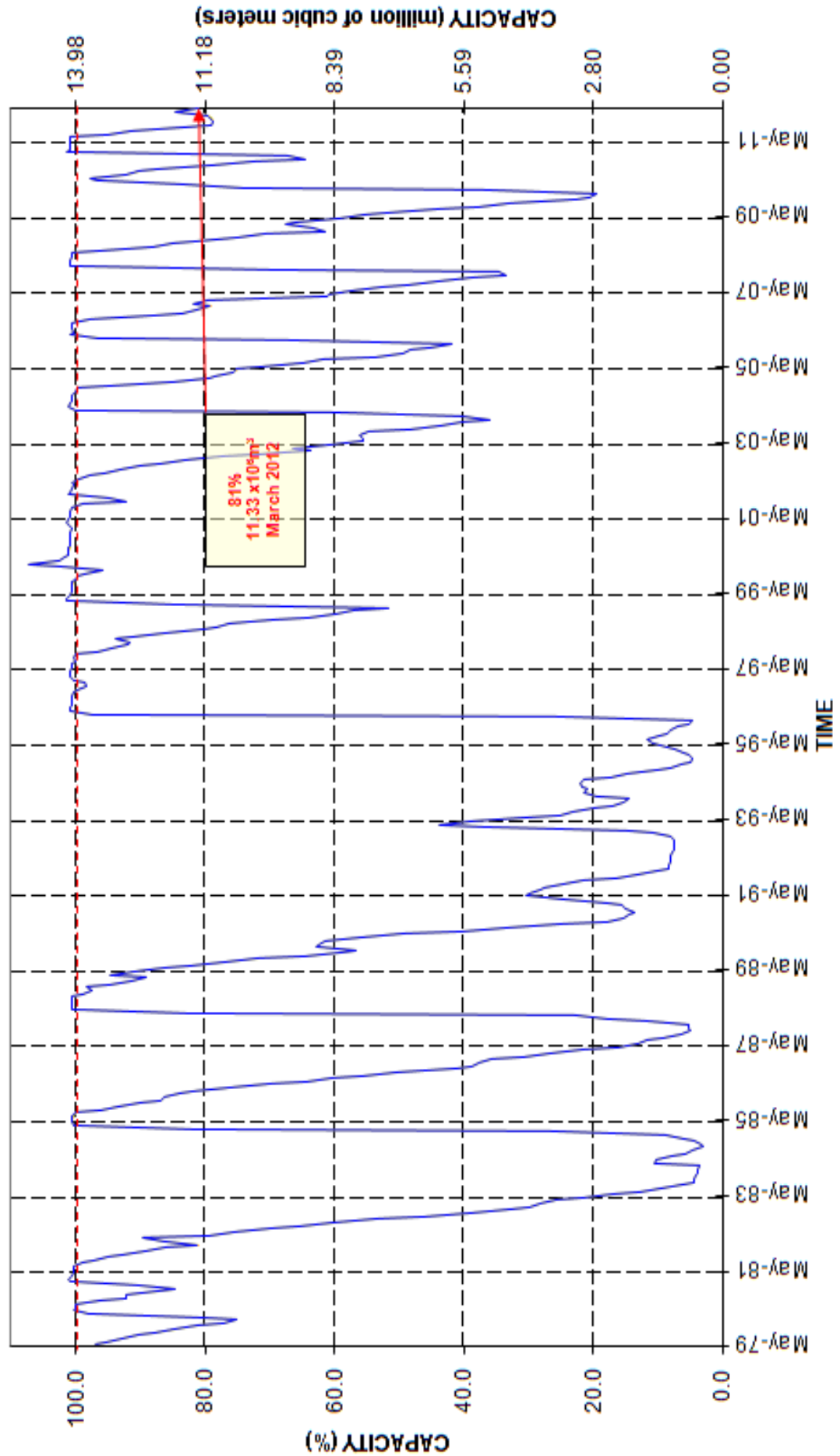
NZHELELE RIVER AT NZHELELE DAM

FULL CAPACITY 51.23 * 10⁶m³



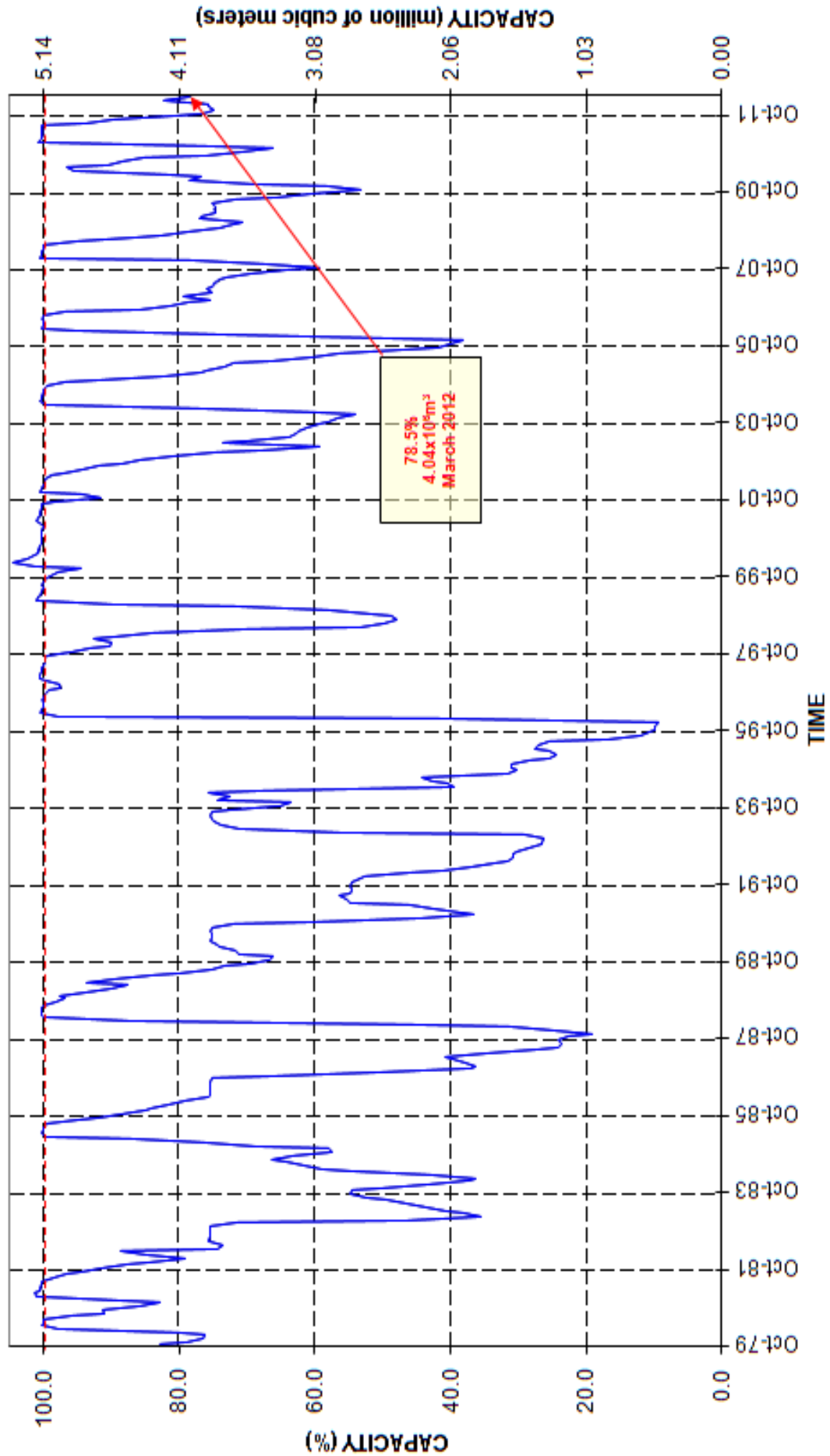
LUPEPHE RIVER AT LUPEPHE DAM

FULL CAPACITY $13.984 \times 10^6 \text{m}^3$



NWANEDZI RIVER AT NWANEDZI DAM

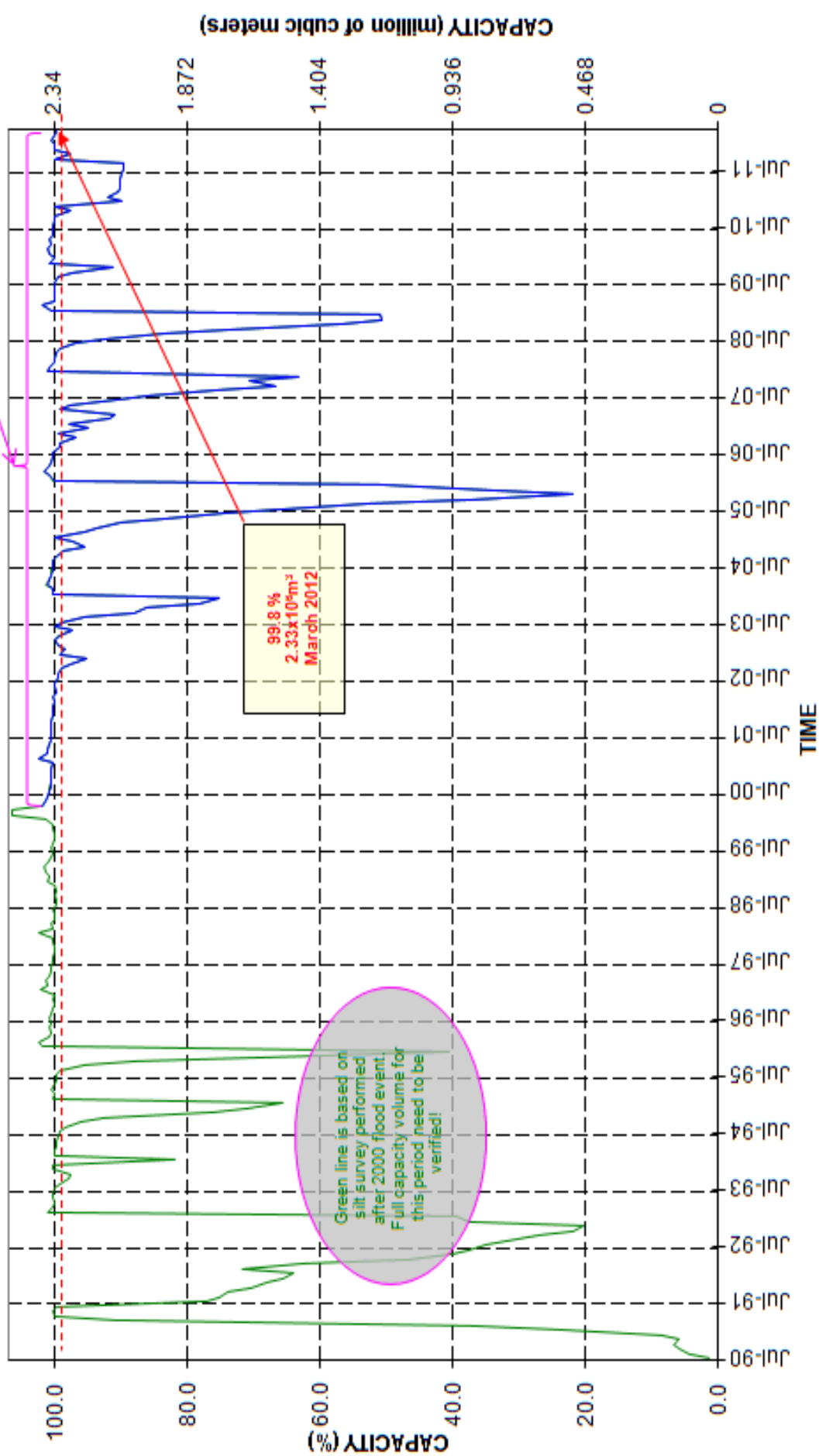
FULL CAPACITY 5.14 * 10⁶ m³



MUTSHEDZI RIVER AT MUTSHEDZI DAM

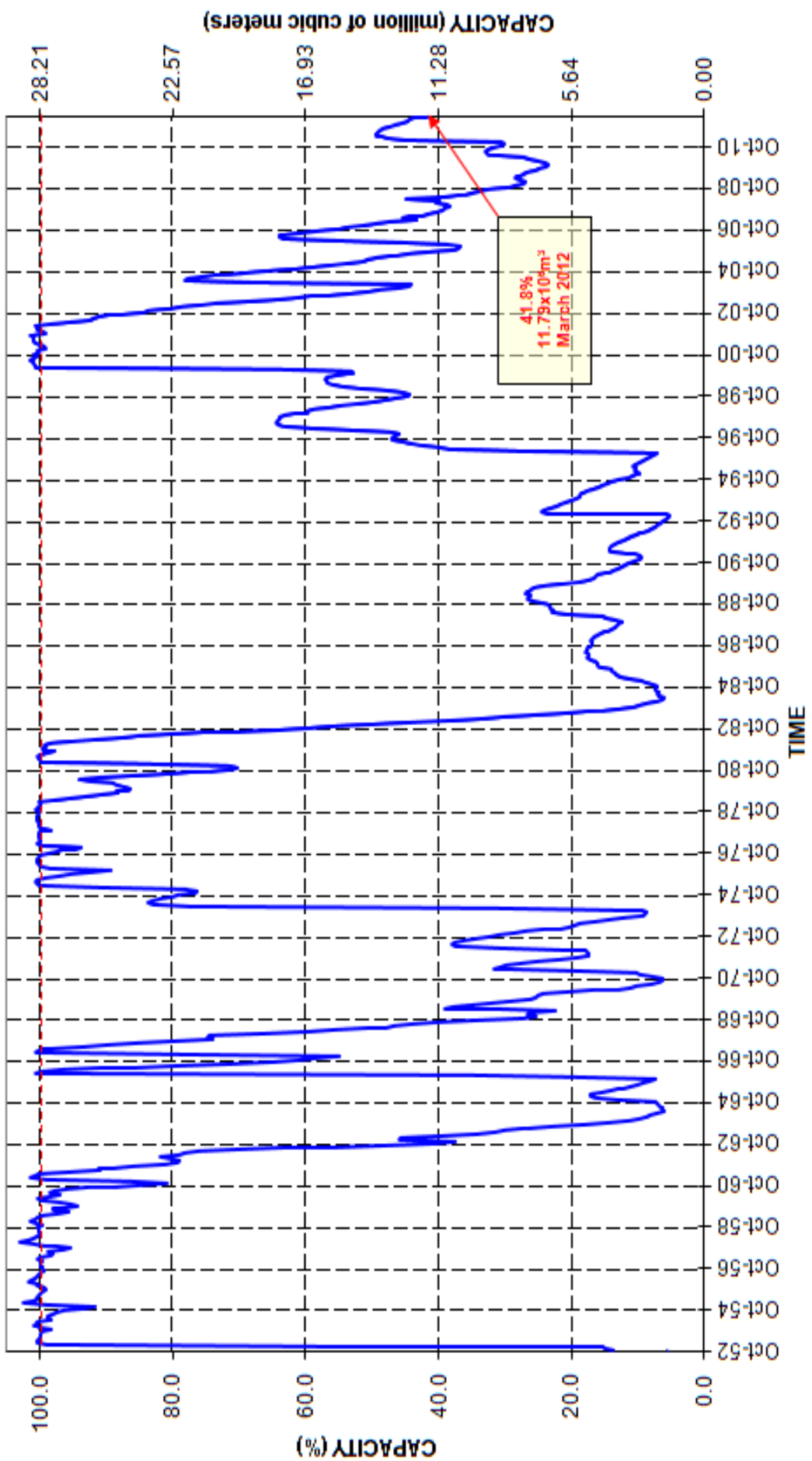
Data currently under review - 2010 basin survey picked up a discrepancy with Full Supply Level!

FULL CAPACITY $2.34 \times 10^6 \text{ m}^3$



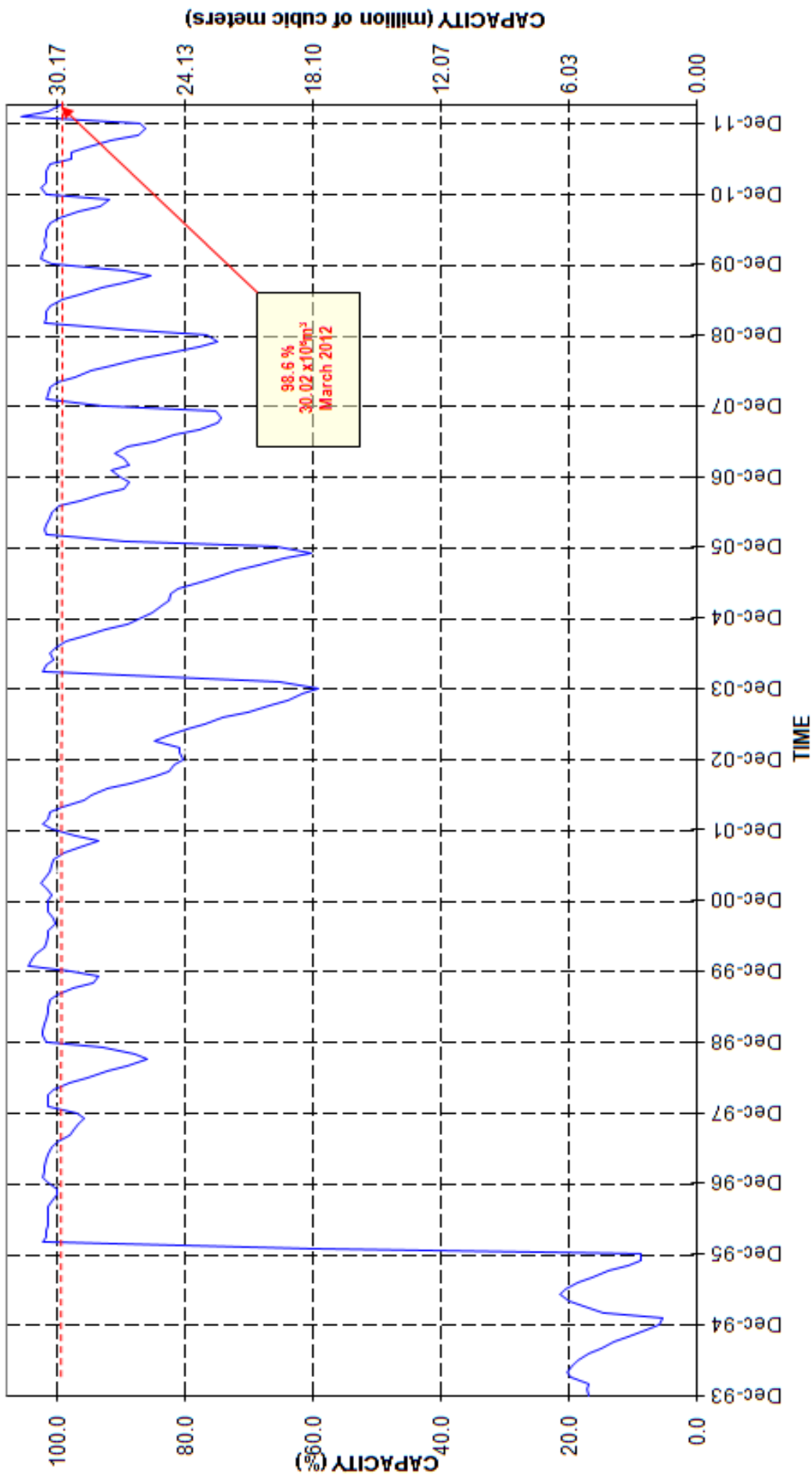
LUVUVHU RIVER AT ALBA SINI DAM

FULL CAPACITY 28.21*10⁶m³



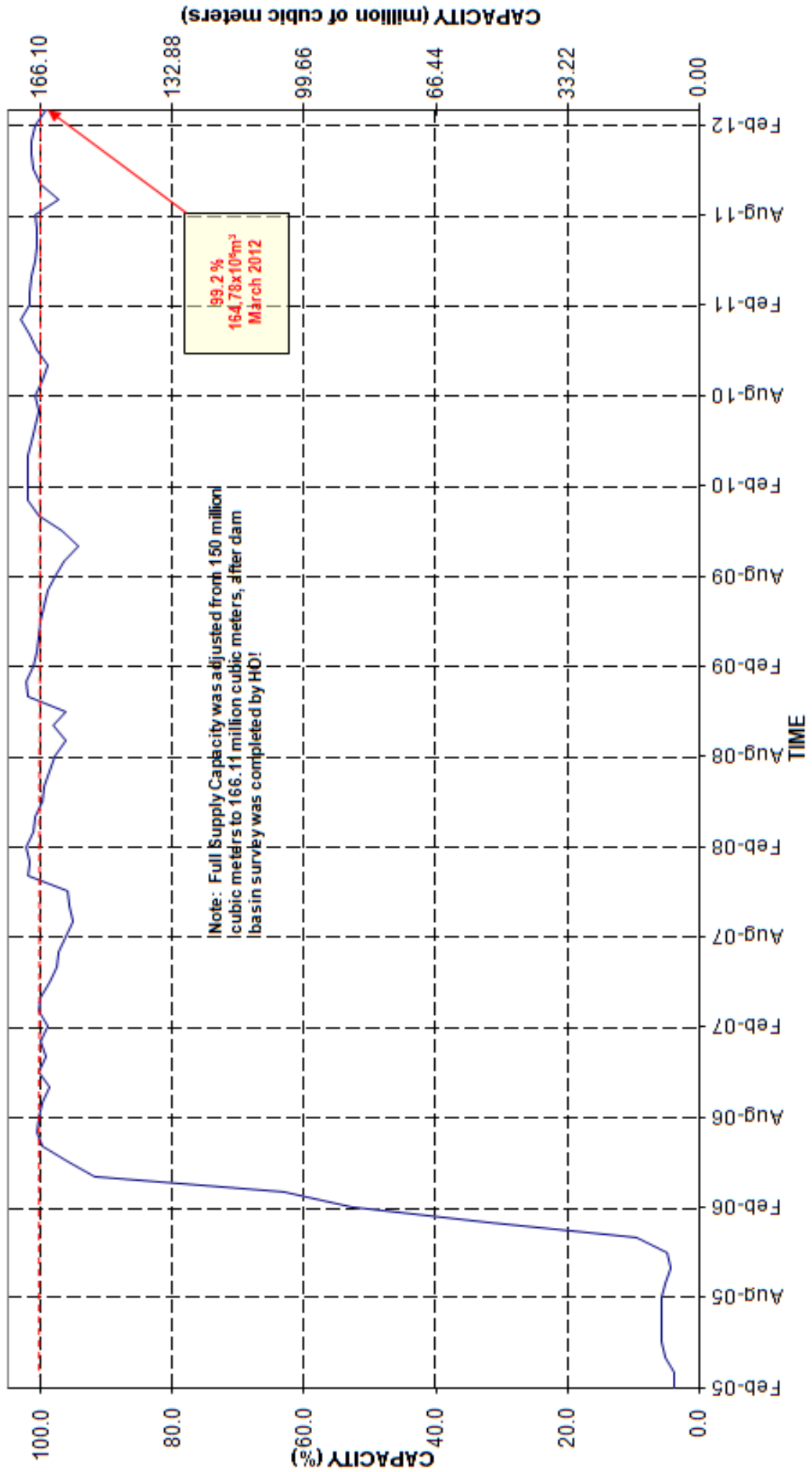
MUTSHINDUDI RIVER AT VONDO DAM

FULL CAPACITY 30.447*10⁶m³

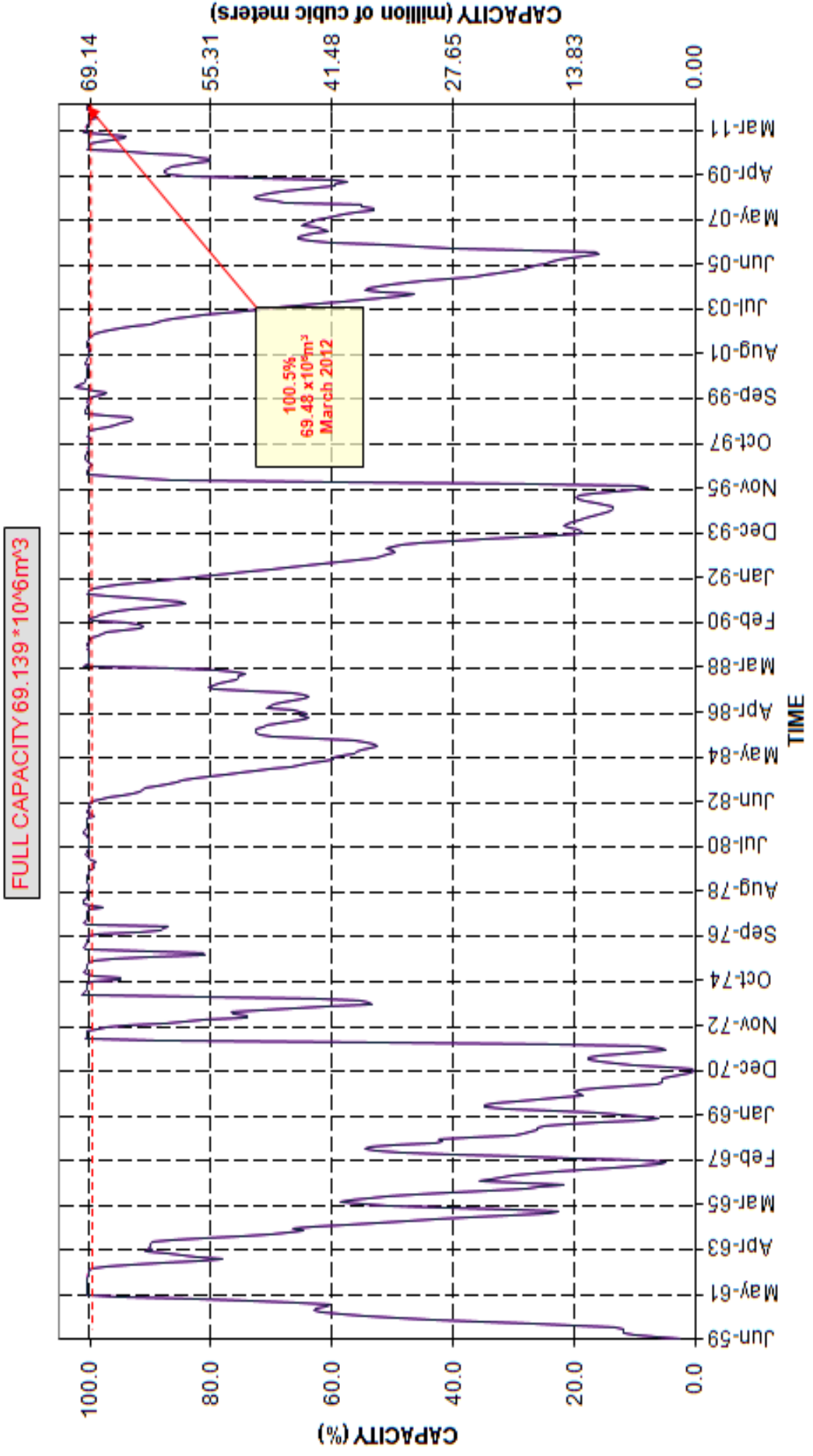


LUVUVHU RIVER AT NANDONI DAM

FULL CAPACITY 166.11*10^6m^3

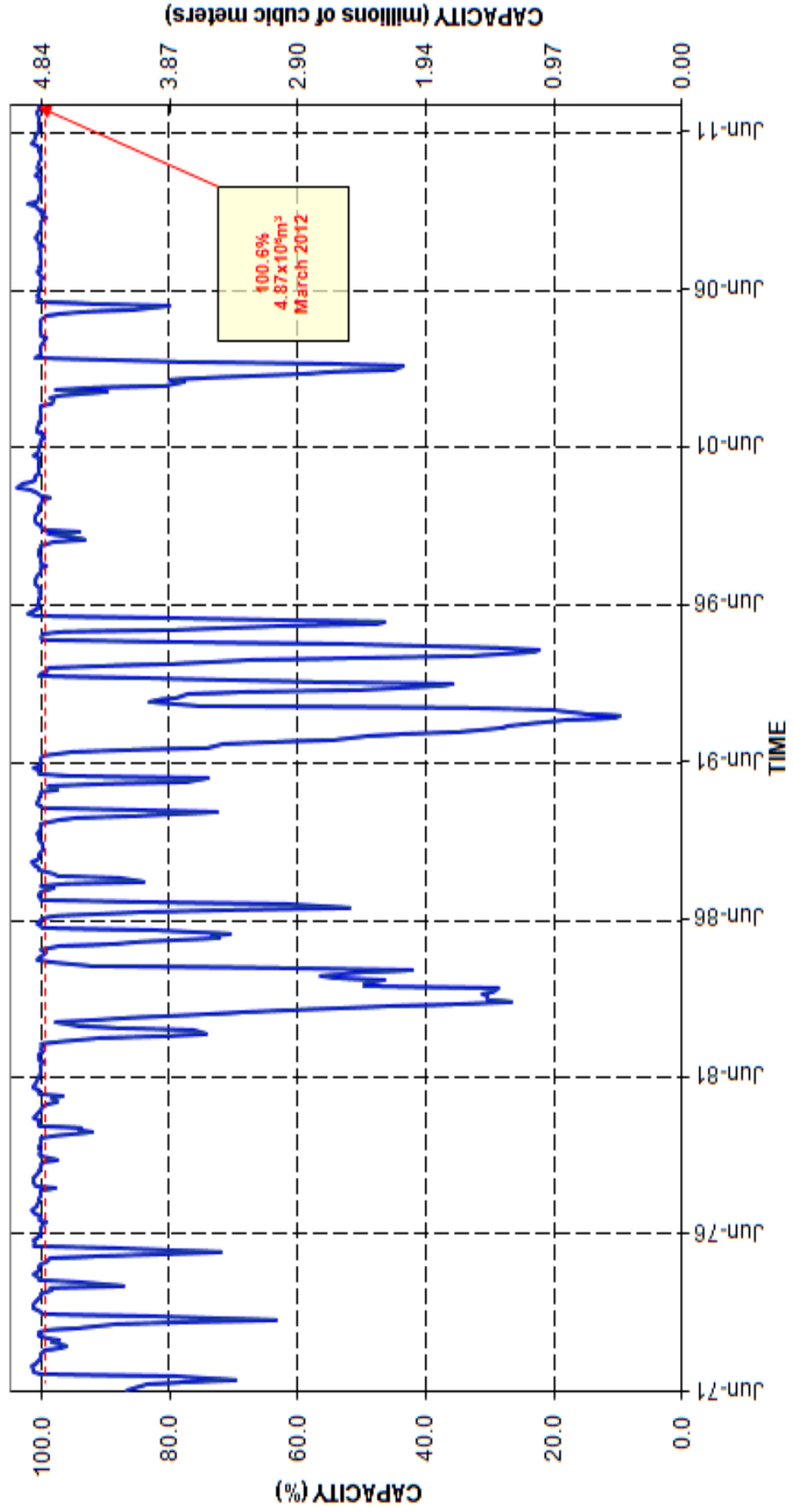


GREAT LETABA RIVER AT EBENEZER DAM

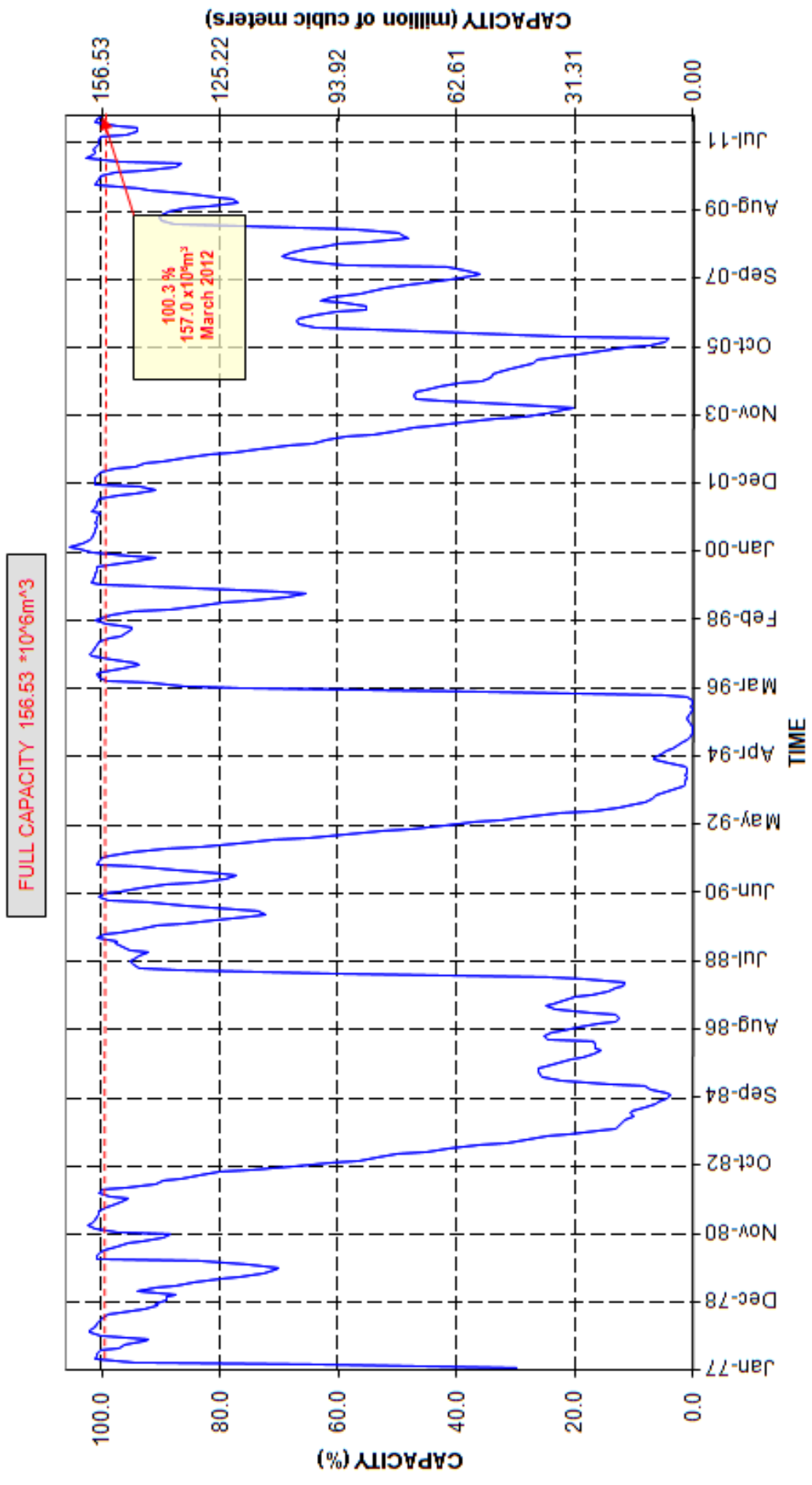


POLITSI RIVER AT MAGOEBASKLOOF DAM

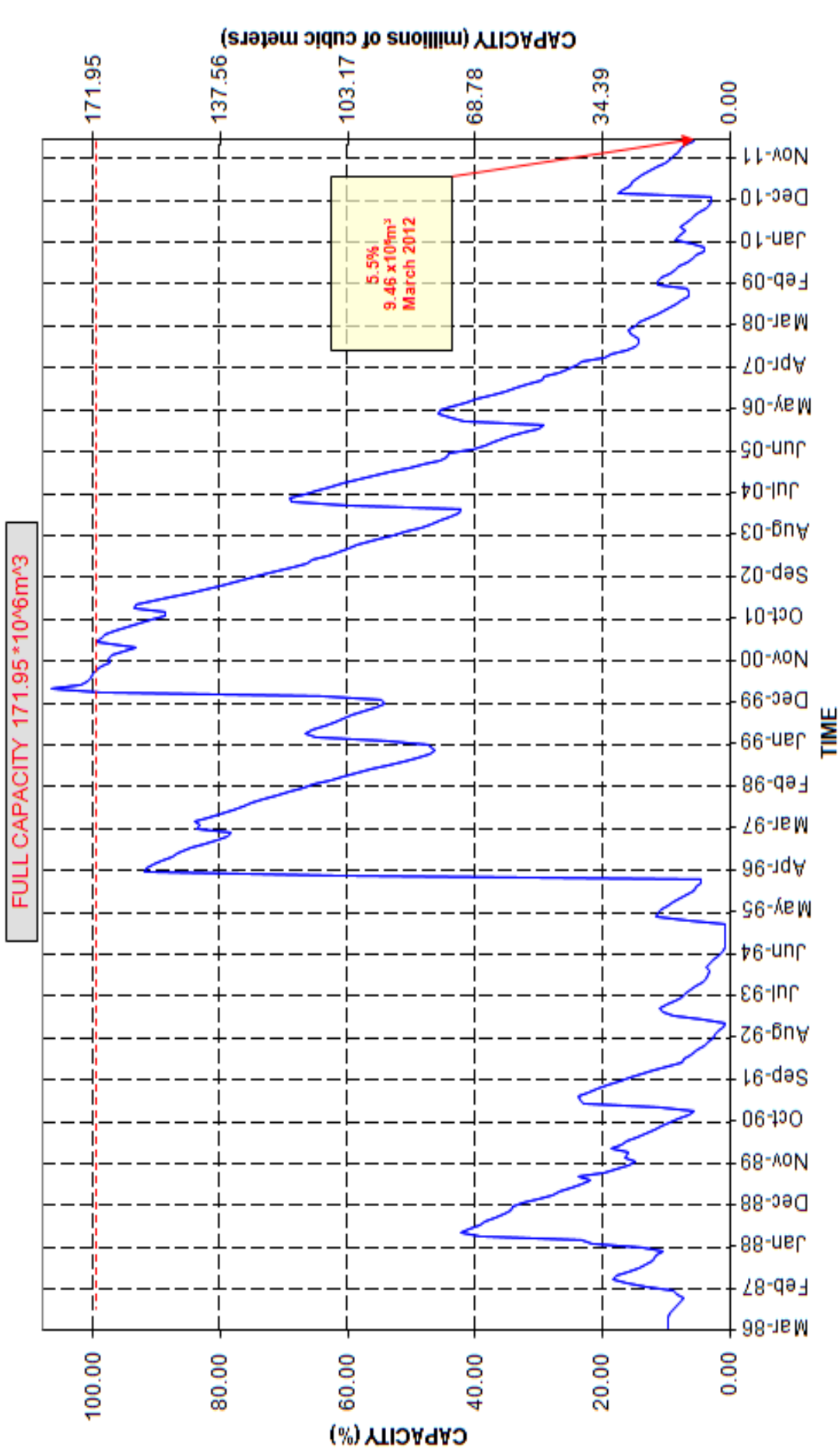
FULL CAPACITY 4.840 * 10^6 m^3

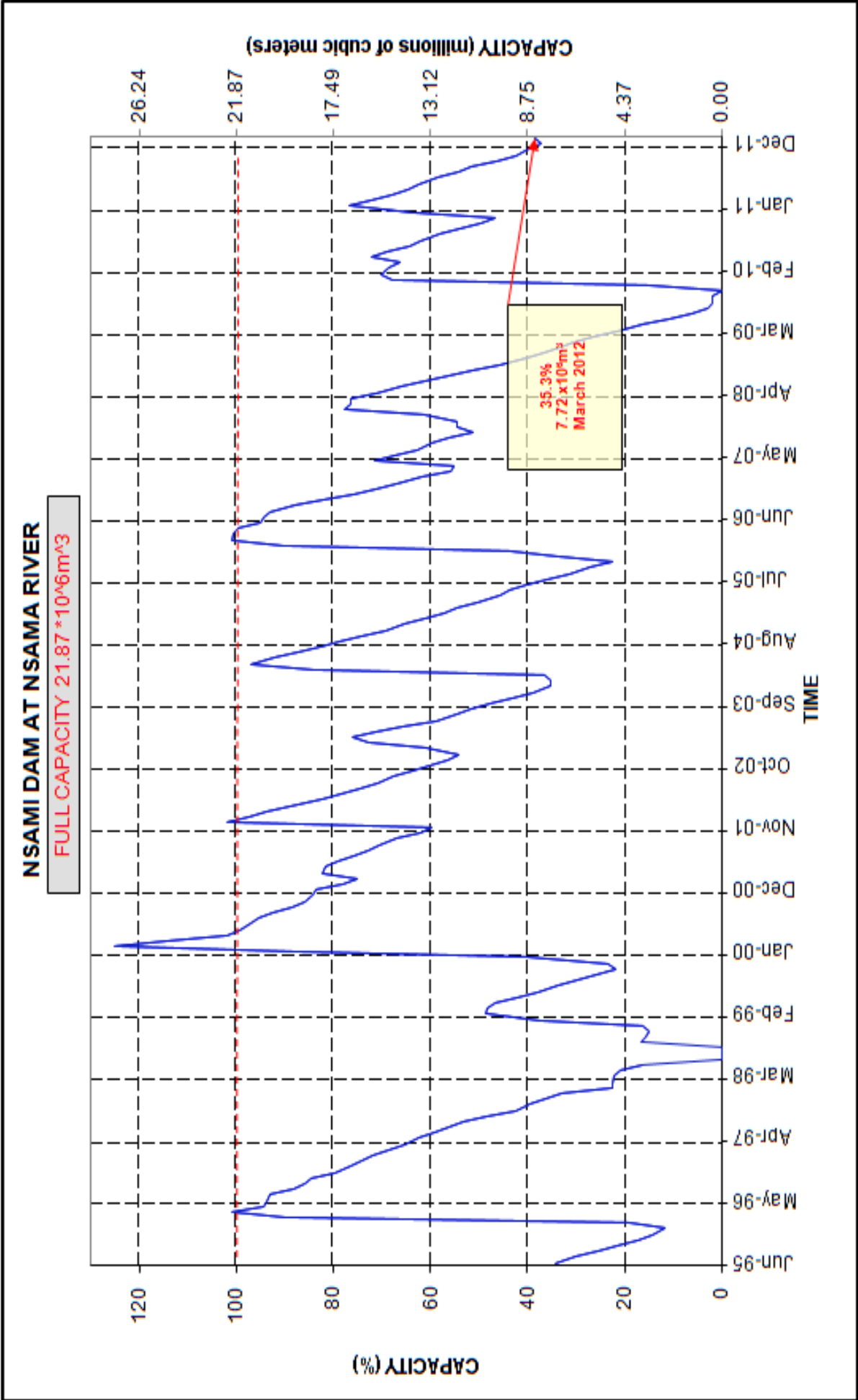


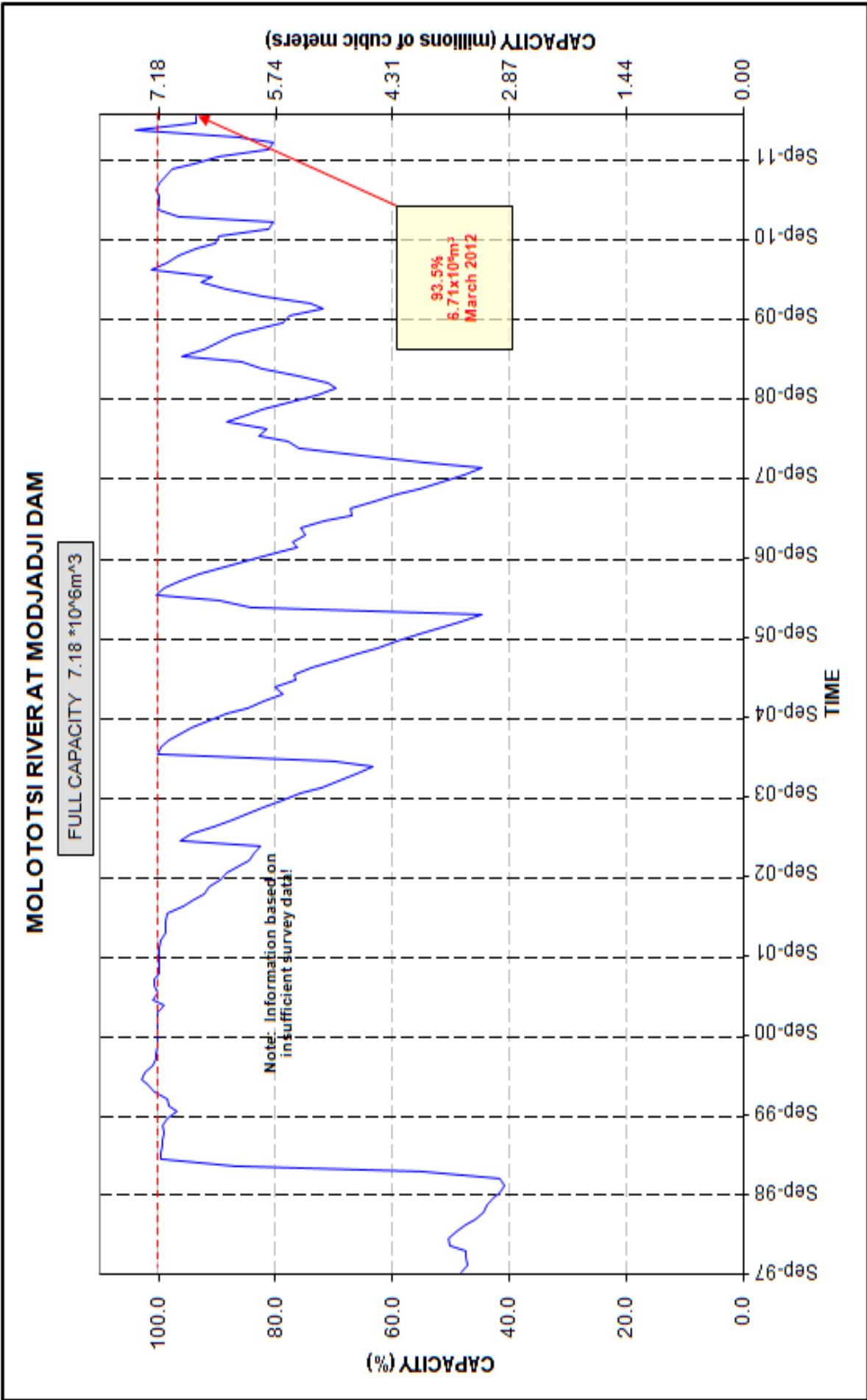
GREAT LETABA RIVER AT TZANEEN DAM



MIDDLE LETABA RIVER AT MIDDLE LETABA DAM

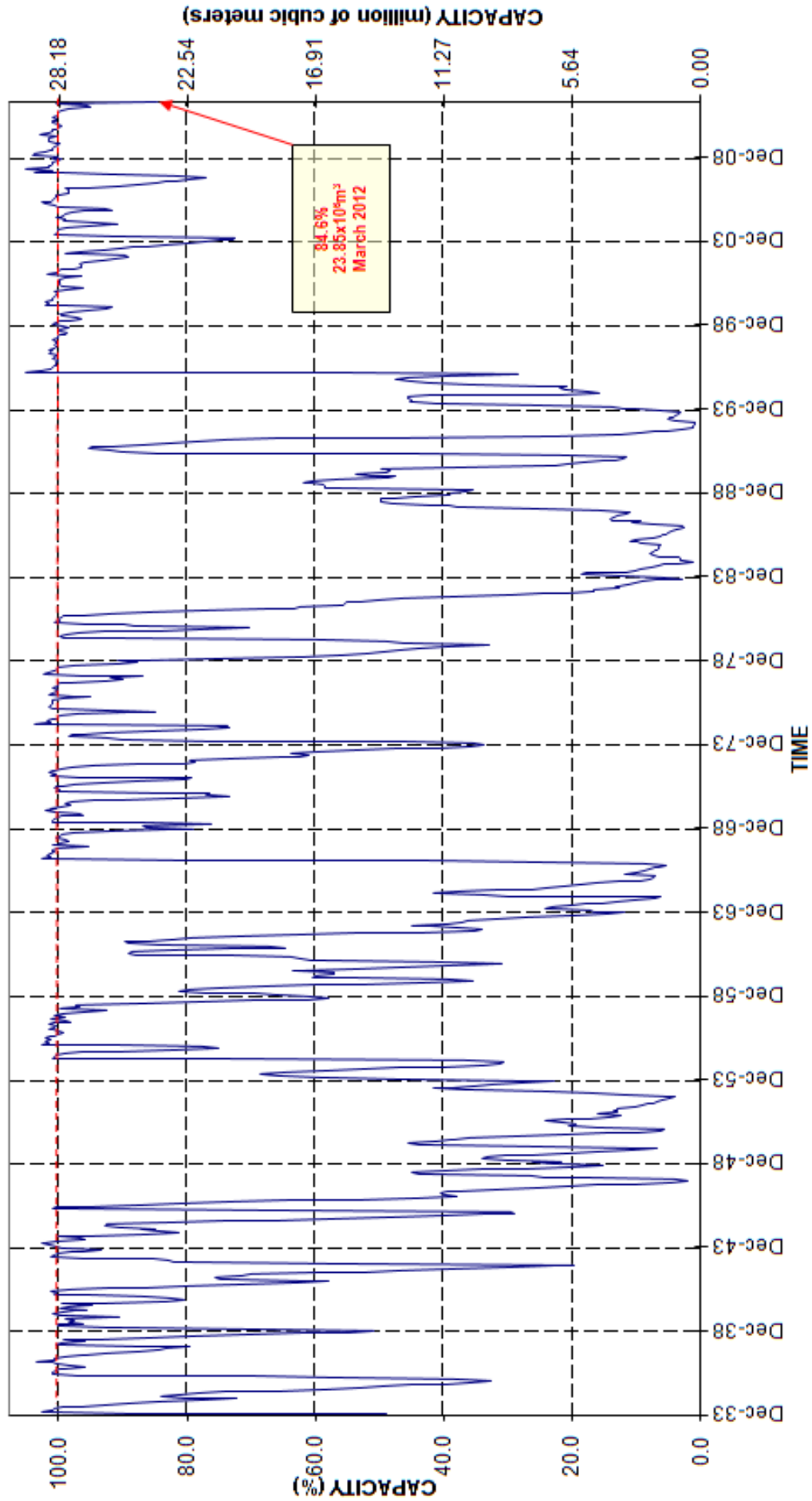






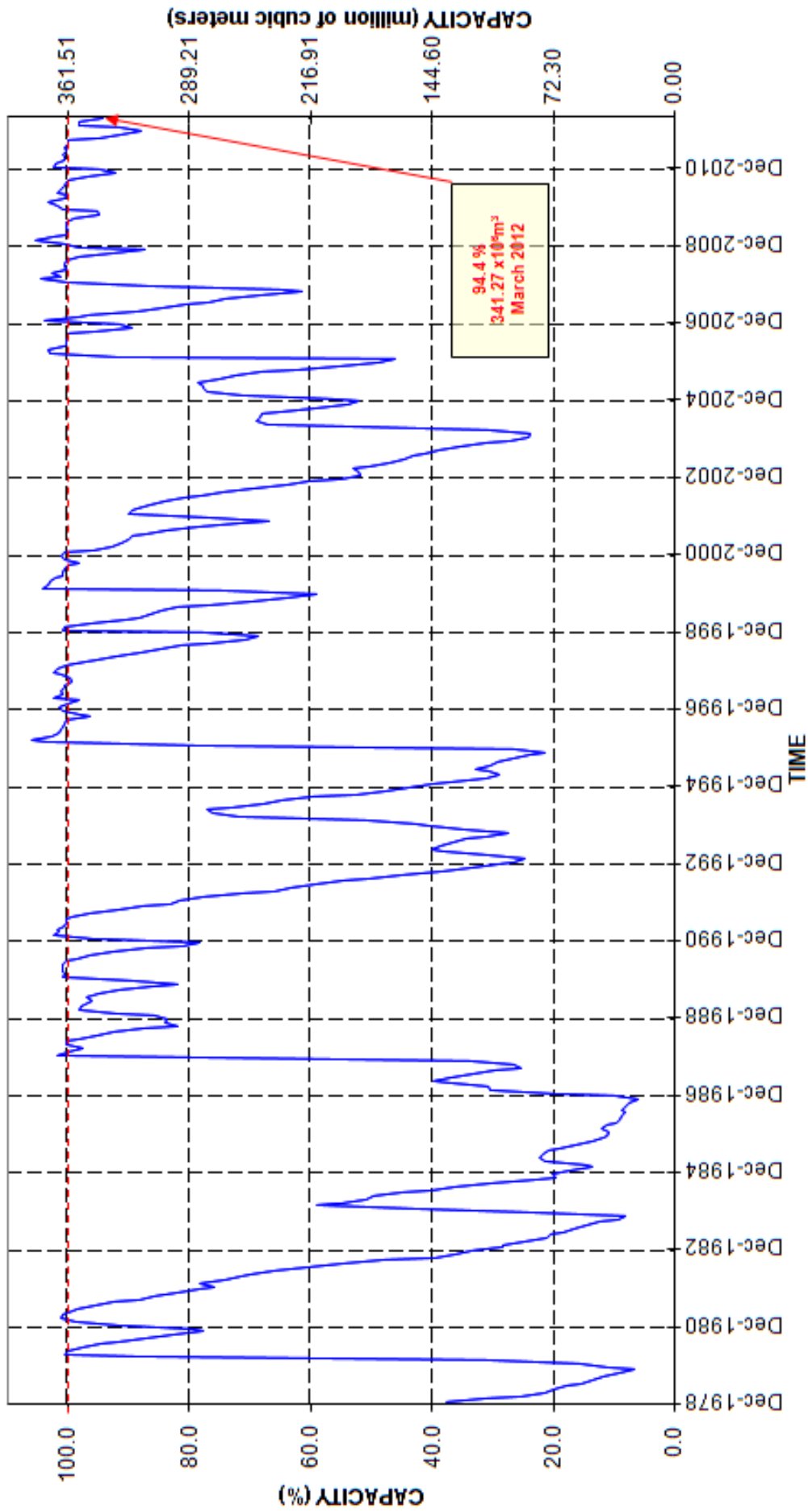
ELANDS RIVER AT RUST DE WINTER DAM

FULL CAPACITY 28.186*10⁶m³



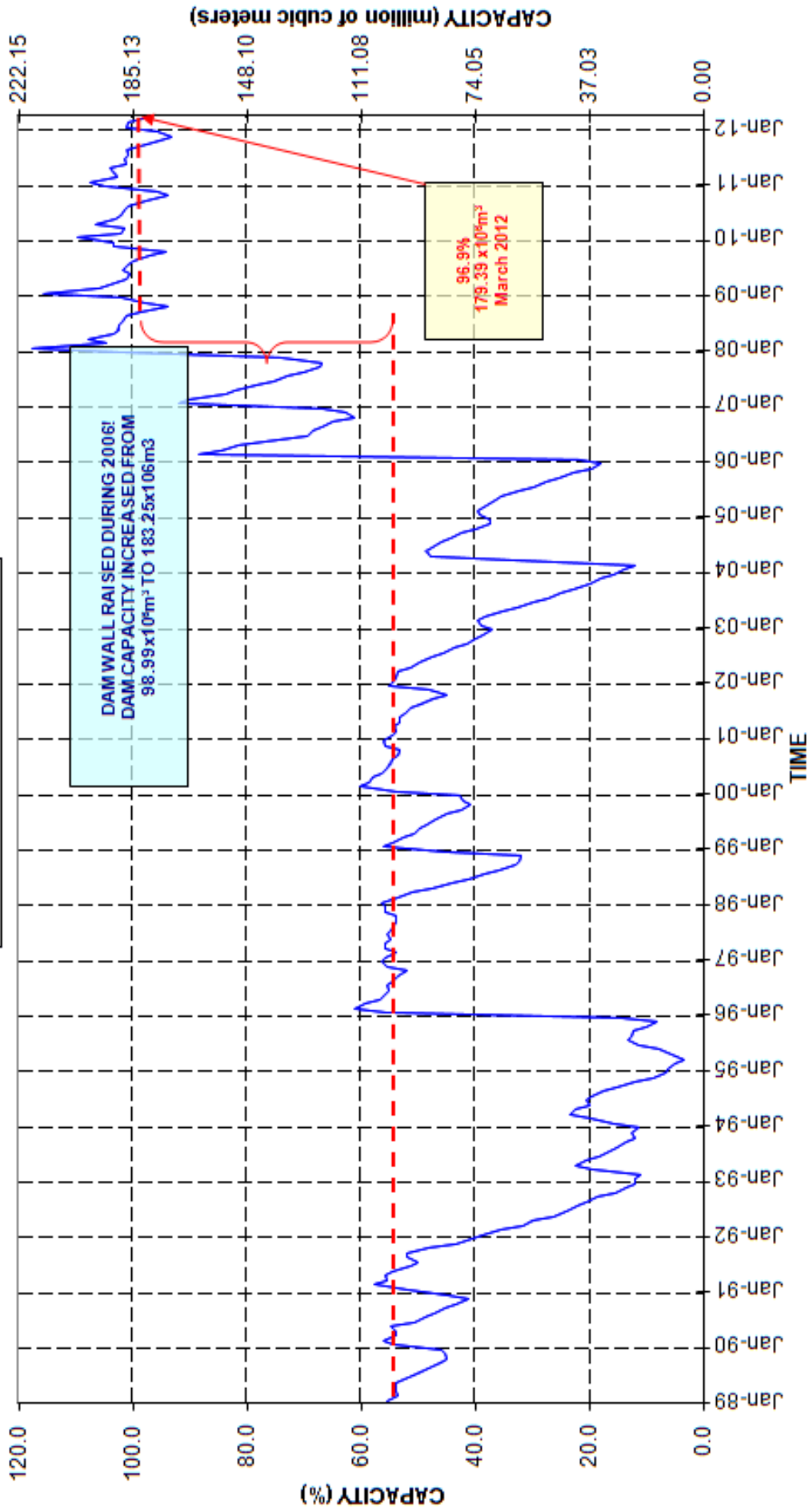
OLIFANTS RIVER AT LOSKOP DAM

FULL CAPACITY 361.51*10⁶m³



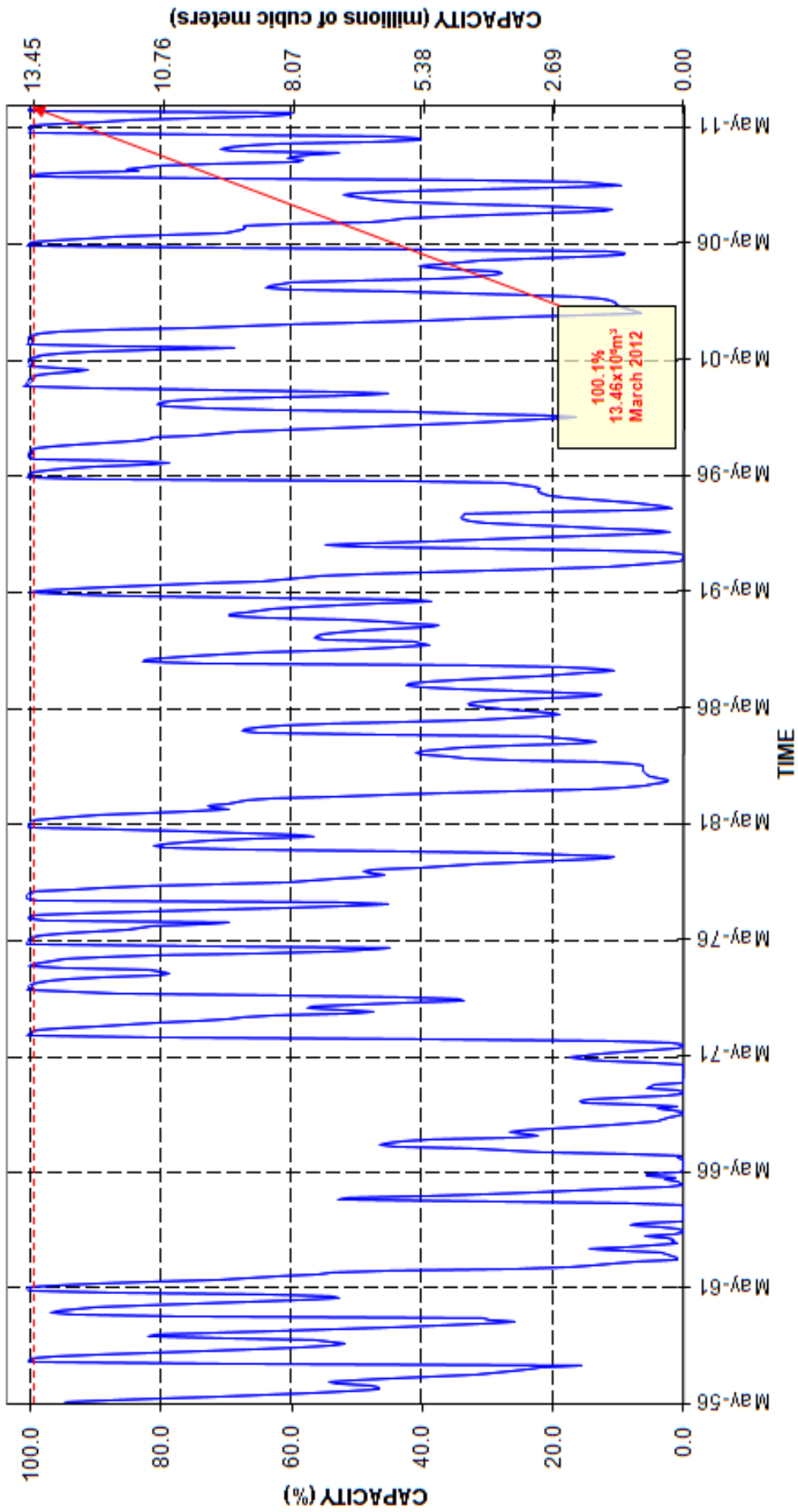
OLIFANTS RIVER AT FLAG BOSHIELO DAM

FULL CAPACITY 185.13*10⁶m³



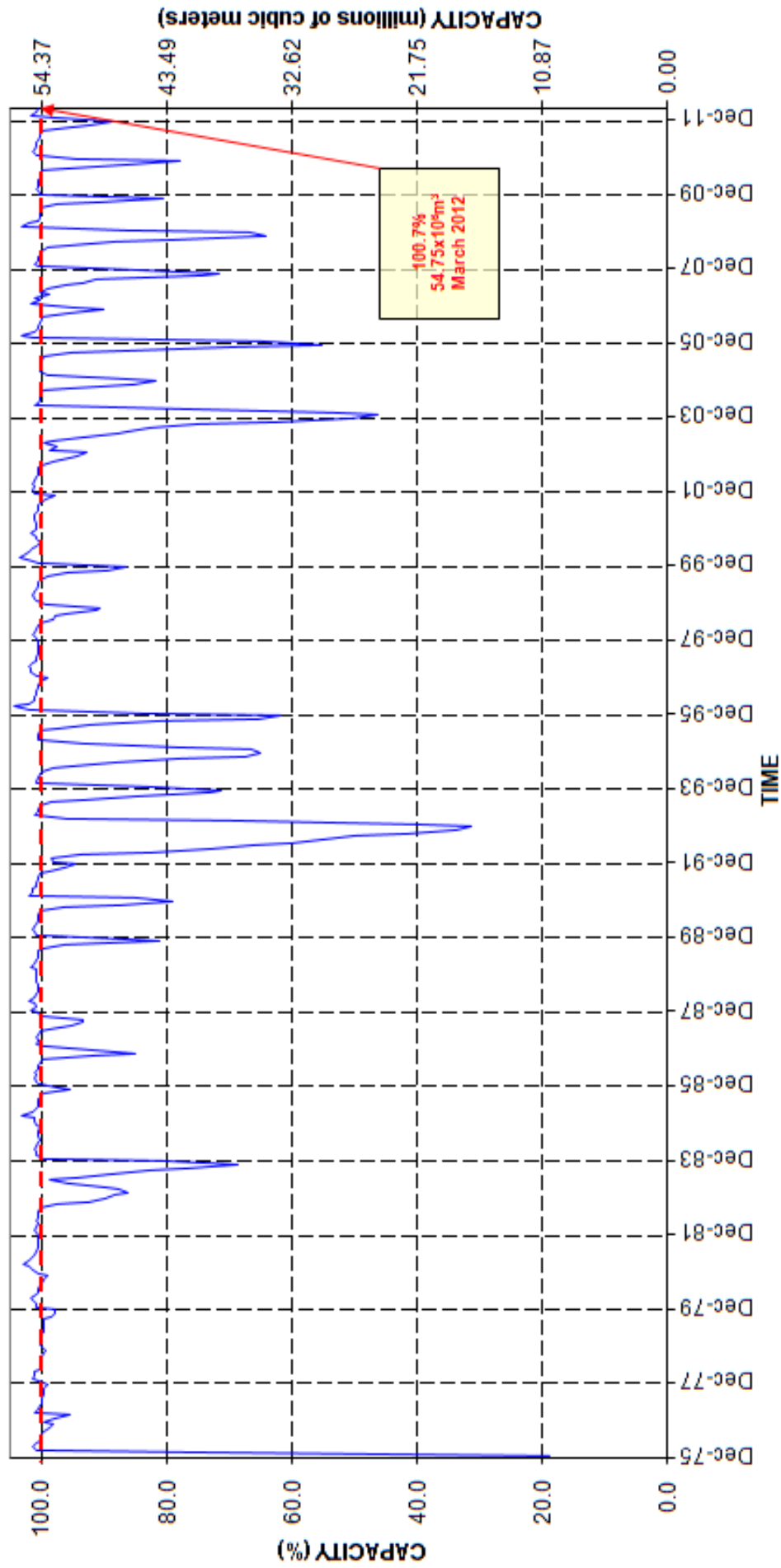
OHRIGSTAD RIVER AT OHRIGSTAD DAM

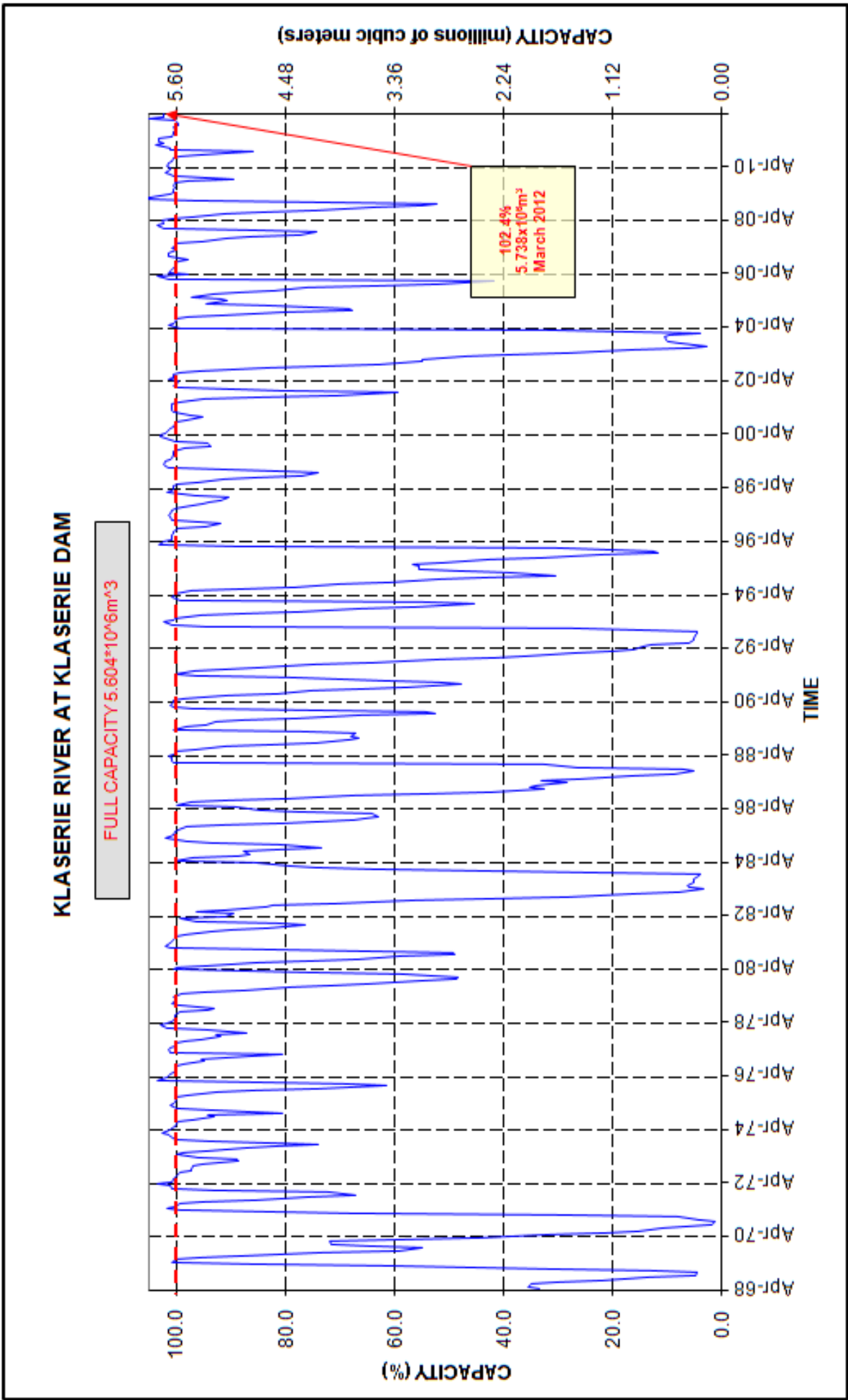
FULL CAPACITY $13.45 \times 10^6 \text{m}^3$



BLYDE RIVER AT BLYDE RIVERSPOORT DAM

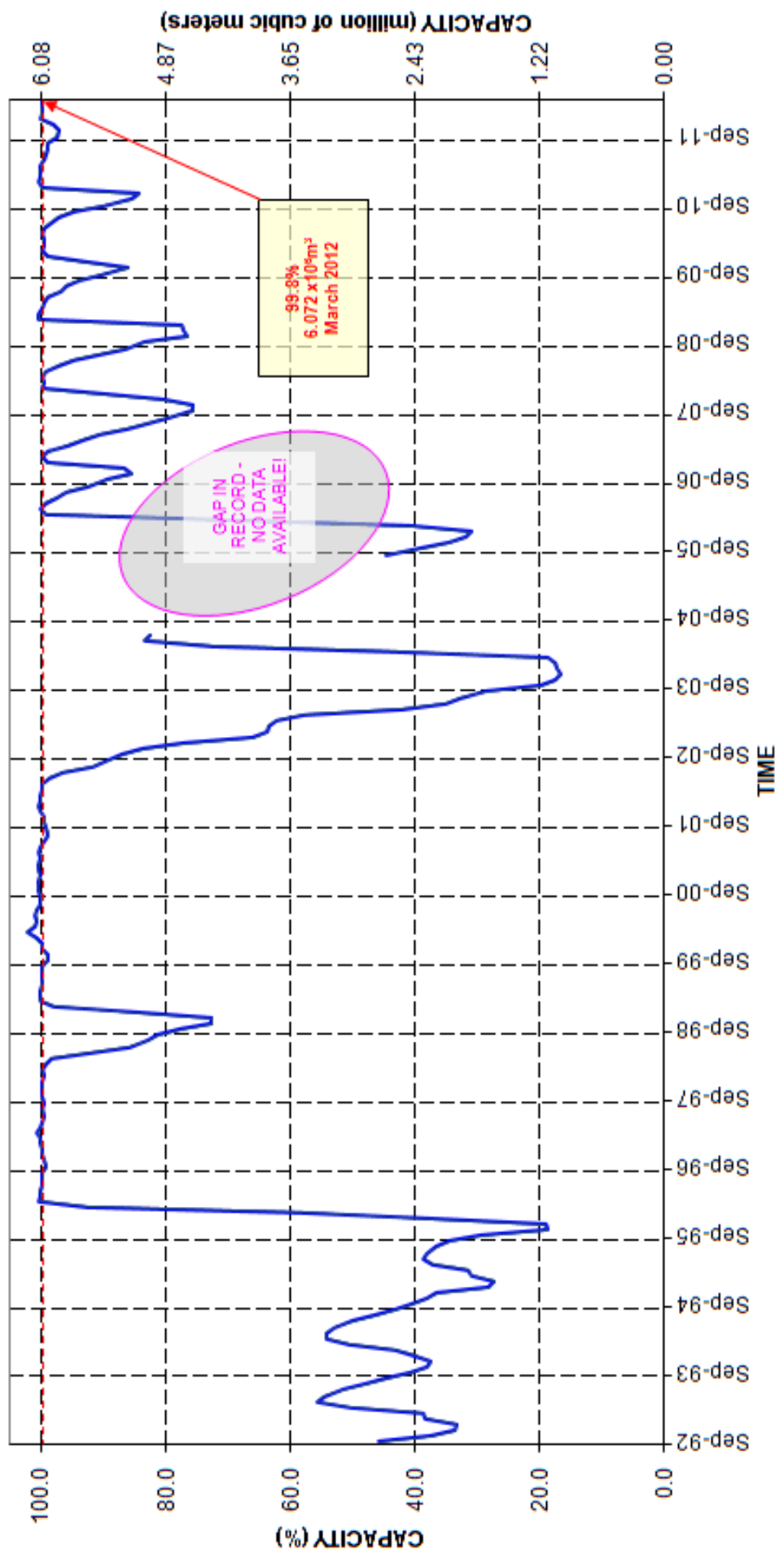
FULL CAPACITY 54.369*10^6m^3





NGWABITSI RIVER AT TOURS DAM

FULL CAPACITY $6.084 \times 10^6 \text{m}^3$



CROCODILE RIVER AT KWENA DAM

