



DEPARTMENT OF WATER AFFAIRS AND FORESTRY
LIMPOPO PROVINCE
WATER RESOURCE INFORMATION

STATUS ON MONITORING &
SURFACE WATER LEVEL TRENDS
April 2014 to September 2014

D VILJOEN
December 2014

GH4332



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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 50.4%** and the Nsami Dam with storage of 54.5%.

In the Limpopo WMA the majority of dams have more water than the previous year: The average storage volume for the Limpopo WMA is 273.2 million cubic meters (97.4%) and is 22.5 million cubic meters more than the corresponding period last year (89.4%).

The average storage volume for the Luvuvhu / Letaba WMA is 539.8 million cubic meters (81.8%) and is 10.2 million cubic meters more than the corresponding period last year (80.3%).

In the Sekhukune area the Flag Boshielo Dam is at a storage level of 91.3% ($169 \times 10^6 \text{m}^3$) and 14% higher than the previous year, which means that the storage volume is 25.9 million cubic meters more than the corresponding period last year.

The average storage volume for the Olifants WMA is 1184.4 million cubic meters (83.5%) and is 210 million cubic meters more than the corresponding period last year (68.7%).

Please take note that the De Hoop Dam storage has also been taken into account. The dam is at a storage level of 282.5 million cubic meters (82%) 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 meters), Der Broggen, Lepellane and Mahlangu dams.

The average storage volume for the Inkomati WMA is 968.1 million cubic meters (92.2%) and is 20.4 million cubic meters more than the corresponding period last year (90.3%).

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 2014.

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 Nkomati 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 July 2013 up to June 2014, 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 2014 up to February 2015 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 LIMPOPO WATER MANAGEMENT AREA

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

4.1 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 98.5% ($143.2 \times 10^6\text{m}^3$) and 5.2% lower than the previous year, which means that the storage volume is 7.5 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 95.3% ($41.72 \times 10^6\text{m}^3$) and 9% higher than the previous year, which means that the storage volume is 3.94 million cubic meters more than the corresponding period last year. See attached graph!

Glen Alpine Dam is at a storage level of 95.9% ($18.12 \times 10^6\text{m}^3$) and 38.7% higher than the previous year, which means that the storage volume is 7.3 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 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 96% ($49.19 \times 10^6\text{m}^3$) and 4.5% higher than the previous year, which means that the storage volume is 2.3 million cubic meters more than the corresponding period last year. See attached graph!

Luphephe and Nwanedzi Dams are at storage levels of 99.3% and 98.6% respectively. Their combined storage is at $18.96 \times 10^6 \text{m}^3$. The combined storage for the corresponding period the previous year was $17.17 \times 10^6 \text{m}^3$. (89.8% of storage volume) See attached graphs!

Mutshedzi Dam is at a storage level of 100% ($2.04 \times 10^6 \text{m}^3$) and the same level as the previous 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 97.7% ($27.56 \times 10^6 \text{m}^3$) and 12.6% higher than the previous year, which means that the storage volume is 3.56 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 0.6% lower than the previous year, which means that the storage volume is 0.185 million cubic meters more than the corresponding period last year. See attached graph!

Nandoni Dam is at a storage level of 99% ($164.46 \times 10^6 \text{m}^3$) and 0.5% lower than the previous year, which means that the storage volume is 0.82 million cubic meters less 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 98.3% ($67.99 \times 10^6 \text{m}^3$) and 0.9% lower than the previous year, which means that the storage volume is 0.61 million cubic meters less than the corresponding period last year. See attached graph!

Magoebaskloof Dam is at a storage level of 100.3% ($4.853 \times 10^6 \text{m}^3$) and 0.1% lower 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 88.8% ($139.02 \times 10^6\text{m}^3$) and 0.8% lower than the previous year, which means that the storage volume is 1.29 million cubic meters less 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 50.4% ($86.72 \times 10^6\text{m}^3$) and 6.2% higher than the previous year, which means that the storage volume is 10.67 million cubic meters more than the corresponding period last year. See attached graph!

The Nsami Dam is at a storage level of 54.5% ($11.92 \times 10^6\text{m}^3$) and 5.9% lower than the previous year, which means that the storage volume is 1.28 million cubic meters less than the corresponding period last year.

The Modjadji Dam is at a storage level of 85.1% ($6.11 \times 10^6\text{m}^3$) and 6.5% higher than the previous year, which means that the storage volume is 0.46 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 98.3% ($27.7 \times 10^6\text{m}^3$) and 7.3% higher than the previous year, which means that the storage volume is 2.08 million cubic meters more than the corresponding period last year. See attached graph!

Loskop Dam is at a storage level of 92.9% ($335.98 \times 10^6\text{m}^3$) and 22.5% higher than the previous year, which means that the storage volume is 81.59 million cubic meters more 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 91.3% ($169.02 \times 10^6\text{m}^3$) and 14.8% higher than the previous year, which means that the storage volume is 27.3 million cubic meters more 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 72.1% ($9.7 \times 10^6\text{m}^3$) and 11.6% lower than the previous year, which means that the storage volume is 1.56 million cubic meters less 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 96.1% ($52.2 \times 10^6\text{m}^3$) and 1.4% 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!

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 102.3% ($5.74 \times 10^6\text{m}^3$) and 6.4% higher than the previous year, which means that the storage volume is 0.37 million cubic meters more than the corresponding period last year. See attached graph!

Tours Dam is at a storage level of 93.7% ($5.7 \times 10^6\text{m}^3$) and 0.1% 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 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 91.2% ($144.95 \times 10^6\text{m}^3$) and 3.6% lower than the previous year, which means that the storage volume is 5.68 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 97.9% ($121.08 \times 10^6\text{m}^3$) and 1.2% lower than the previous year, which means that the storage volume is 1.45 million cubic meters less than the corresponding period last year. See attached graph!

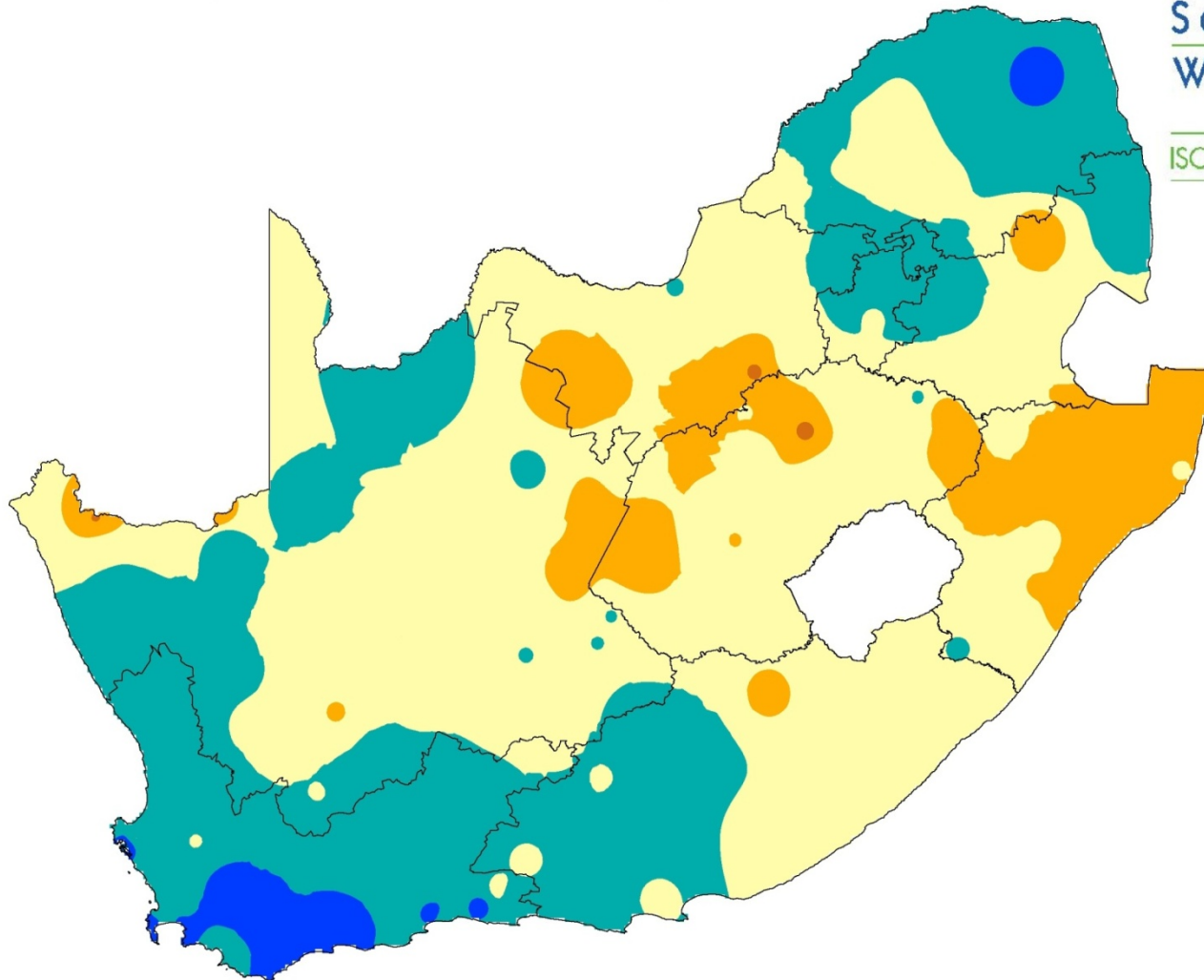
Percentage of normal rainfall for season July 2013 - June 2014

(Based on preliminary data, Normal period 1971-2000)

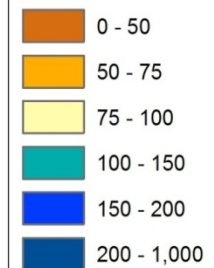


South African
Weather Service

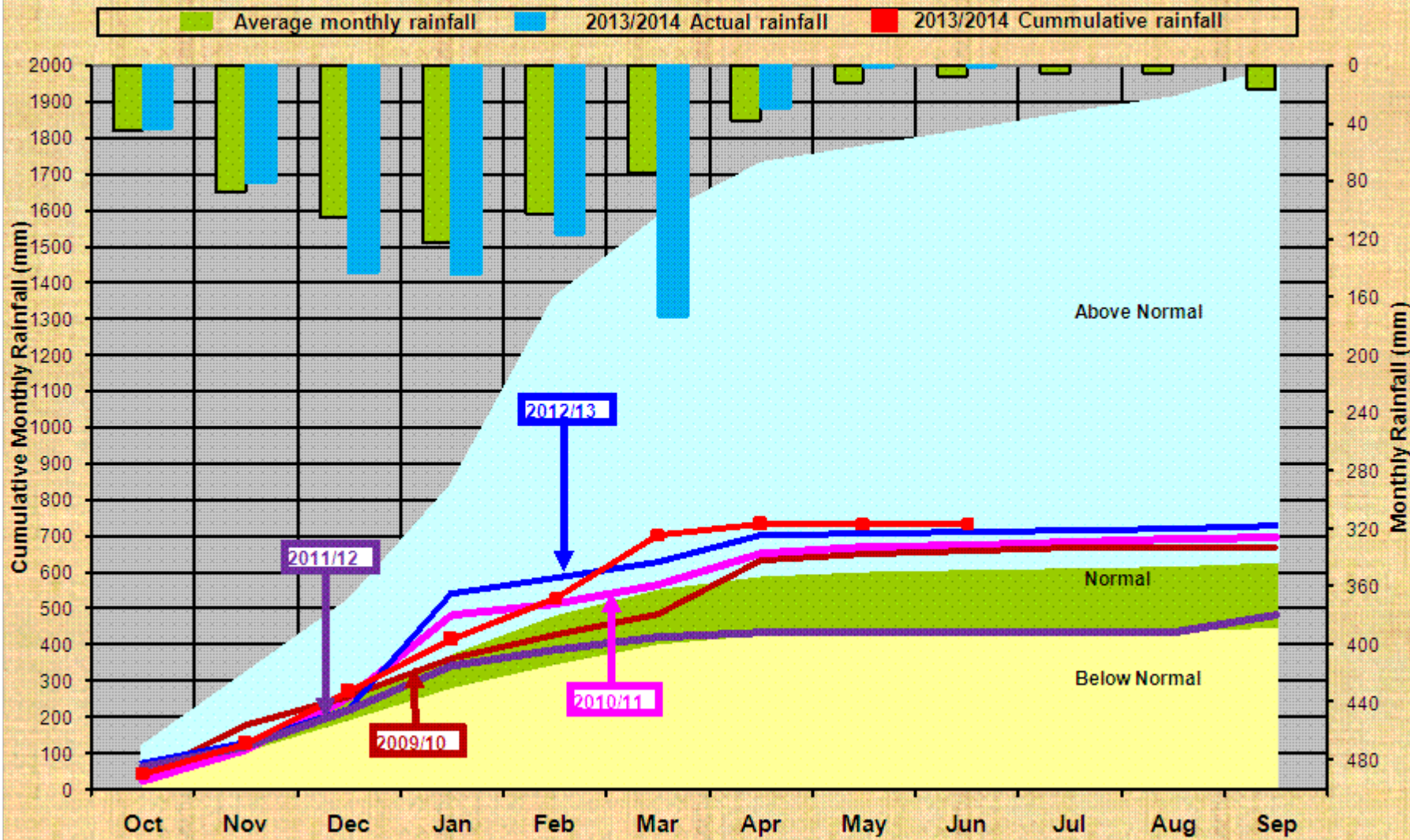
ISO 9001 Certified Organisation



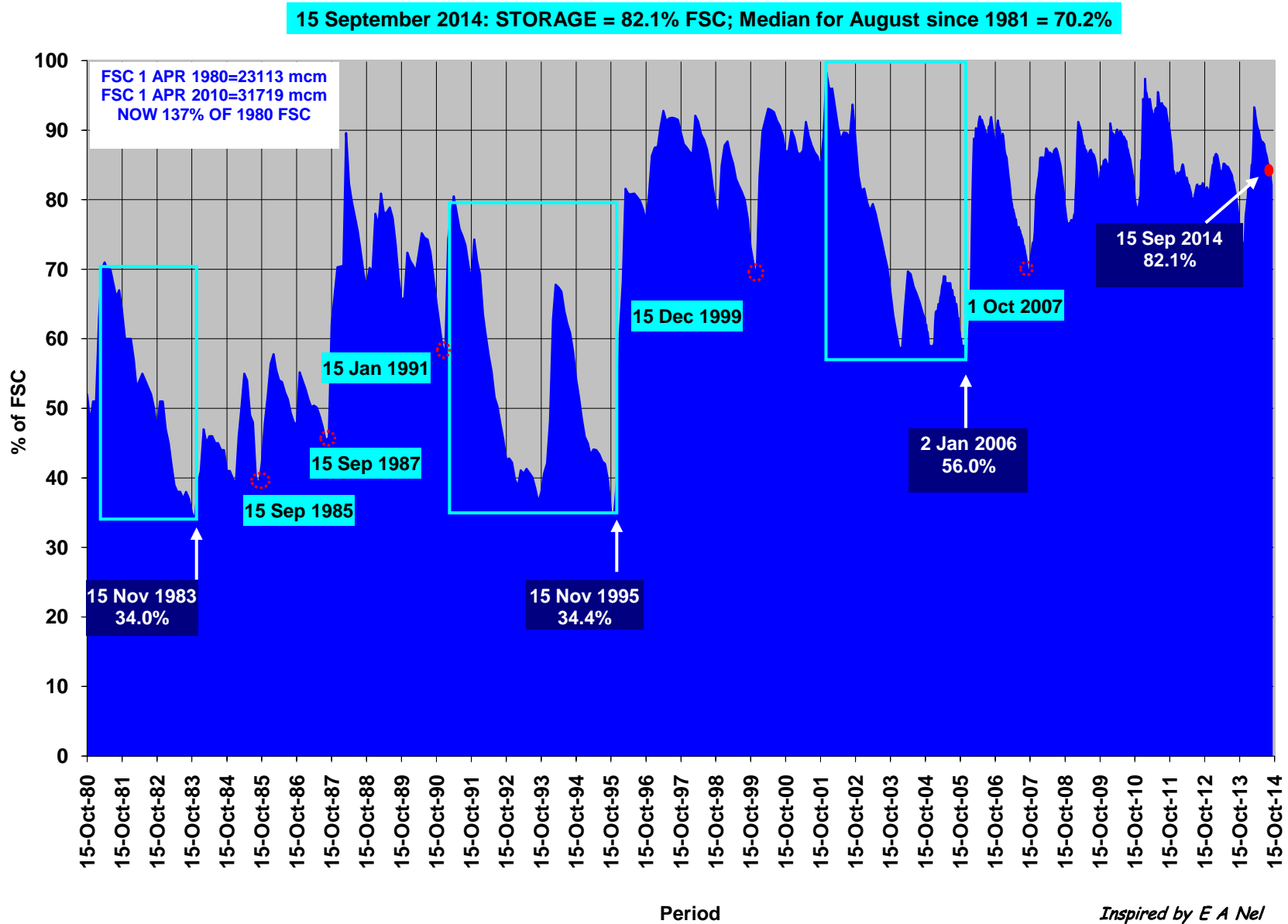
% of Normal



LIMPOPO

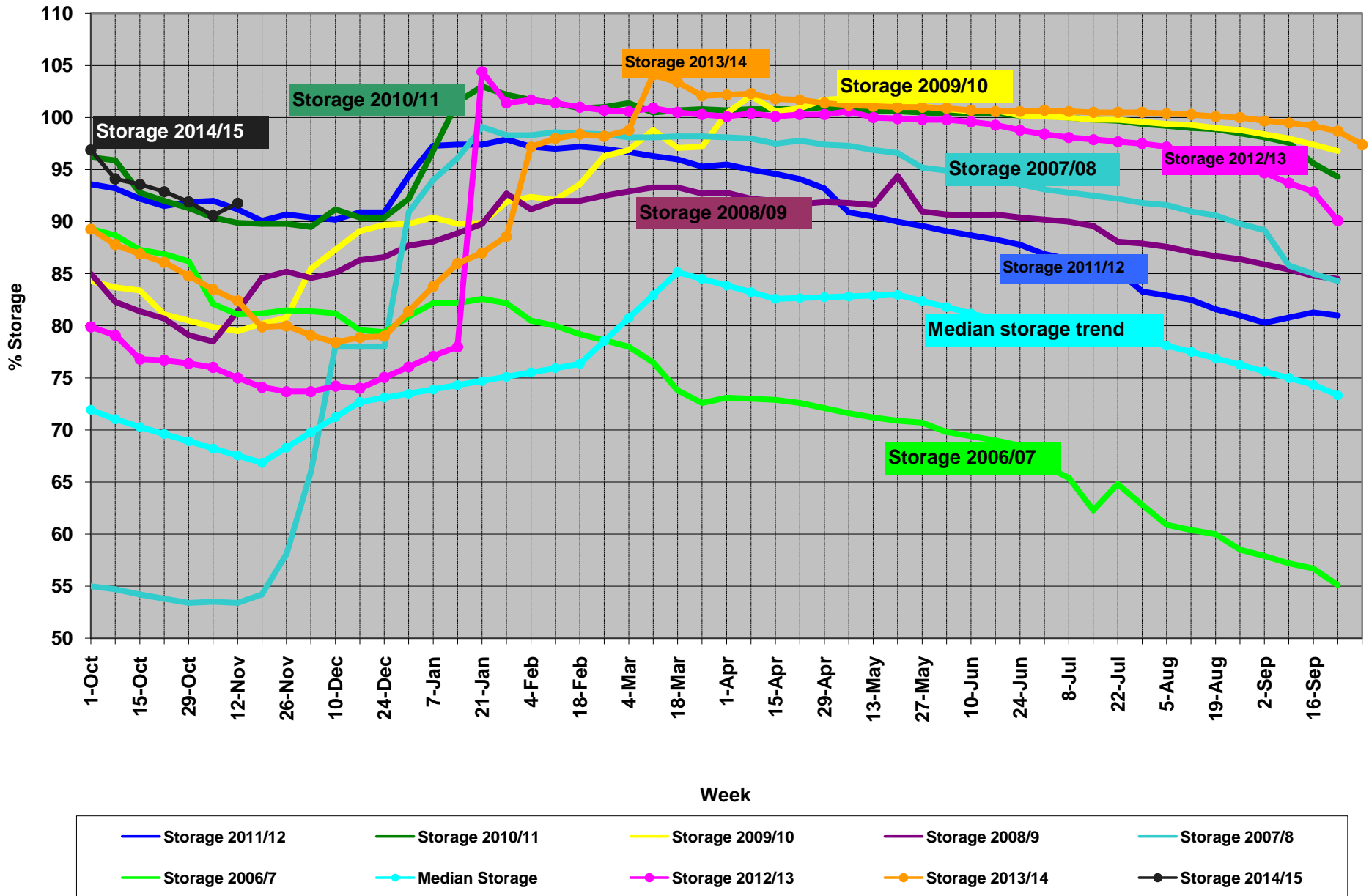


National Dams: Water Storage: The Storage for 15 September 2014 since August 1981 (Weekly values since 4/10/04)

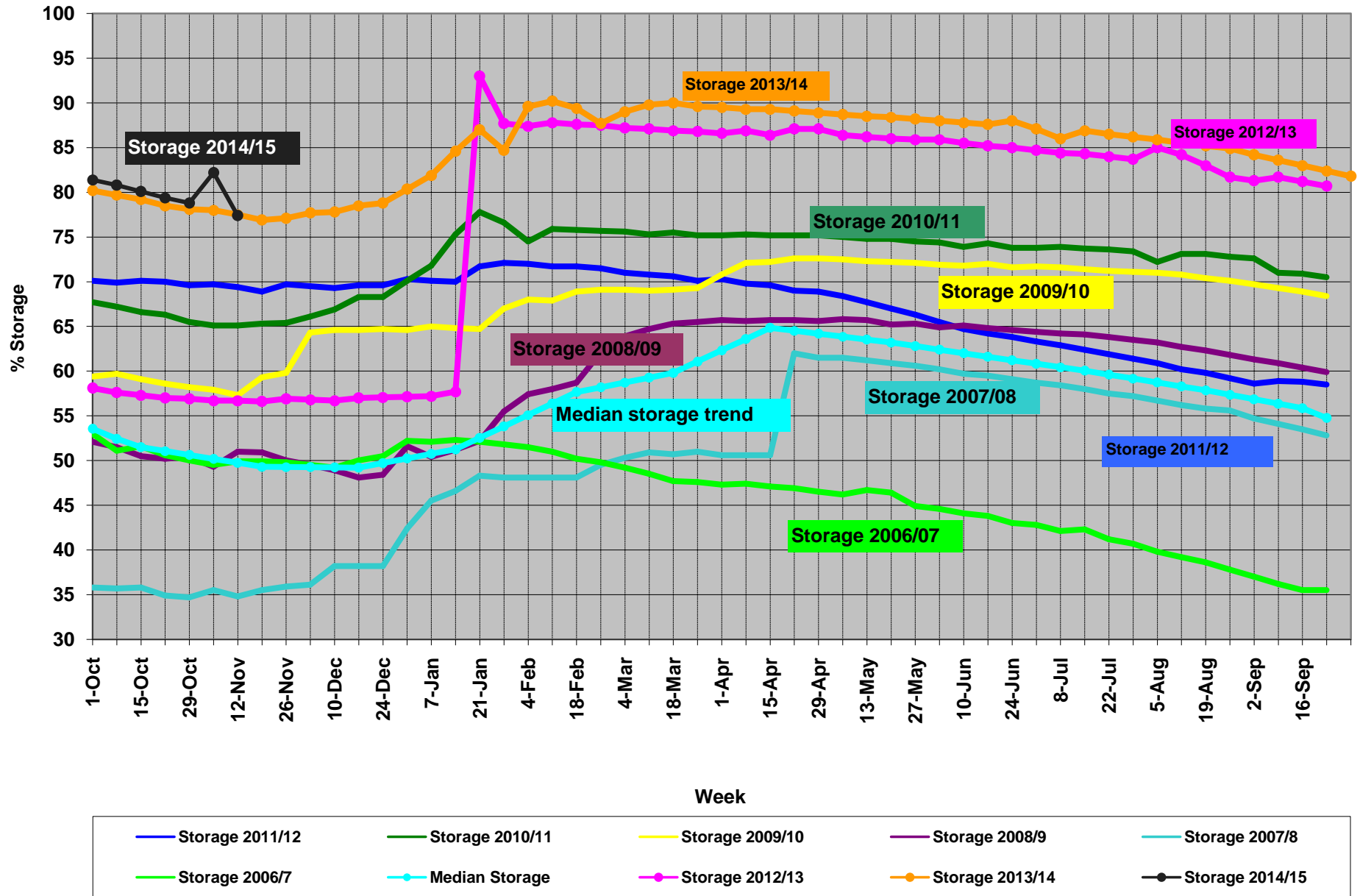


LIMPOPO: WMA 1: STORAGE FOR CORRESPONDING WEEKS (%FSC)

Weekly: Oct to Sep



Luvuvhu-Letaba: WMA 2: STORAGE FOR CORRESPONDING WEEKS (%FSC) Weekly: Oct to Sep



Summary WMA		Full Supply Capacity 10 ⁶ M ³	Water in Storage 10 ⁶ M ³	Last Year % Full	Last Week % Full	This Week 29/09/2014 % Full
1	Limpopo	280.4	273.2	89.4	98.7	97.4
2	Luvubu/Letaba	652.5	533.7	80.3	82.4	81.8
3	Crocodile (West) Marico	807.3	586.0	60.5	73.4	72.6
4	Olifants	1418.4	1184.4	68.7	84.4	83.5
5	Inkomati	1049.5	968.1	90.3	93.7	92.2
6	Usutu/Mhlatuze	3276.2	2463.7	81.8	75.6	75.2
7	Thukela	1254.5	1068.2	91.6	85.7	85.2
8	Upper Vaal	5659.2	5058.4	82.7	90.1	89.4
9	Middle Vaal	1671.6	1260.9	31.6	77.4	75.4
10	Lower Vaal	108.5	96.7	68.0	92.1	89.2
11	Mvoti/Umzimkulu	801.9	642.7	91.2	81.1	80.1
12	Mzimvubu/Keiskamma	1091.6	980.4	83.7	90.4	89.8
13	Upper Orange	11428.3	8629.8	78.8	76.5	75.5
14	Lower Orange	36.1	36.9	104.7	104.9	102.4
15	Fish/Tsitsikamma	725.2	383.9	56.2	52.1	52.9
16	Gouritz	268.3	195.7	76.5	74.7	72.9
17	Olifants/Doom	128.2	129.2	97.1	99.5	100.7
18	Breede	1041.9	949.8	90.7	91.3	91.2
19	Berg	416.5	416.3	100.9	100.4	100.0
GRAND TOTAL		32116.3	25858.1	78.1	81.4	80.5

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.

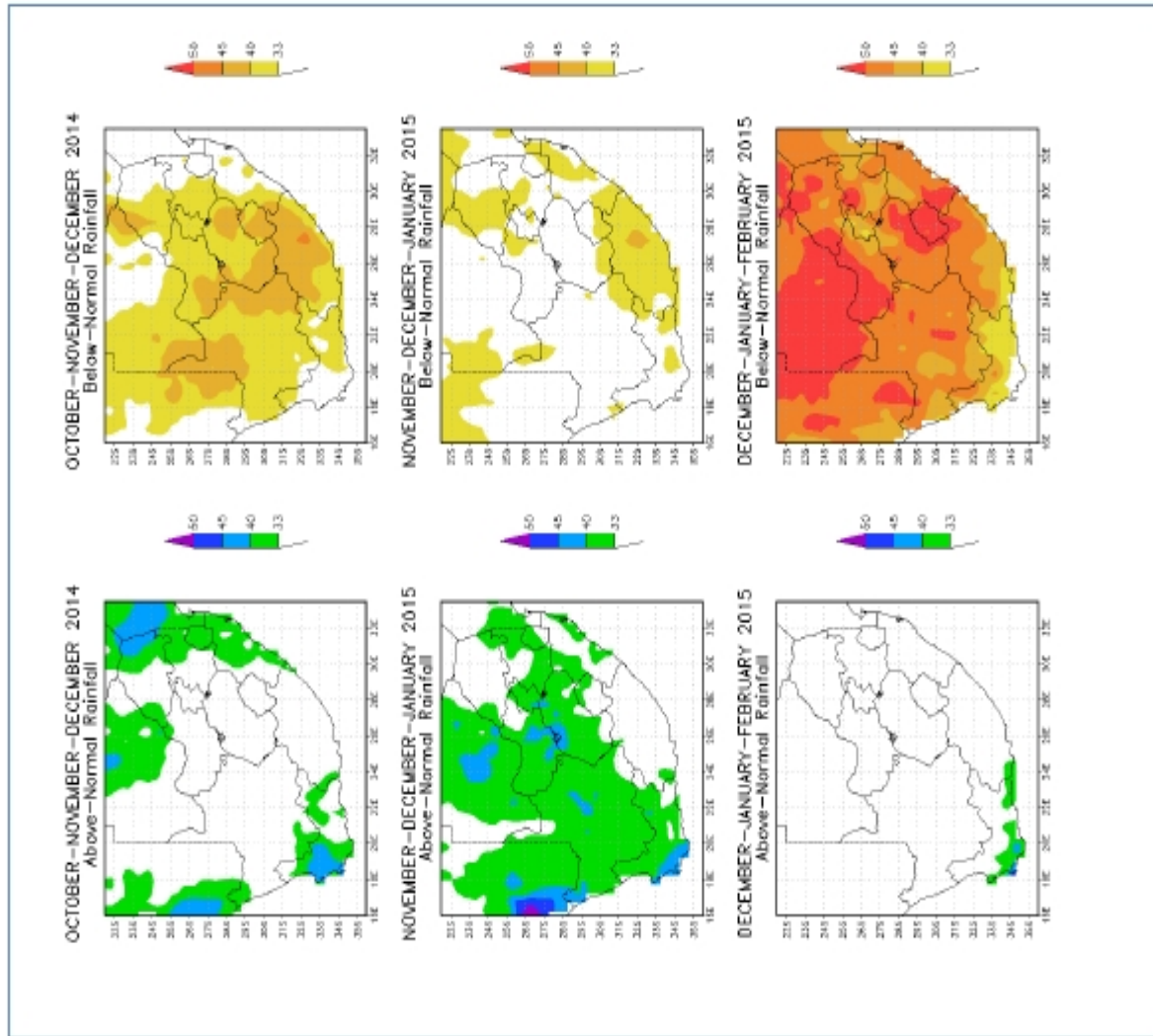
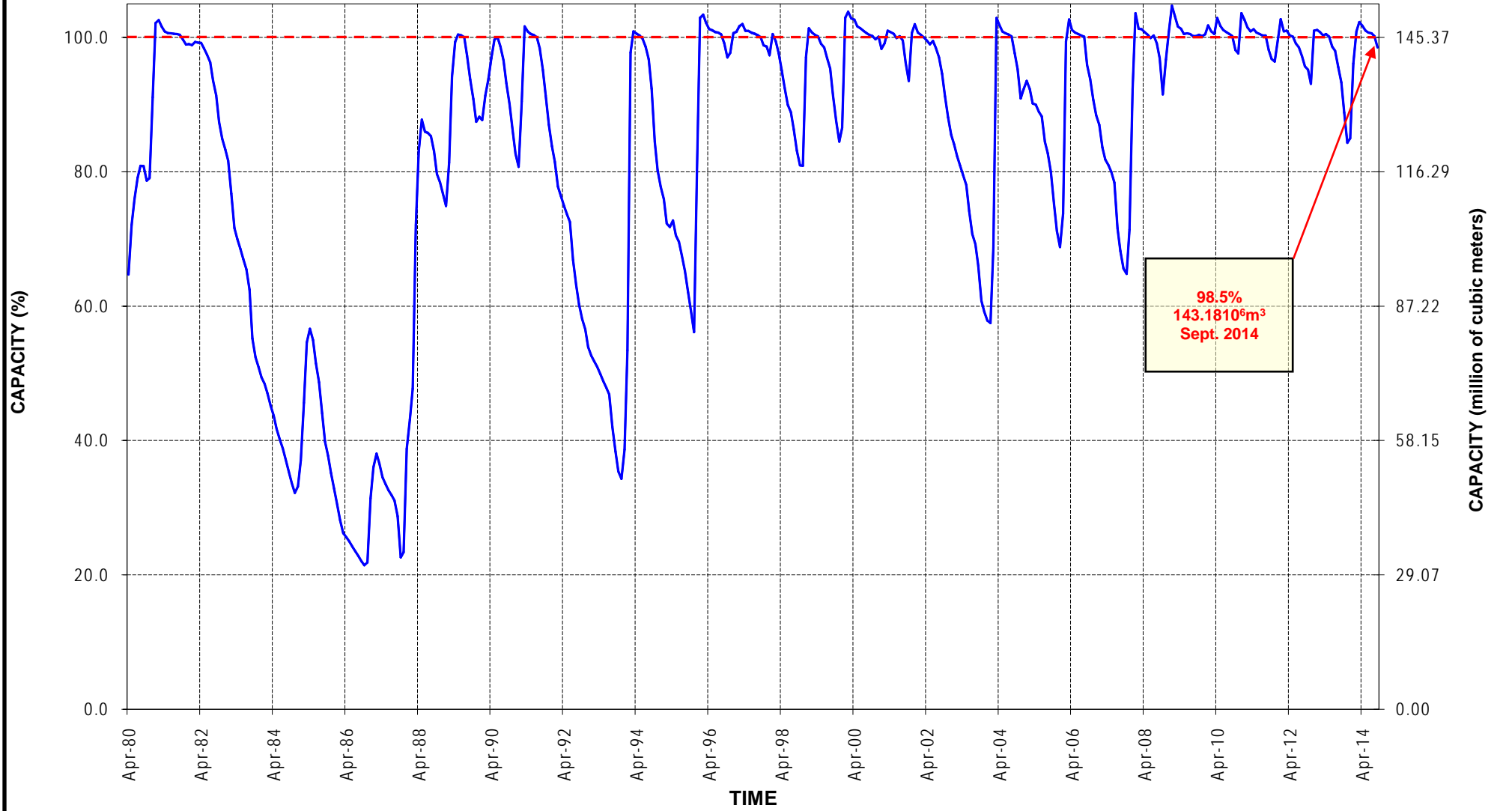


Figure 1: Rainfall forecasts for the three overlapping seasons valid for the period of October 2014 to February 2015

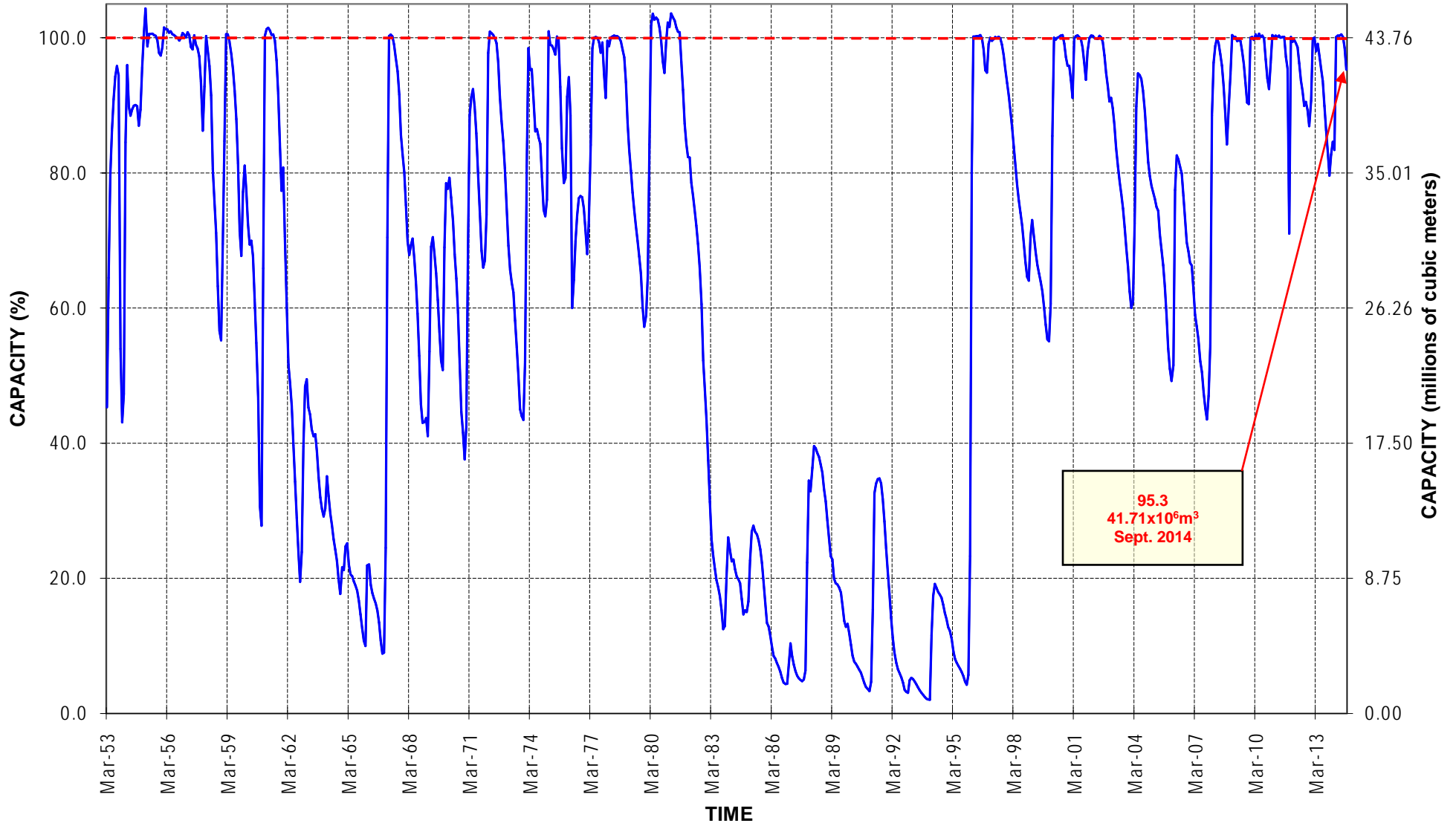
MOGOL RIVER AT MOKOLO DAM

FULL CAPACITY 145.37 *10⁶m³



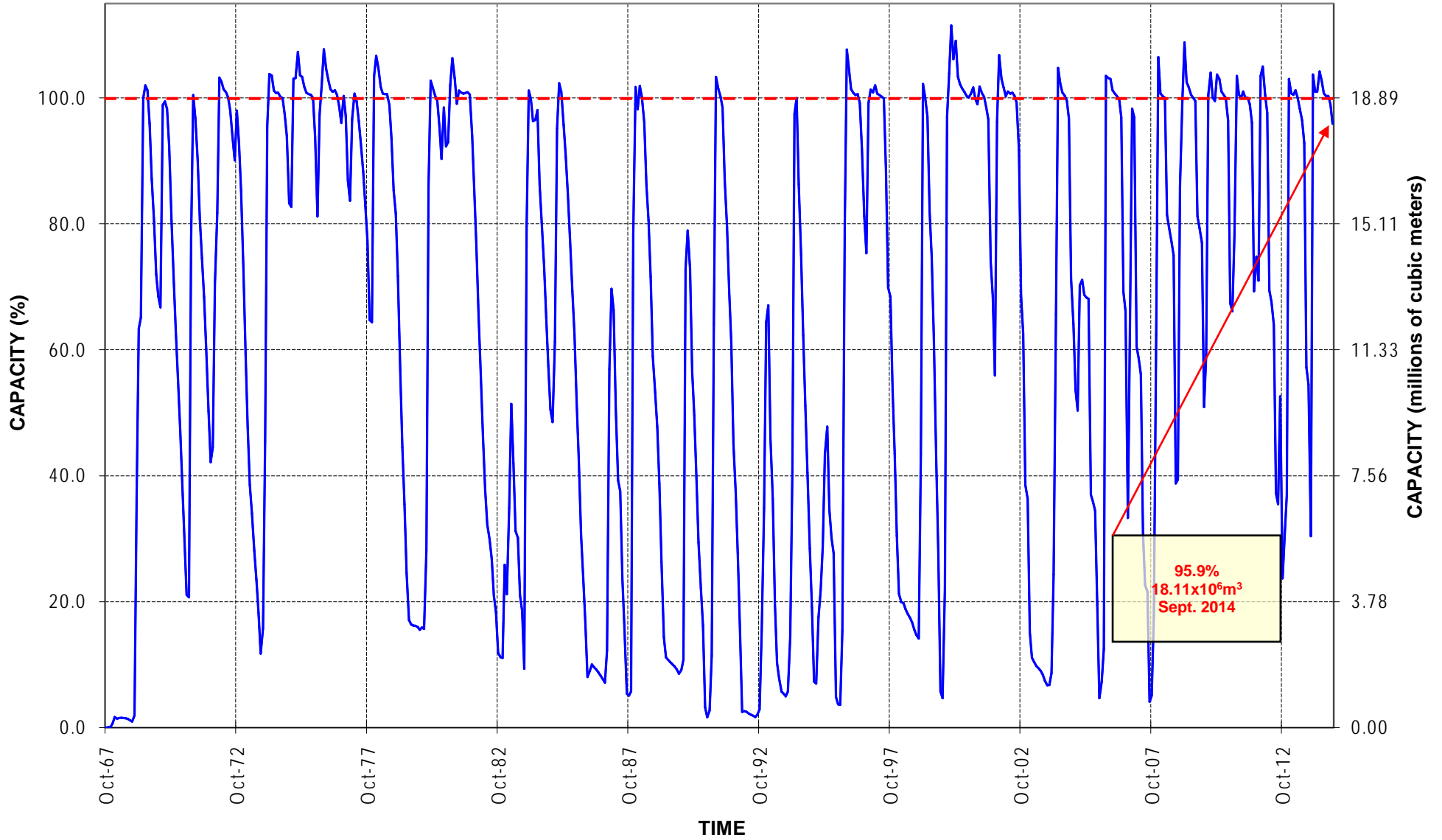
STERK RIVER AT DOORNDRAAI DAM

FULL CAPACITY $43.76 \times 10^6 \text{m}^3$



MOKGALAKWENA RIVER AT GLEN ALPINE DAM

FULL CAPACITY $18.89 \times 10^6 \text{m}^3$



NZHELELE RIVER AT NZHELELE DAM

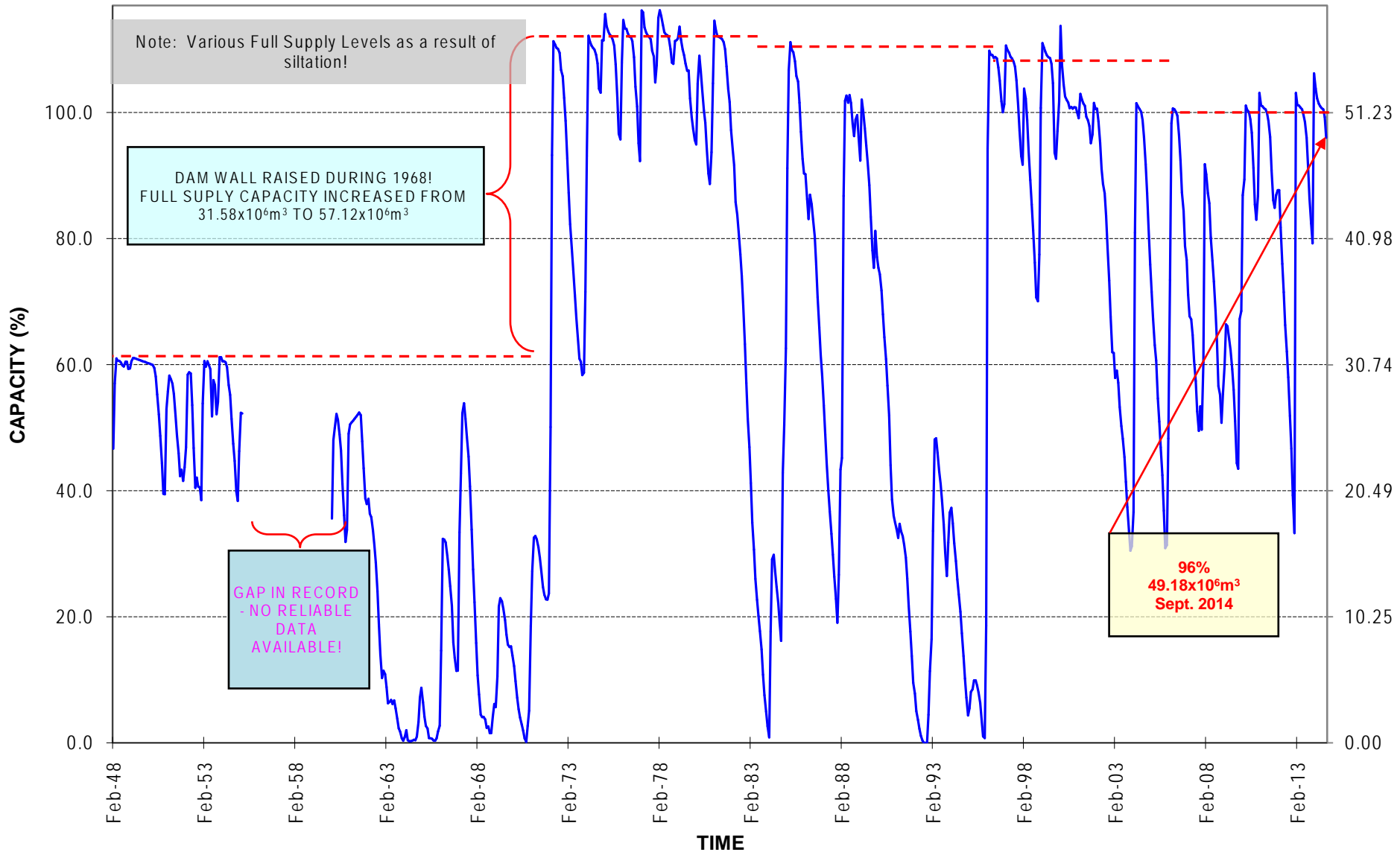
FULL CAPACITY 51.23 *10⁶m³

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

DAM WALL RAISED DURING 1968!
FULL SUPPLY CAPACITY INCREASED FROM
31.58x10⁶m³ TO 57.12x10⁶m³

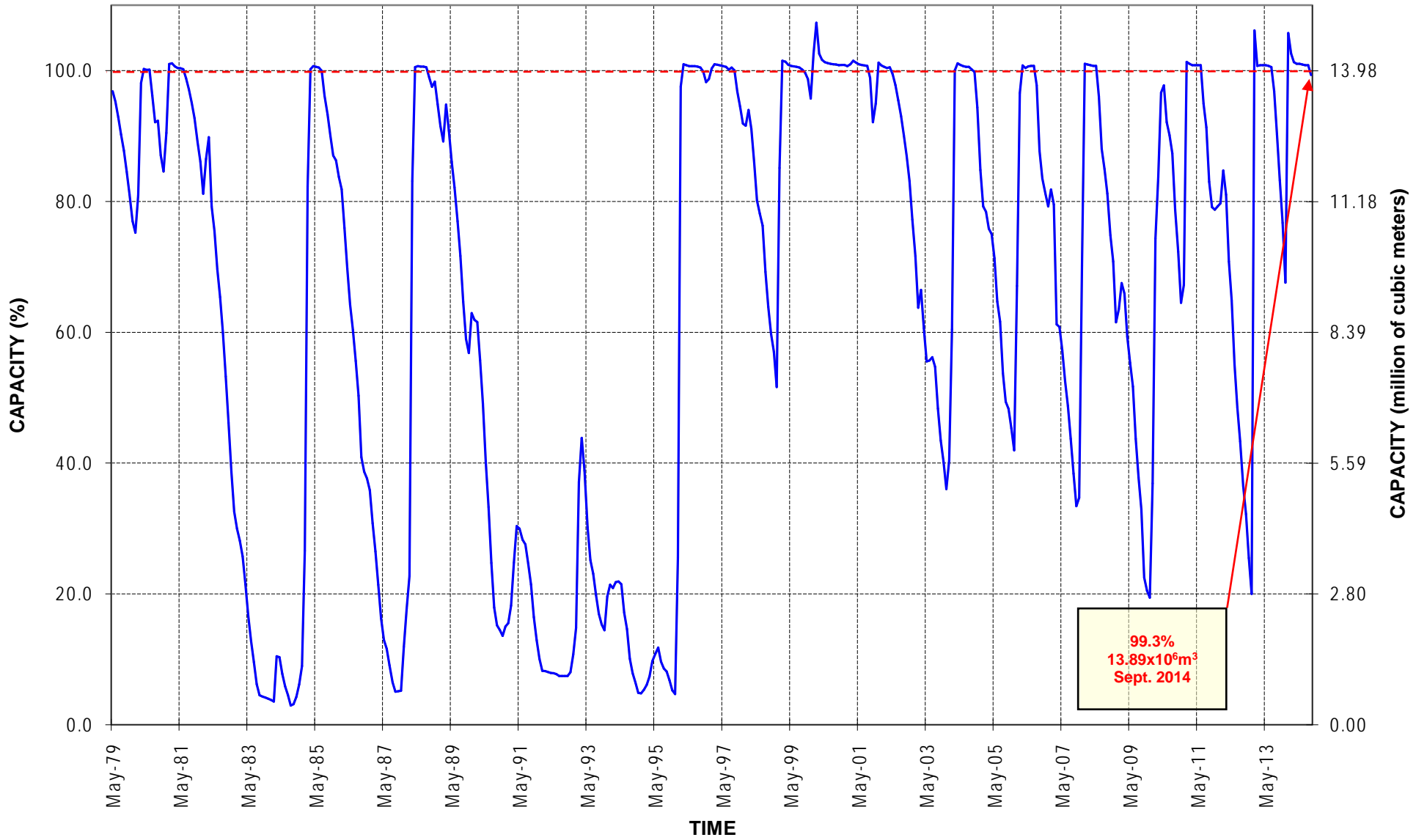
GAP IN RECORD
- NO RELIABLE
DATA
AVAILABLE!

96%
49.18x10⁶m³
Sept. 2014



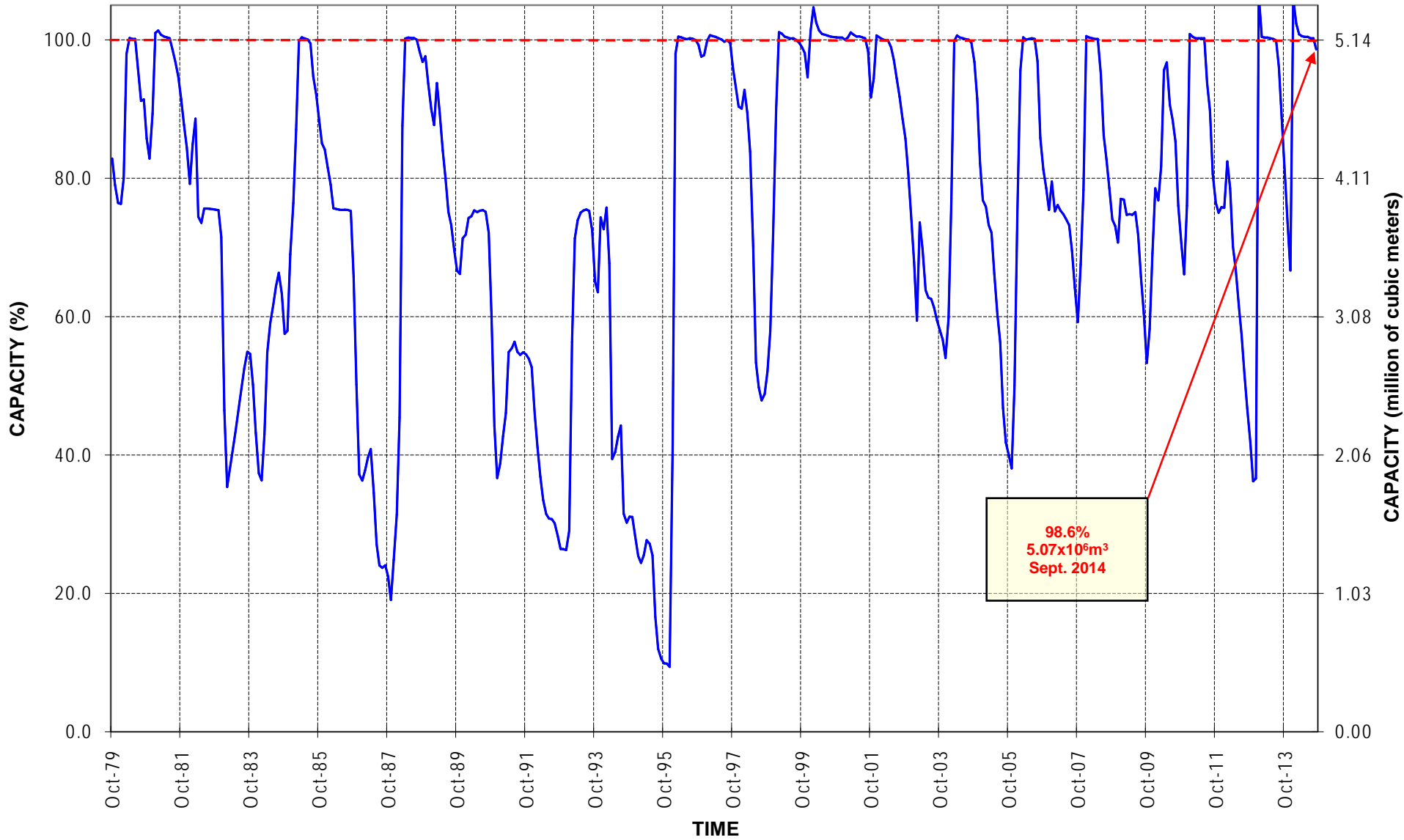
LUPHEPHE RIVER AT LUPHEPHE DAM

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



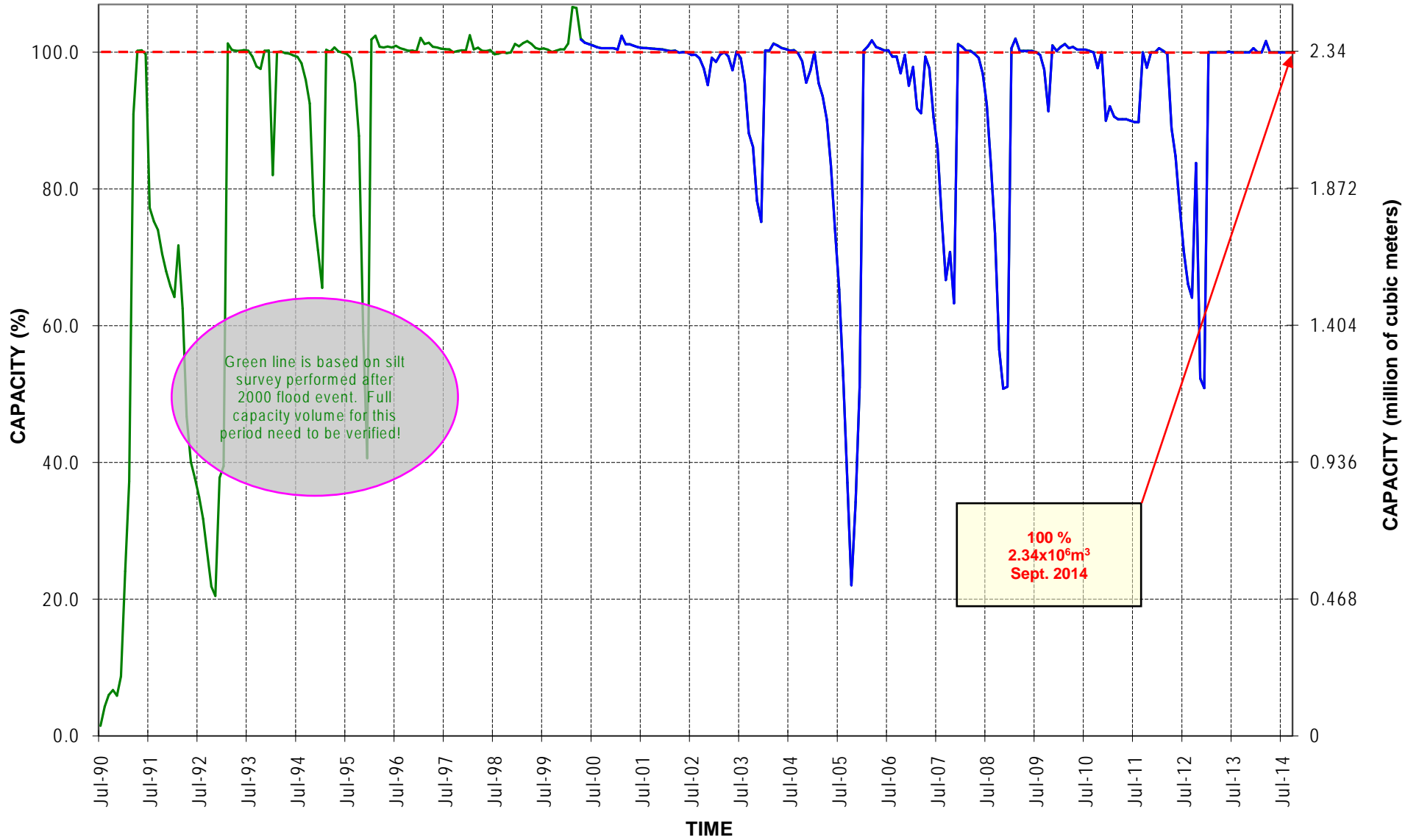
NWANEDZI RIVER AT NWANEDZI DAM

FULL CAPACITY $5.14 \times 10^6 \text{m}^3$



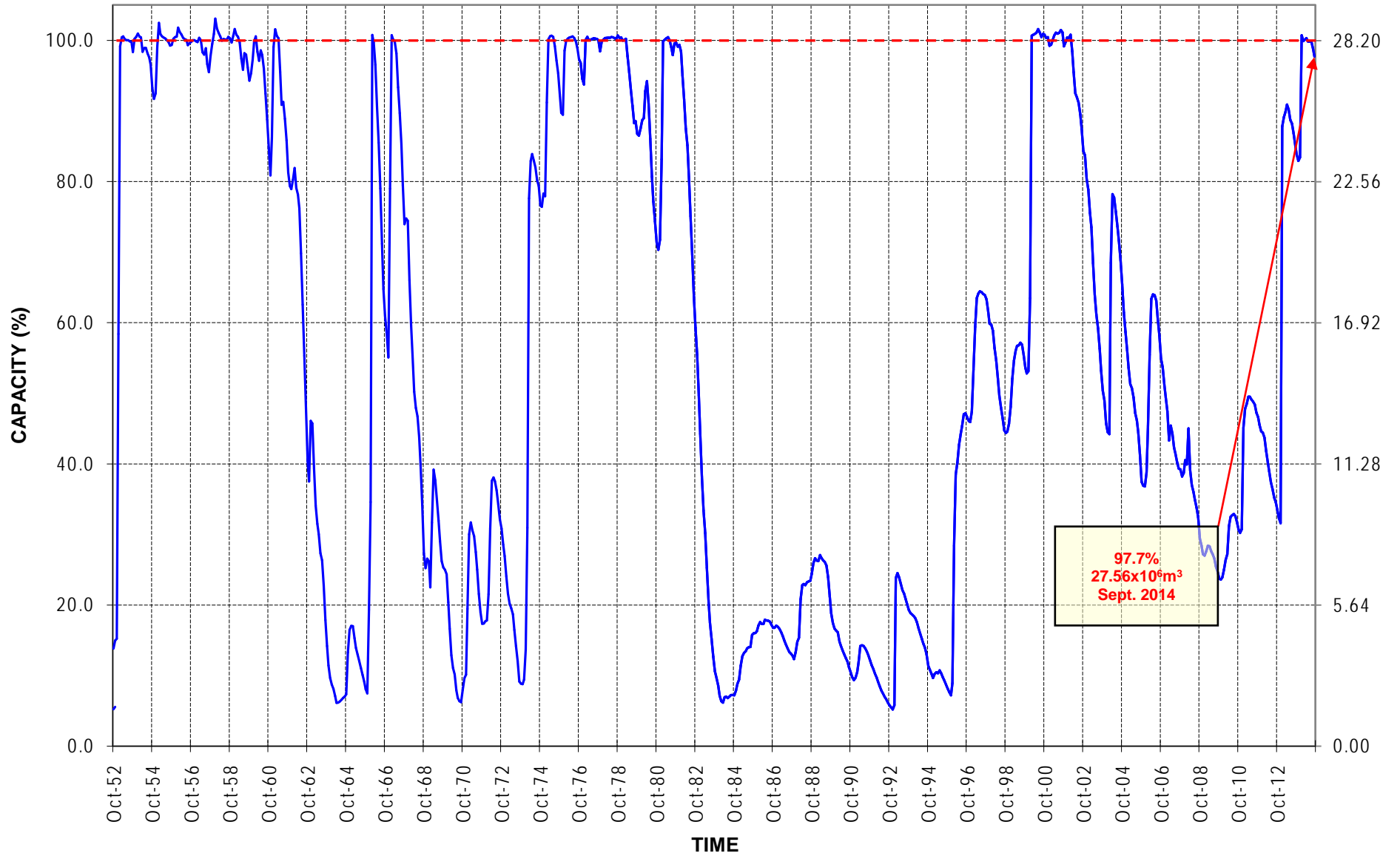
MUTSHEDZI RIVER AT MUTSHEDZI DAM

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



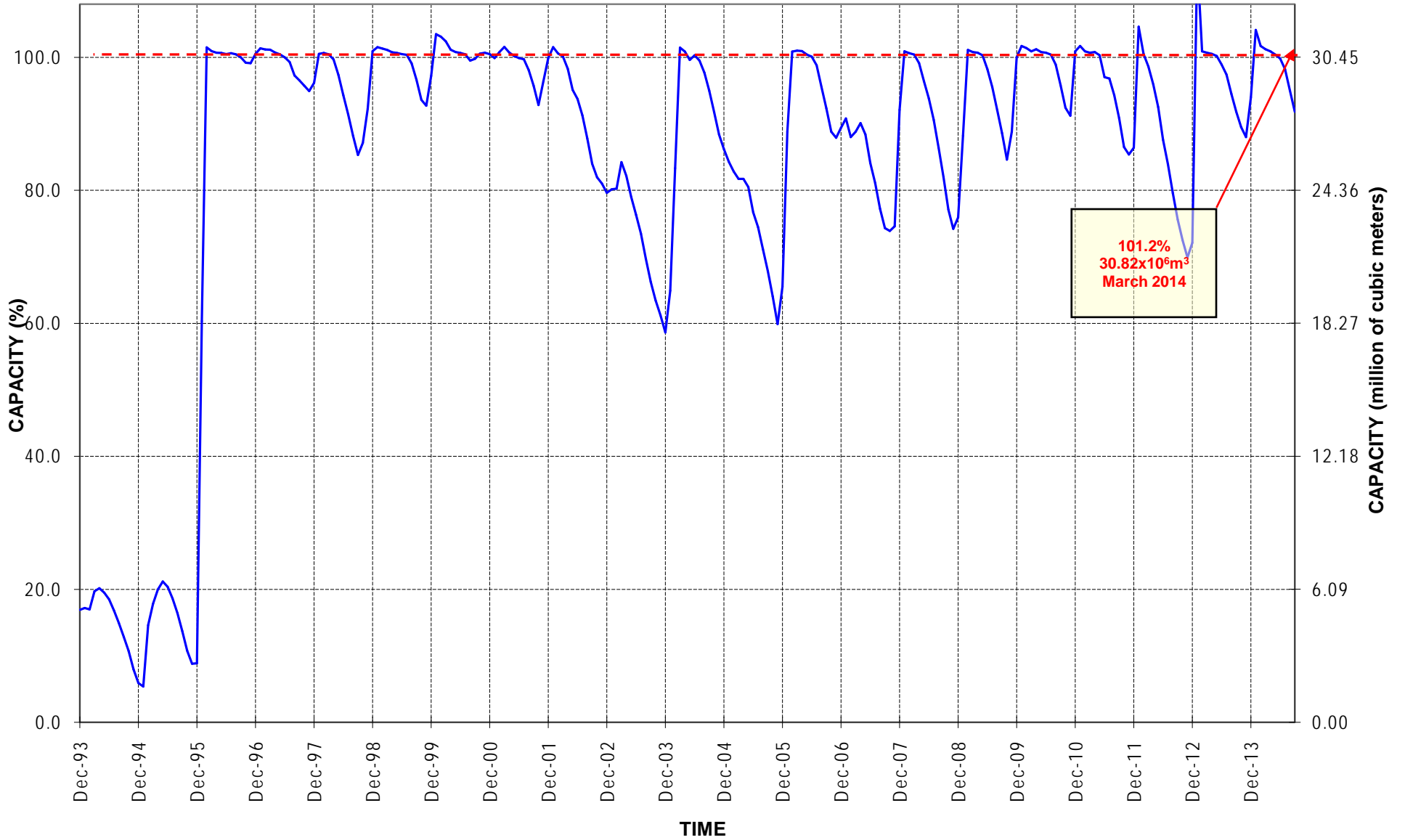
LUVUVHU RIVER AT ALBASINI DAM

FULL CAPACITY 28.21*10⁶m³



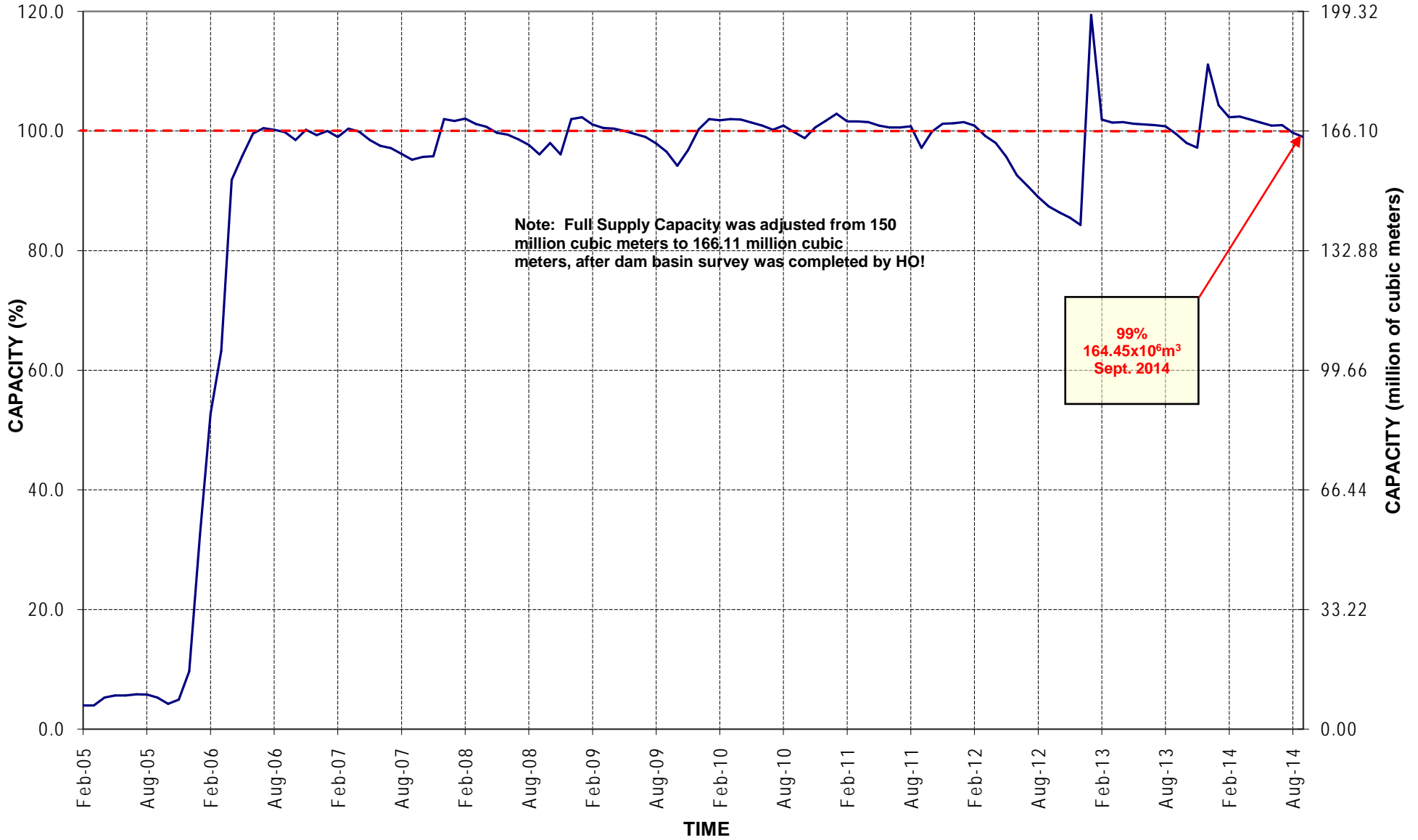
MUTSHINDUDI RIVER AT VONDO DAM

FULL CAPACITY $30.447 \times 10^6 \text{m}^3$



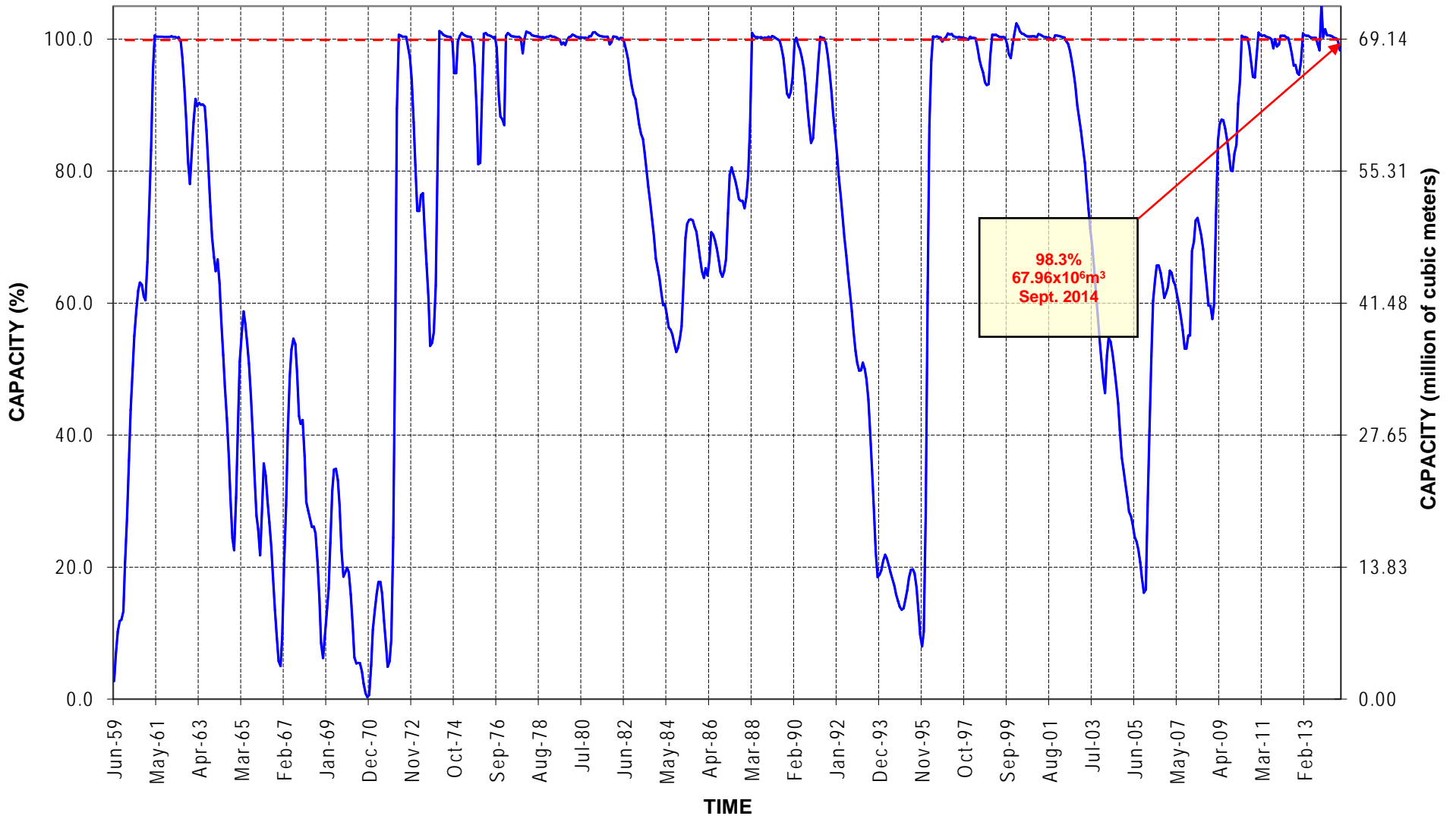
LUVUVHU RIVER AT NANDONI DAM

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



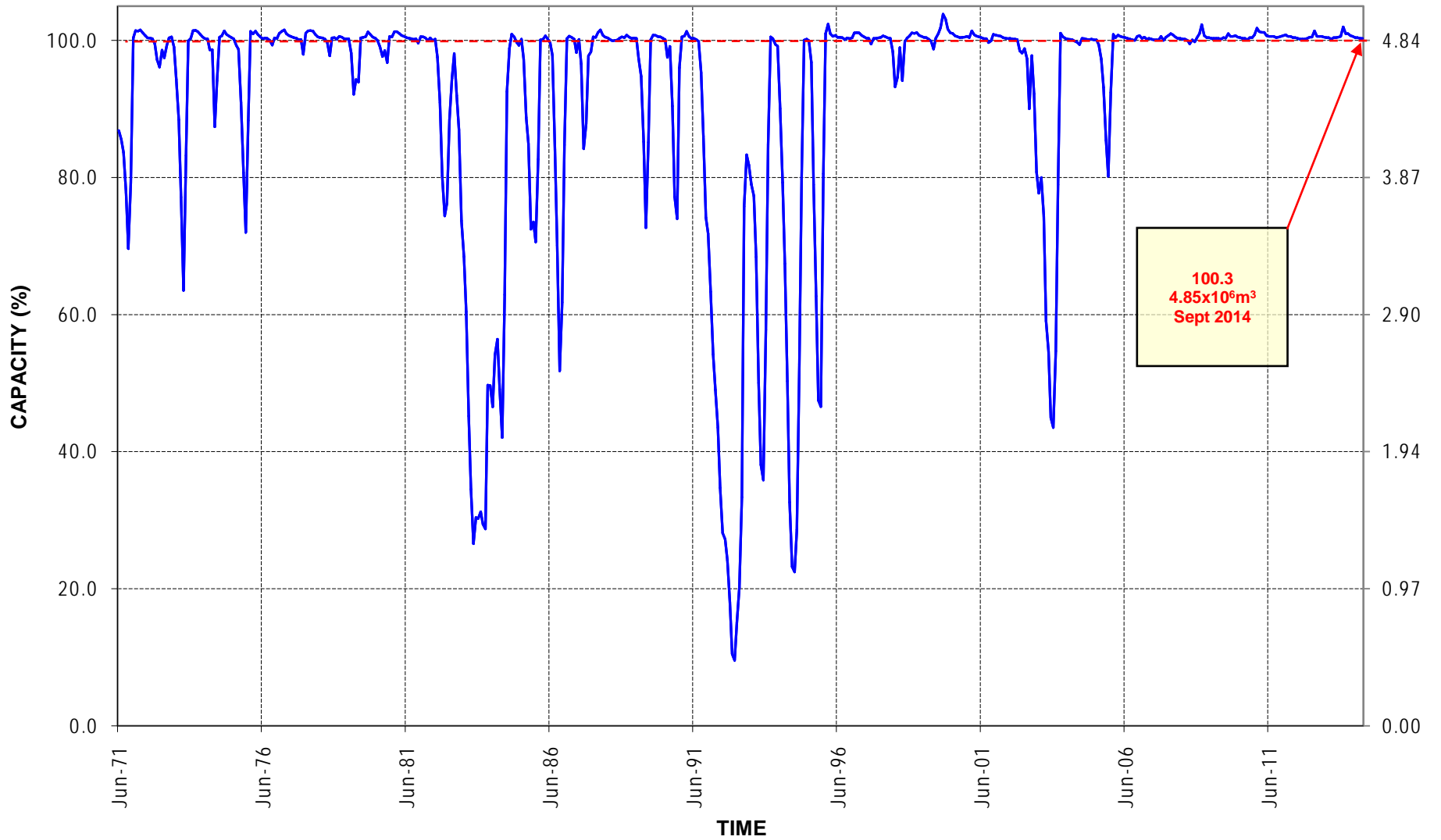
GREAT LETABA RIVER AT EBENEZER DAM

FULL CAPACITY $69.139 \times 10^6 \text{m}^3$



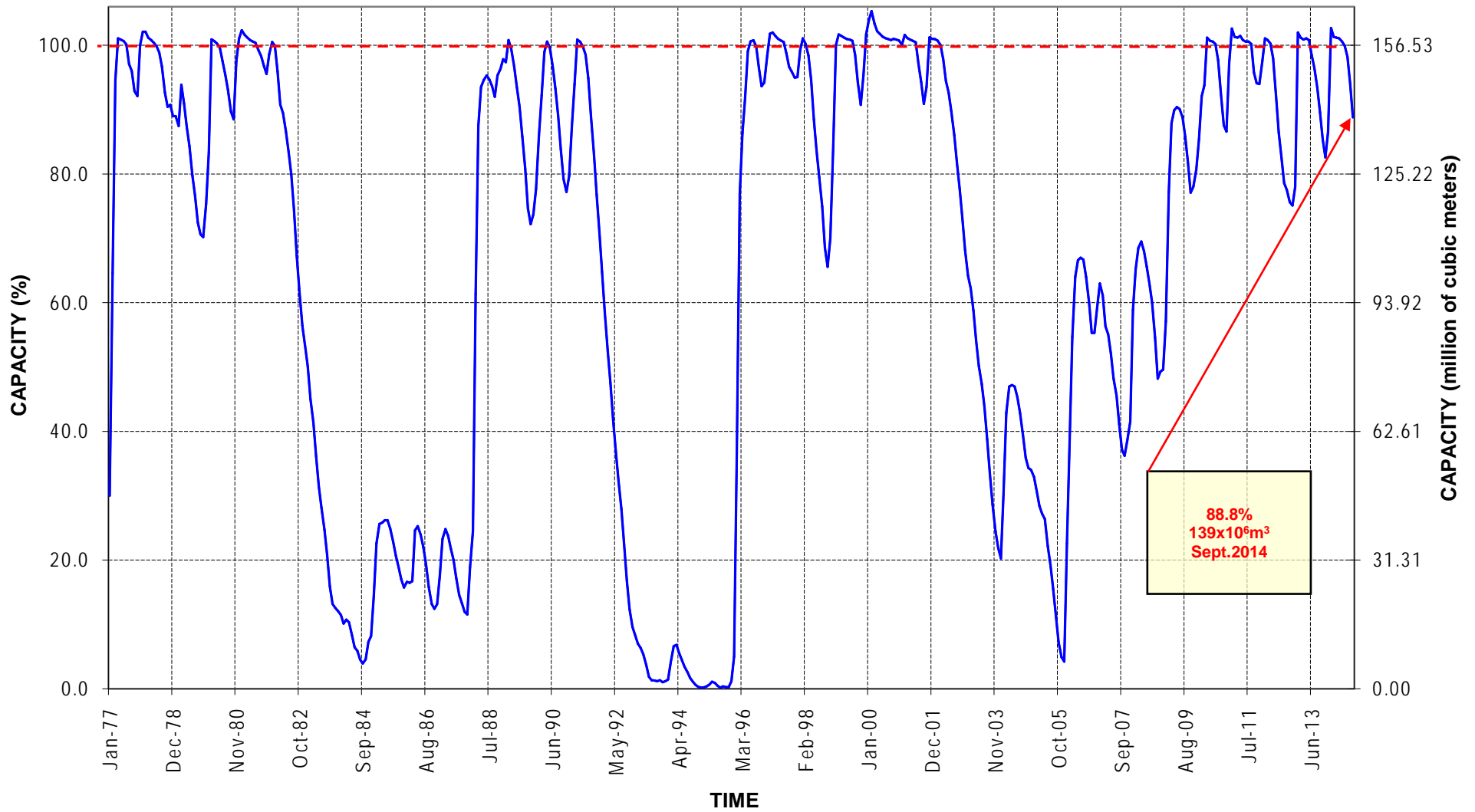
POLITSI RIVER AT MAGOEBAKLOOF DAM

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

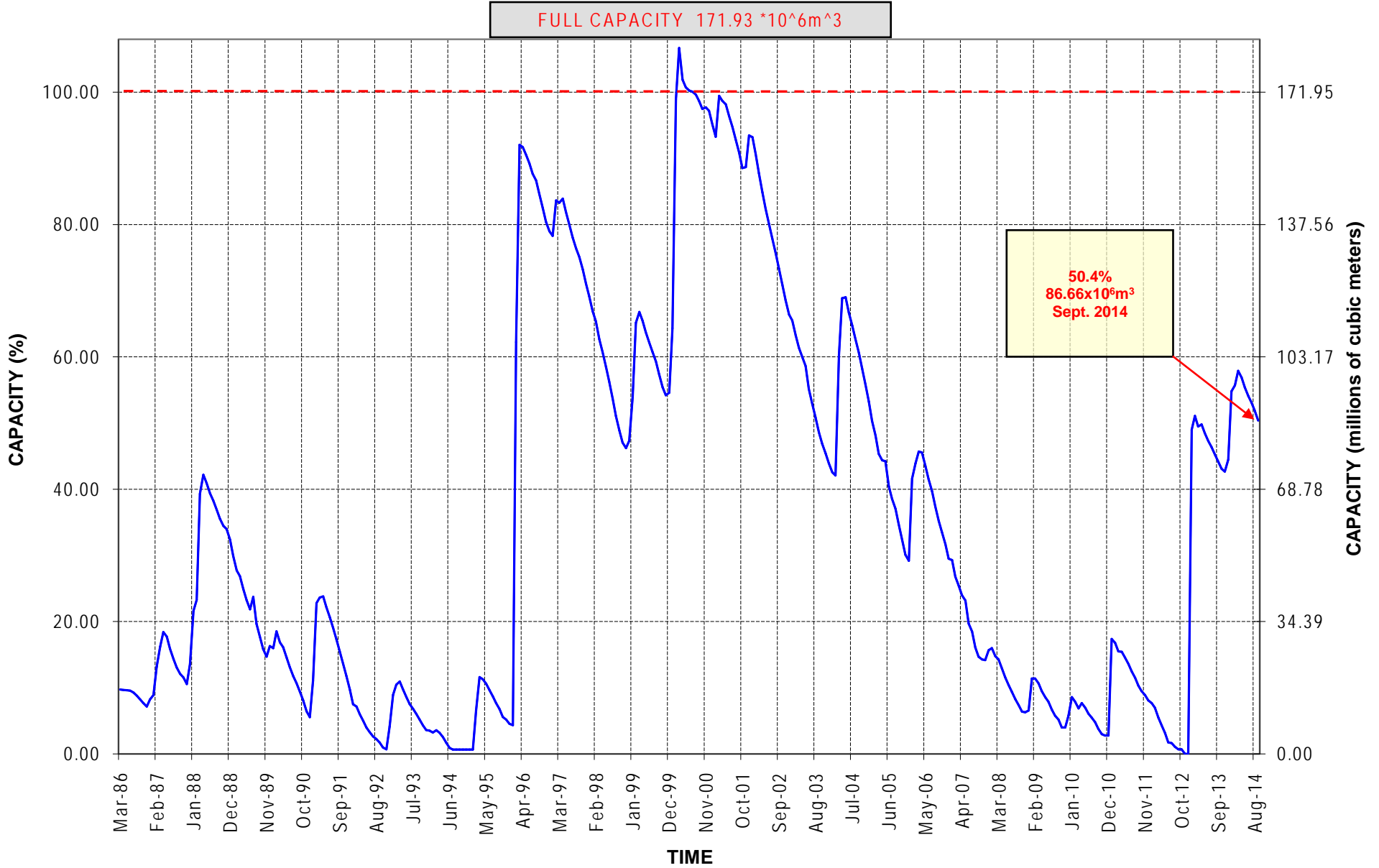


GREAT LETABA RIVER AT TZANEEN DAM

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

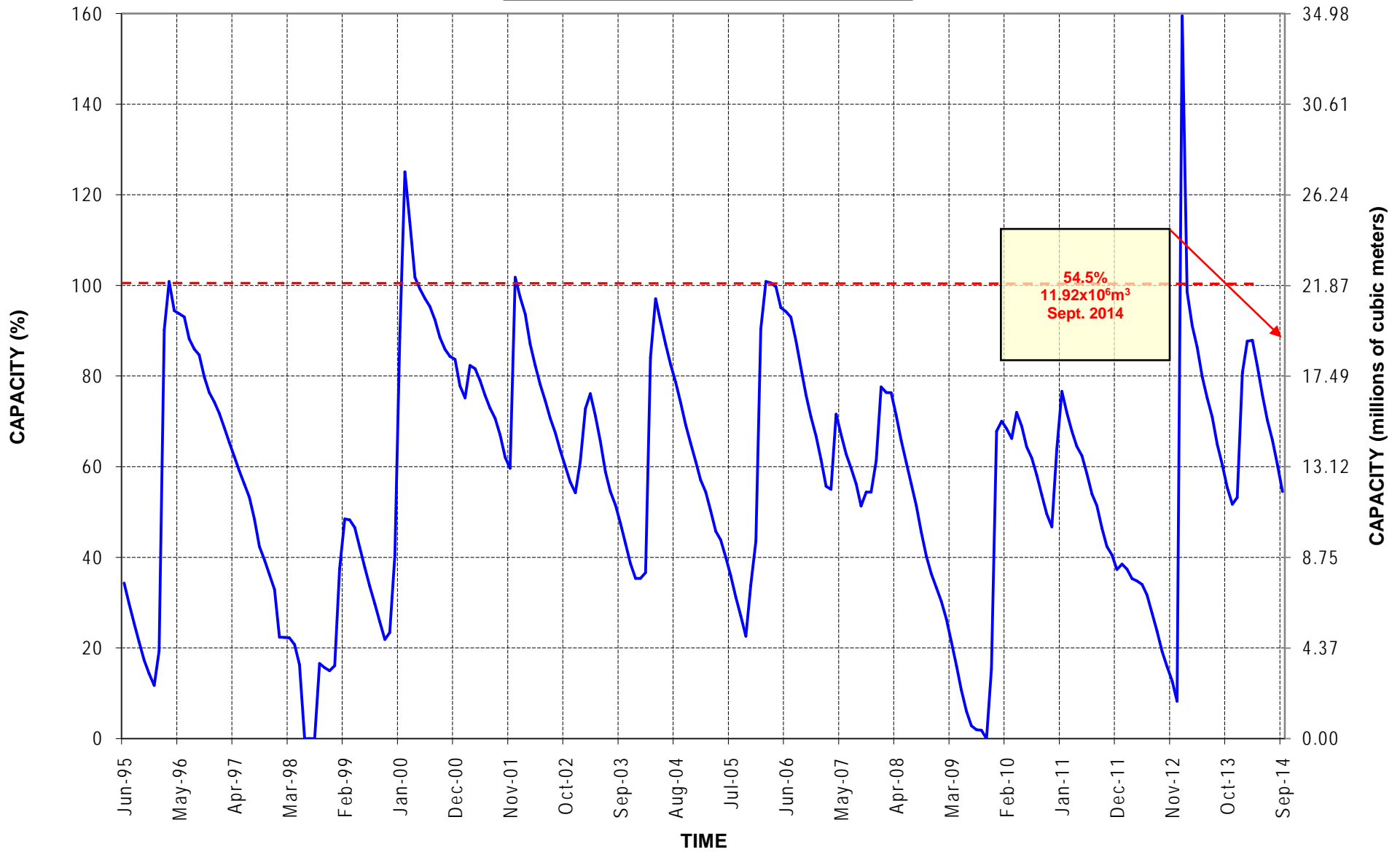


MIDDLE LETABA RIVER AT MIDDLE LETABA DAM



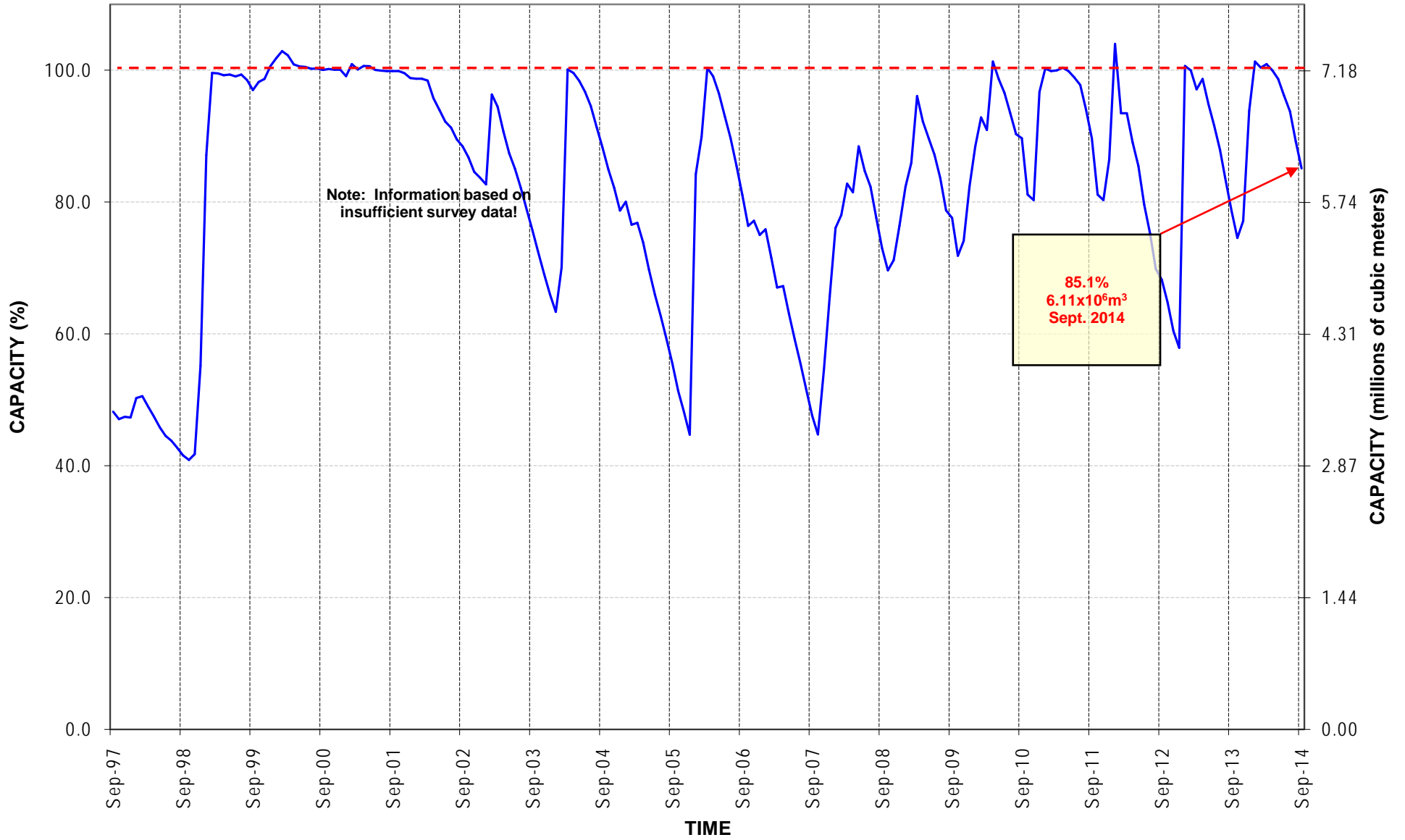
NSAMI DAM AT NSAMA RIVER

FULL CAPACITY $21.87 \times 10^6 \text{m}^3$



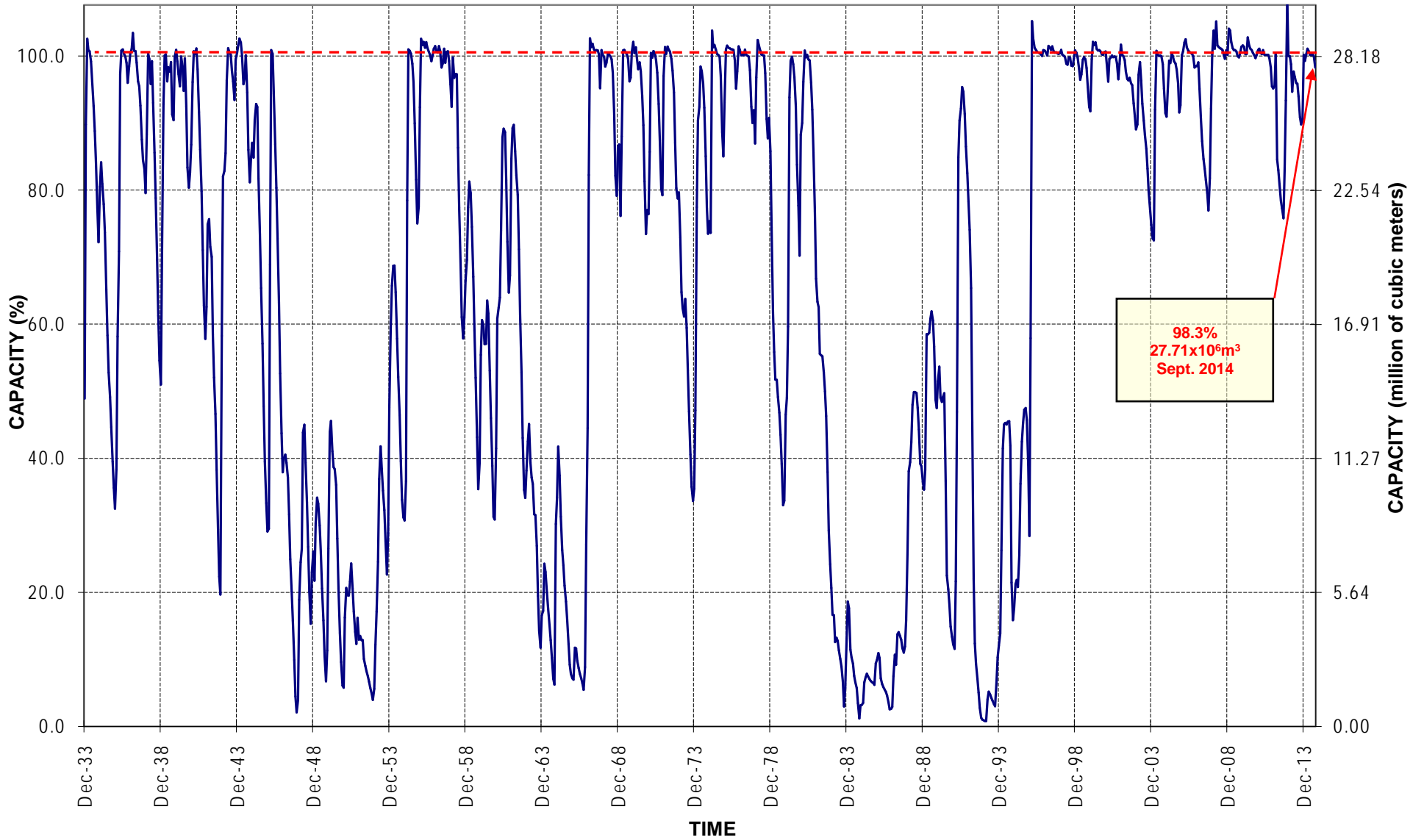
MOLOTOTSI RIVER AT MODJADJI DAM

FULL CAPACITY $7.18 \times 10^6 \text{m}^3$



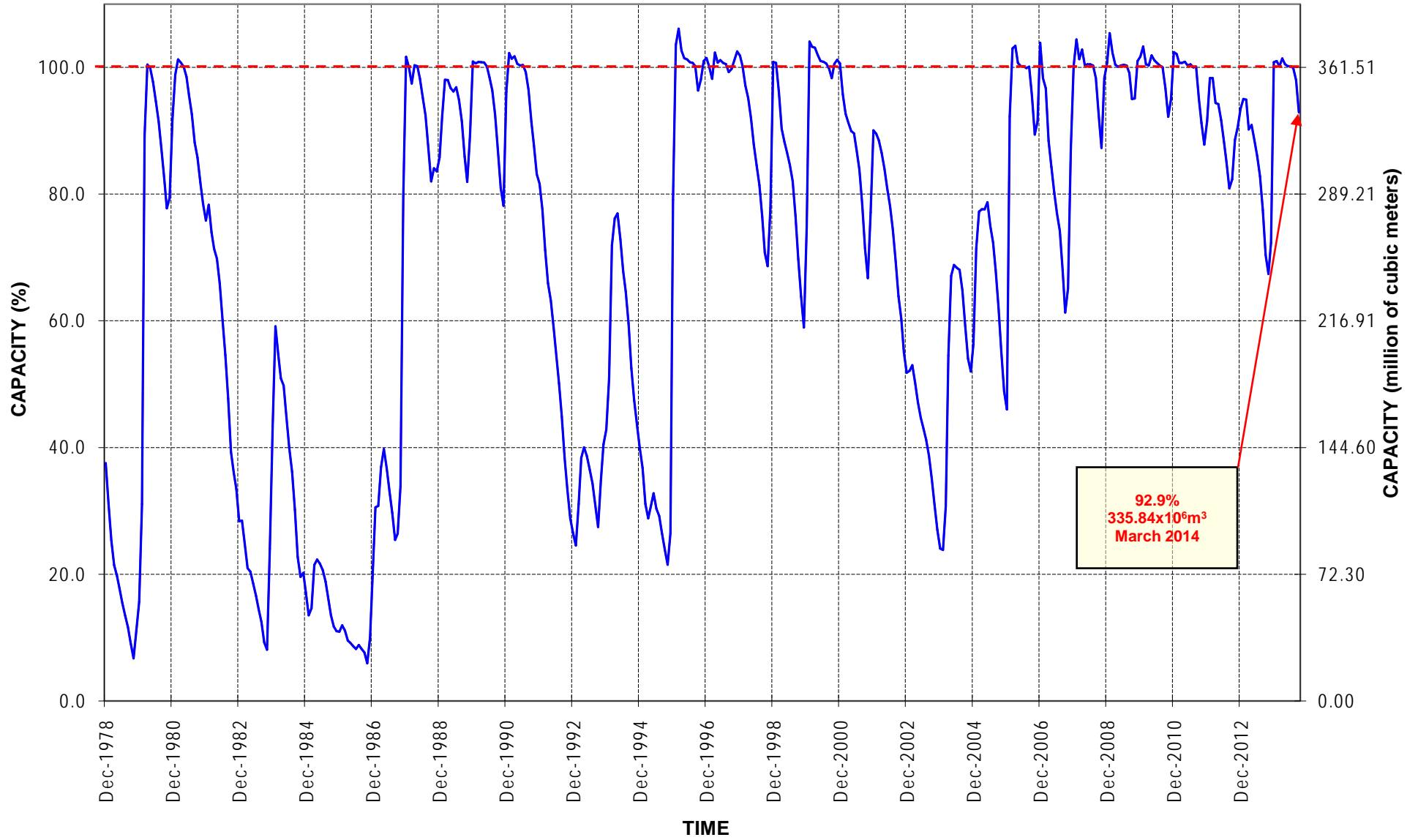
ELANDS RIVER AT RUST DE WINTER DAM

FULL CAPACITY $28.186 \times 10^6 \text{m}^3$



OLIFANTS RIVER AT LOSKOP DAM

FULL CAPACITY $361.51 \times 10^6 \text{m}^3$

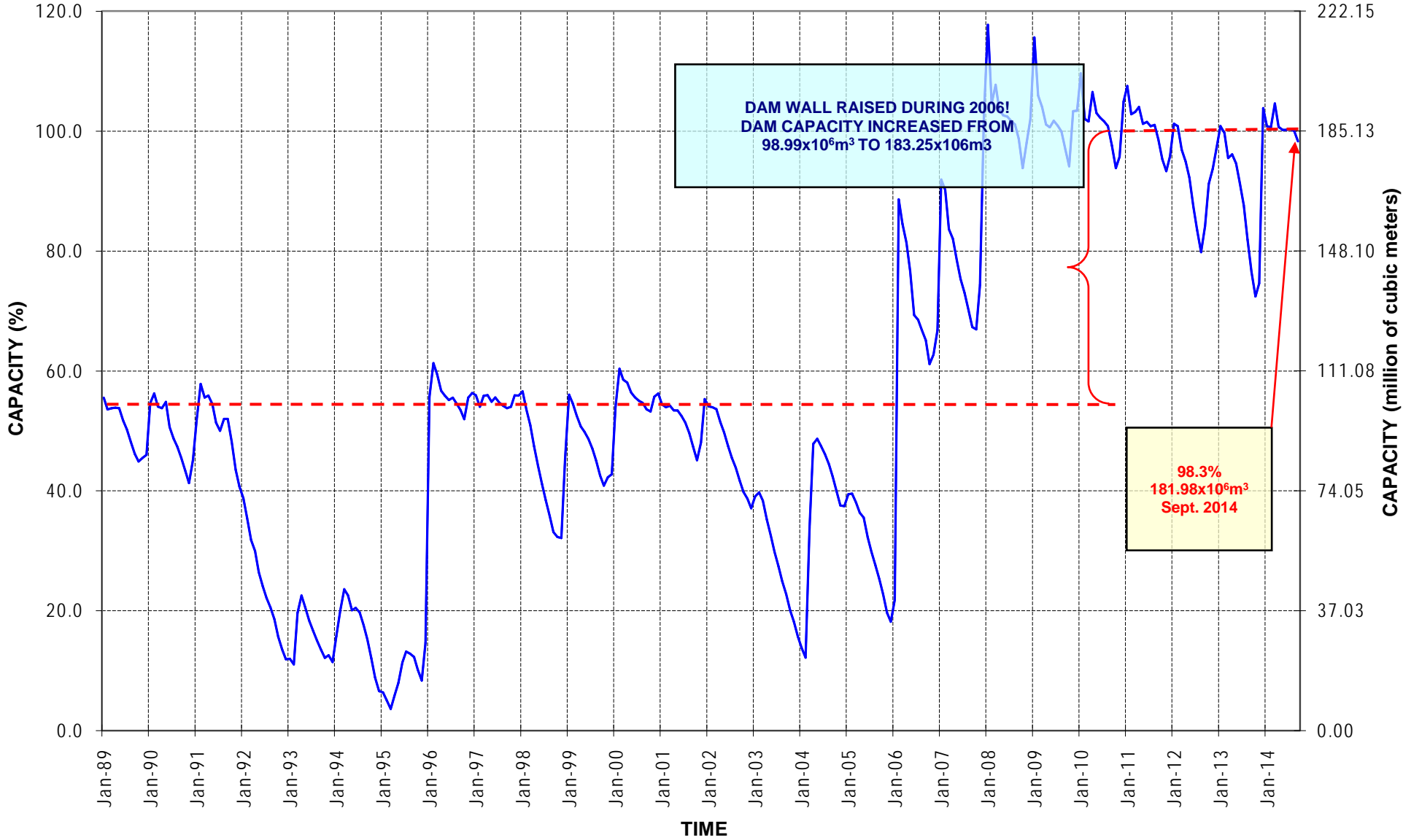


OLIFANTS RIVER AT FLAG BOSHELLO DAM

FULL CAPACITY $185.13 \times 10^6 \text{m}^3$

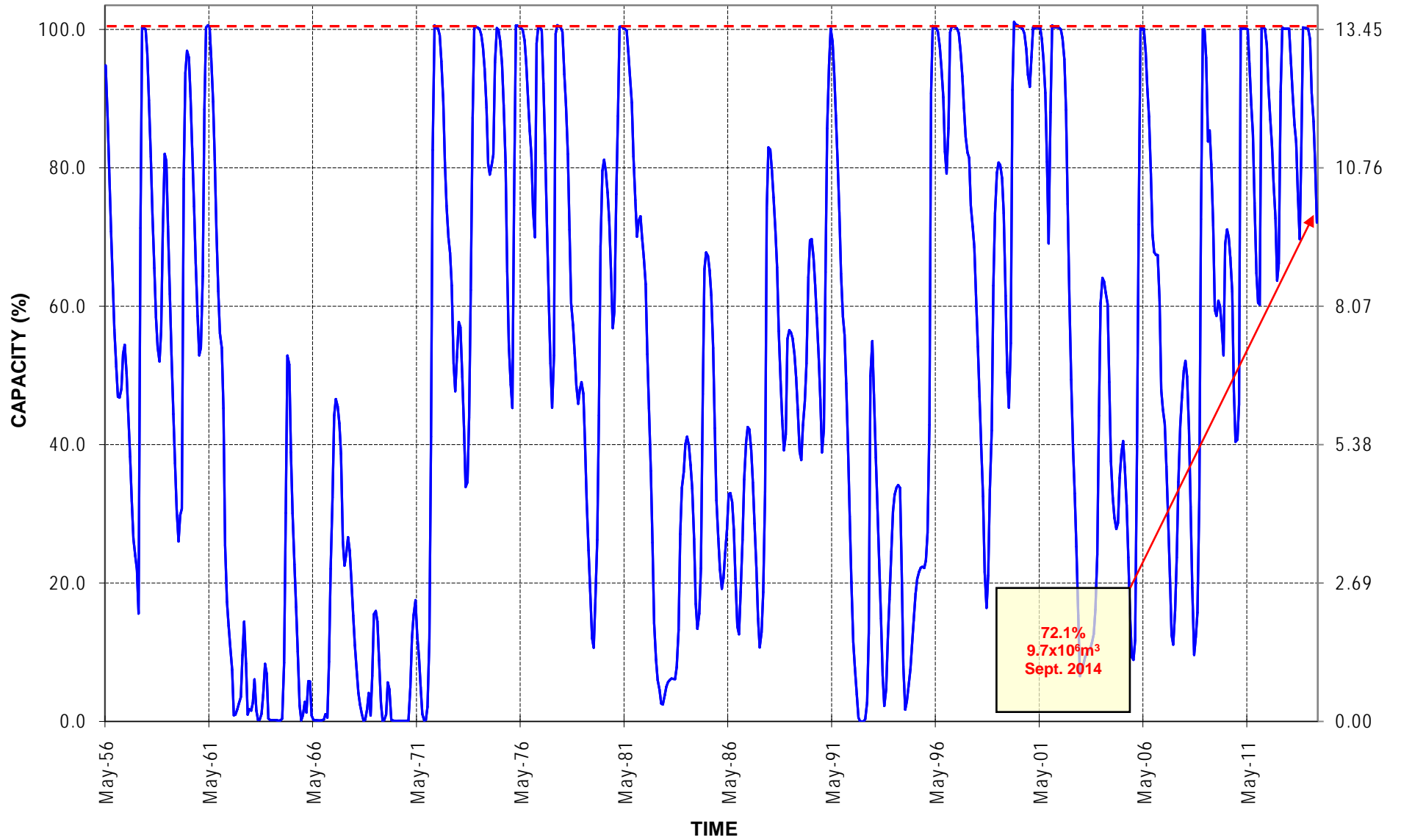
DAM WALL RAISED DURING 2006!
DAM CAPACITY INCREASED FROM
 $98.99 \times 10^6 \text{m}^3$ TO $183.25 \times 10^6 \text{m}^3$

98.3%
 $181.98 \times 10^6 \text{m}^3$
Sept. 2014



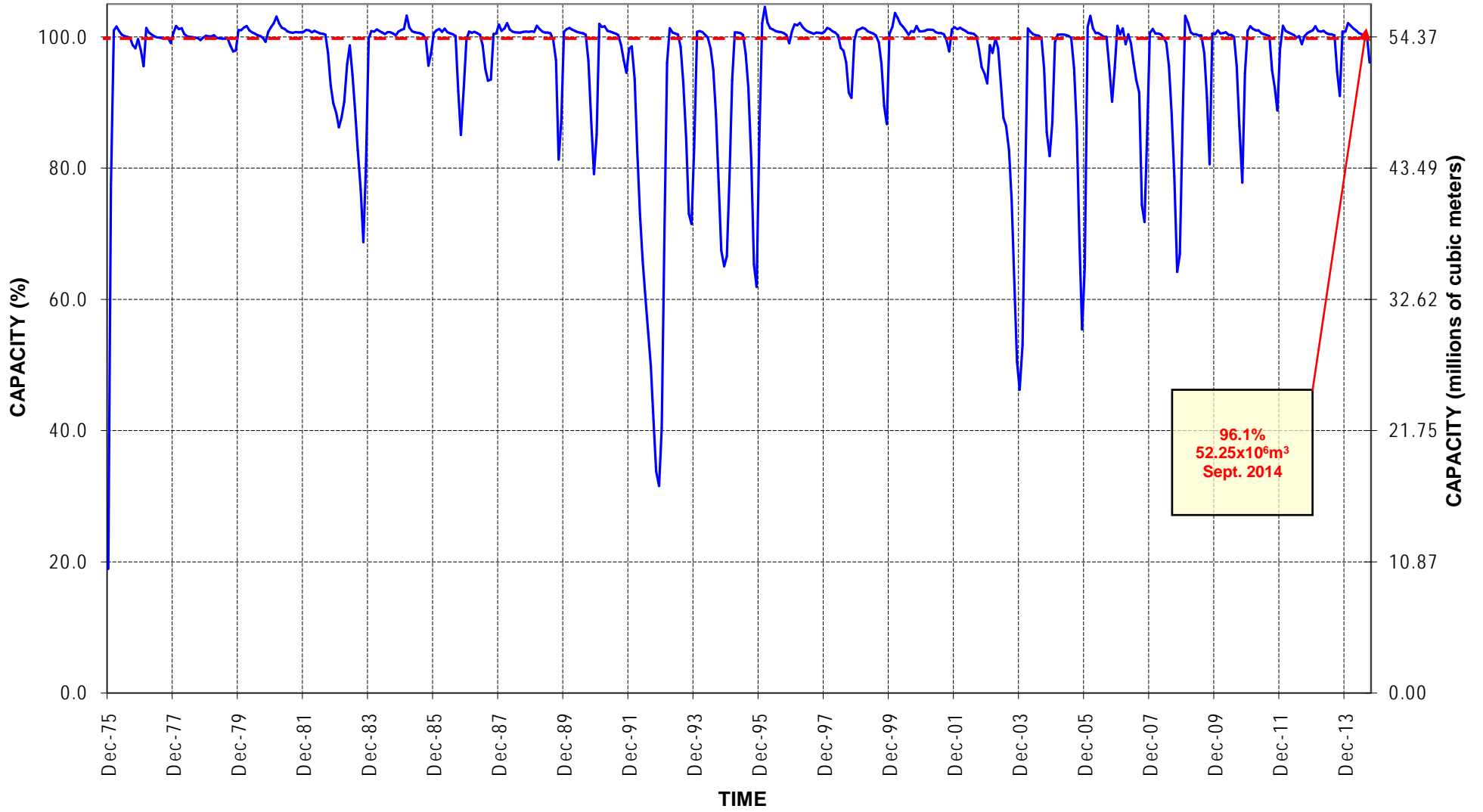
OHRIGSTAD RIVER AT OHRIGSTAD DAM

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



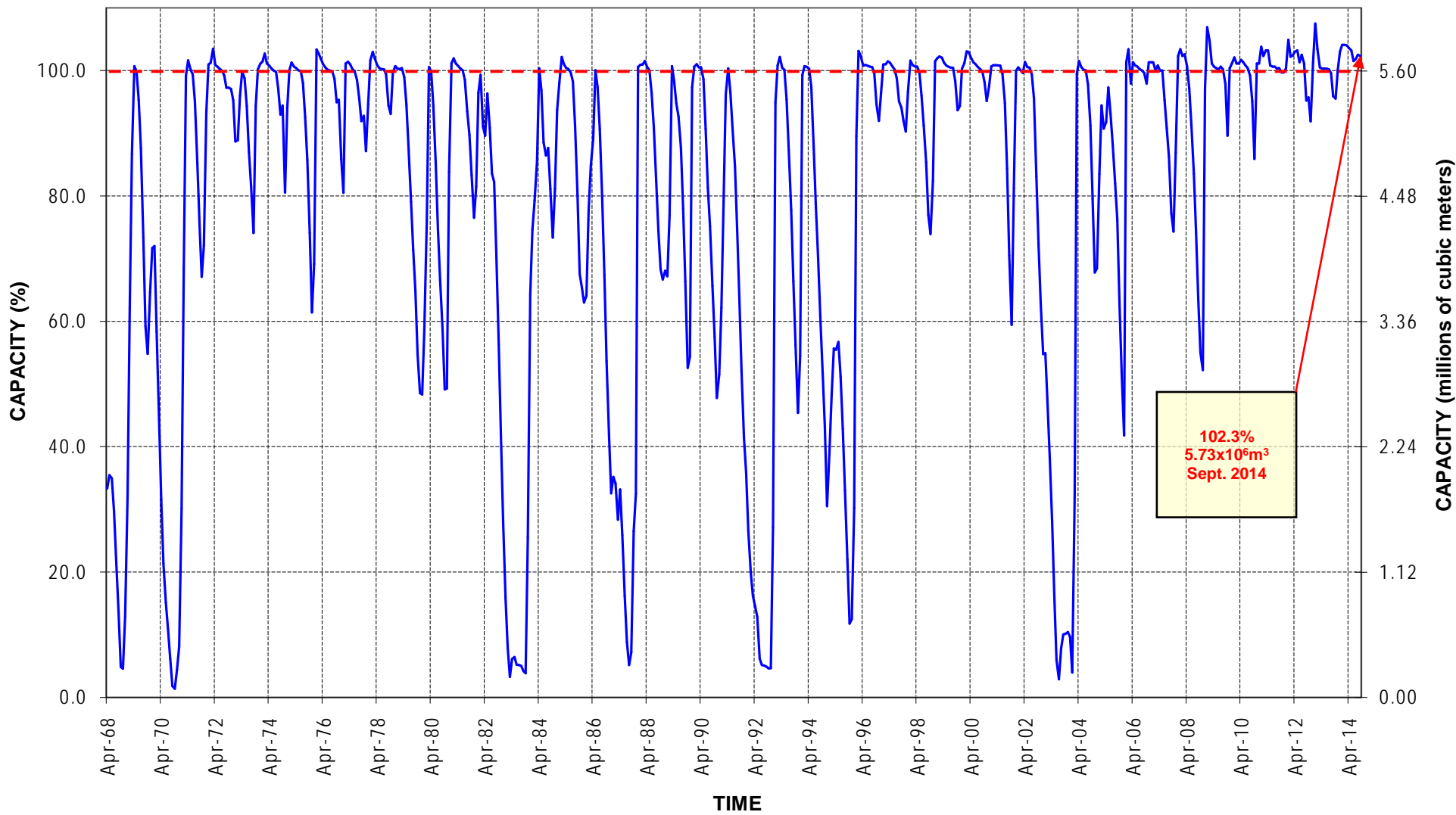
BLYDE RIVER AT BLYDE RIVIERSPOORT DAM

FULL CAPACITY $54.369 \times 10^6 \text{m}^3$



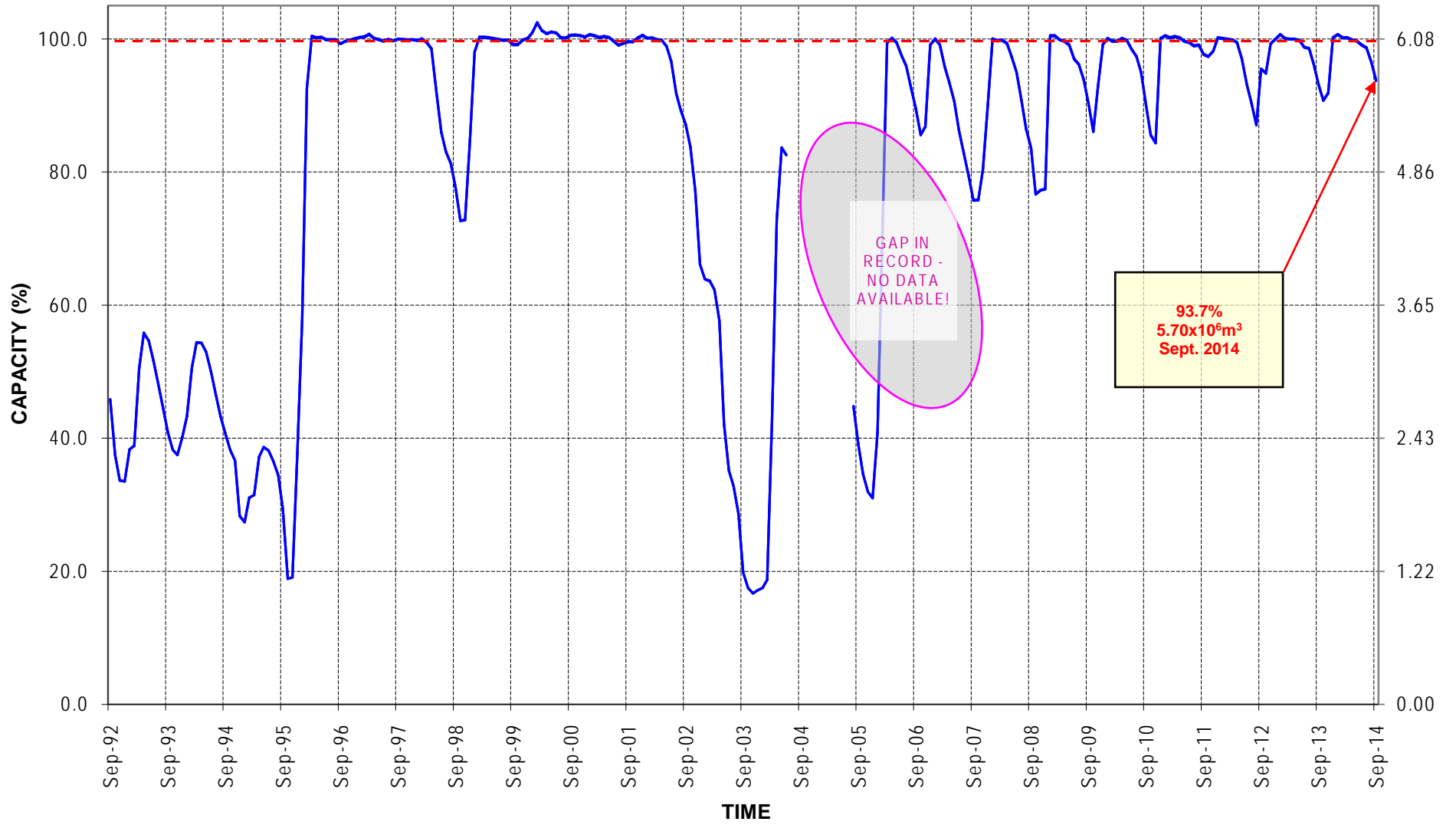
KLASERIE RIVER AT KLASERIE DAM

FULL CAPACITY $5.604 \times 10^6 \text{m}^3$



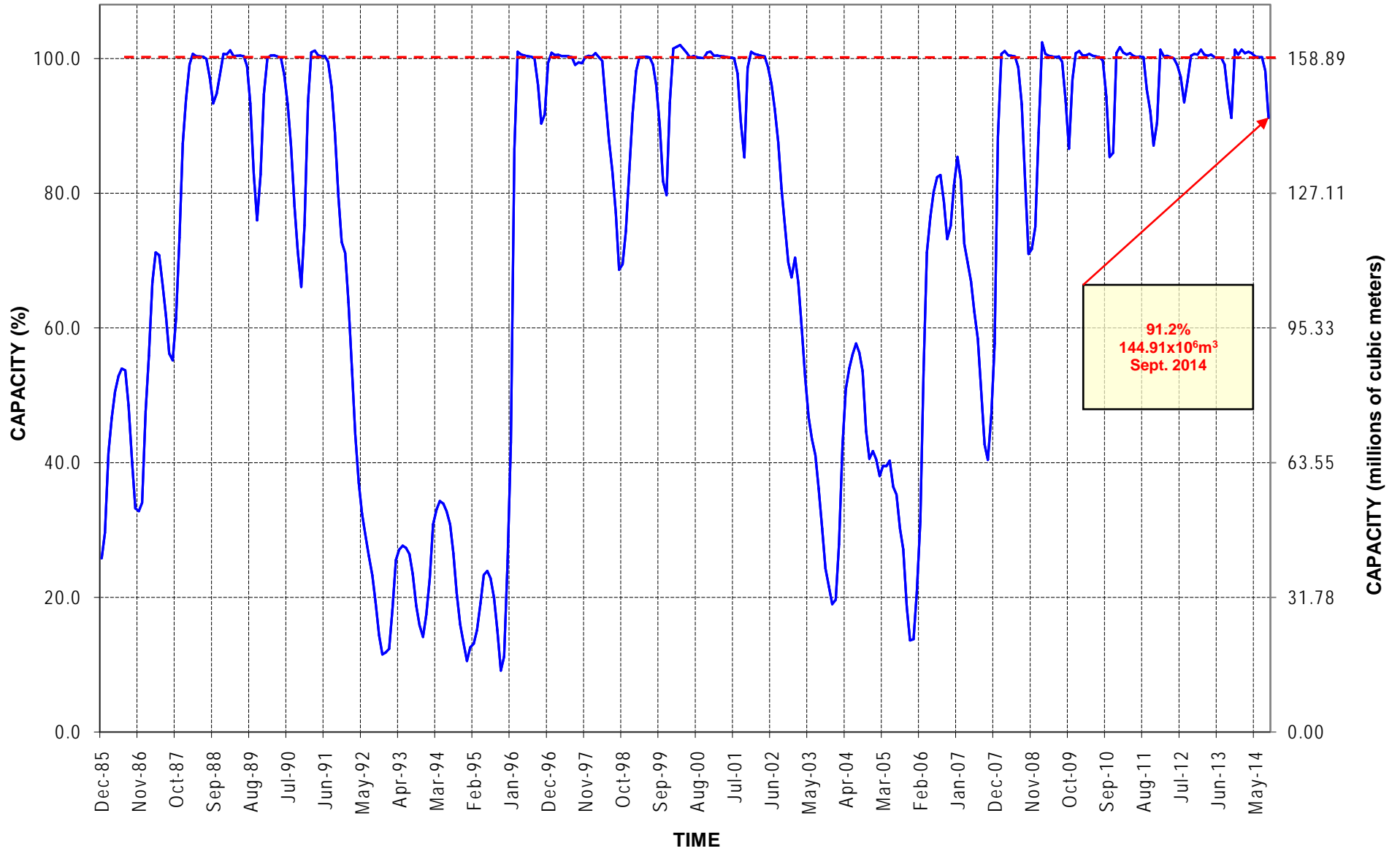
NGWABITSI RIVER AT TOURS DAM

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



CROCODILE RIVER AT KWENA DAM

FULL CAPACITY 158.89 *10⁶m³



MERITI RIVER AT INYAKA DAM

FULL CAPACITY 123.66 *10^6m^3

