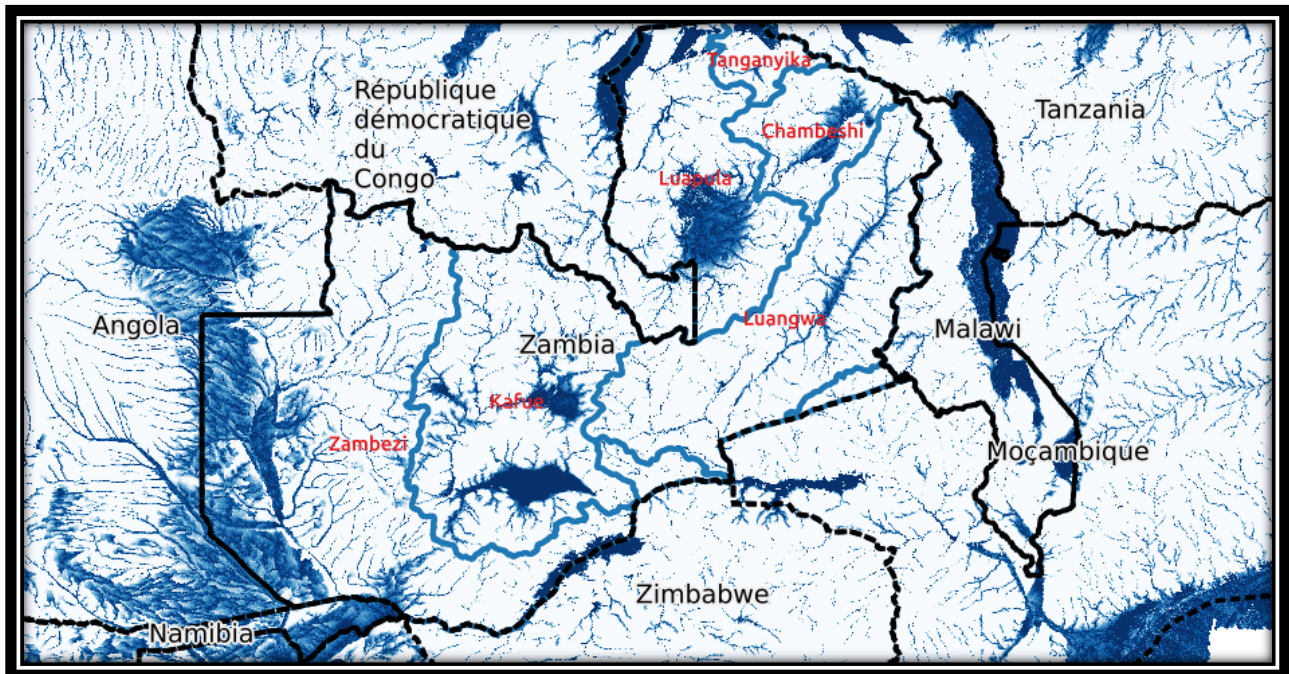




THE WATER RESOURCES MANAGEMENT AUTHORITY

WARMA



UPDATE ON THE WATER LEVEL SITUATION IN KEY RIVERS

IN ZAMBIA

16th March, 2018



INTRODUCTION

The Water Resources Management Authority (WARMA) is mandated to manage all water resources in the country. Key to this management is the quantification of the nation's water resources. During the rainy season, the authority monitors water levels and discharges of its stations in order to inform the relevant institutions in the event of floods. Since 2015 WARMA has automated some key stations in order to improve its early warning system. The Authority continues in its efforts to develop its flood forecasting capacities in order to increase the lead-time within which an early warning would need to be raised in the event of floods.

OBJECTIVE

This report highlights the water levels and discharges at selected surface water gauging stations in the week of the from the last update on the 2nd February, 2018 to date. The main aim of this report is to indicate if there has been any rainfall recorded at the selected stations from the beginning of December, 2017 and to review the rainfall trend in light of the dry spell that has been experienced in some parts of the country.

The other objective is to give an update on the corresponding reaction in the discharges or water levels at these selected stations to ascertain if there has been a rise or recession in response to the rainfall.

Presented are the hydrographs for the selected stations, showing the Maximum (Blue and long term mean hydrograph flows or water levels which are used for comparison with the flows or water levels for this current year.

REVIEW OF THE RAINFALL AND WATER LEVELS FOR SELECTED STATIONS

- The rainfall period considered was from the December, 2017 to 16th March, 2018.
- Water levels considered were from 1st October, 2017 to 16th March, 2018.

WARMA has equally been monitoring some of its reporting stations on the Global Flood Awareness System (GloFas) which indicates rainfall forecasts of 30 days and corresponding discharge reaction to the rain at these reporting stations. The report highlights some of these selected stations as well.



Chongwe River at GERB (5-025)

Chongwe - Lusaka Province

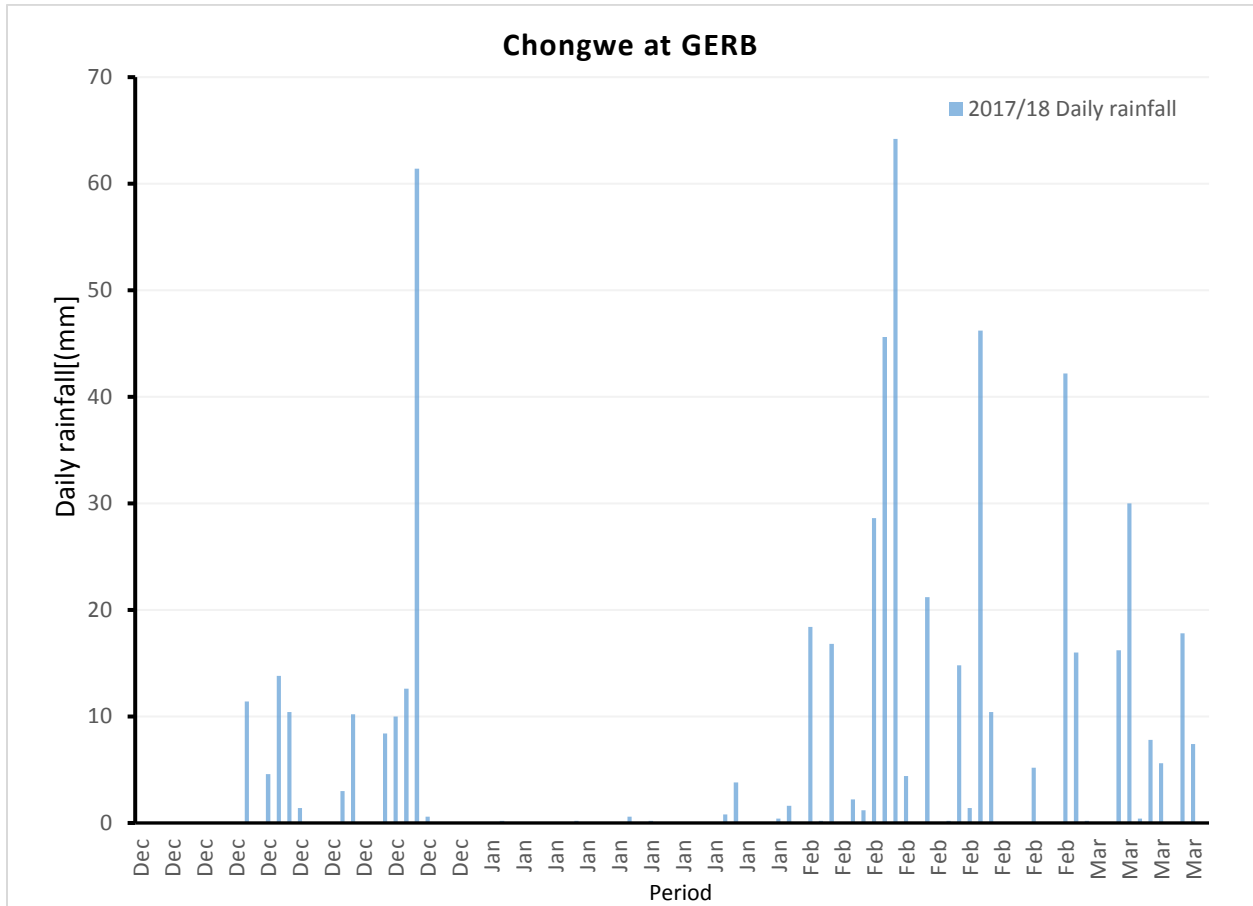


Figure 1: Daily rainfall for the station on the Chongwe River at the Great East Road Bridge

The rainfall season at this station commenced around the 11th November, 2017 and it was raining intermittently since then up to 28th December, 2017. The month of January, 2018 has been dry with very little rainfall maximum being 5mm on the 26th January, 2018 and the first half of the month of February we have been experiencing rainfall at this station (Fig. 1).

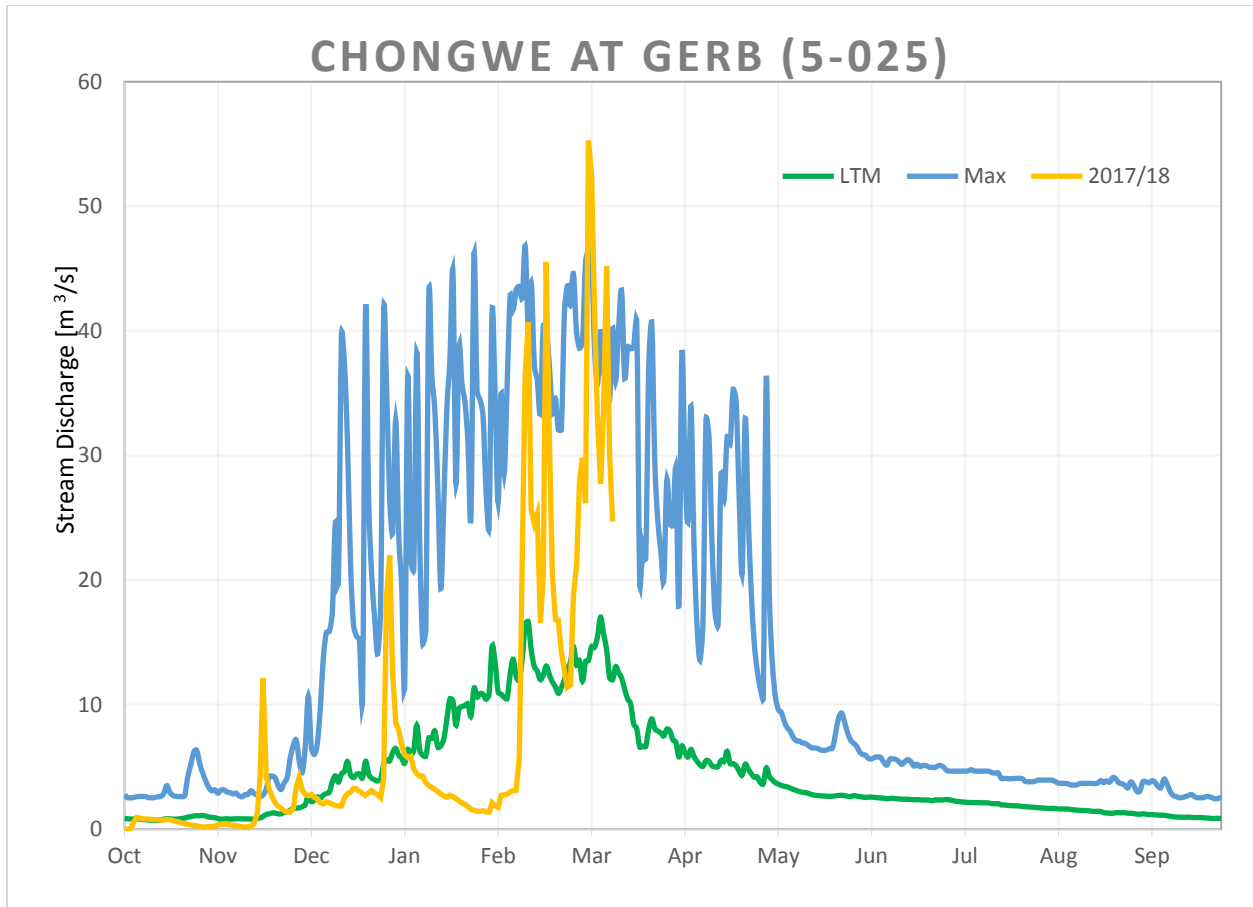


Figure 2: Water level readings for the Station on the Chongwe River at the Great East Road Bridge

Figure 2 above shows that the water level at this station had begun rising since November, 2017 and has continued to do so. There is a marked spikes in the water level as a result of the rainfall recorded at the end of December, 2017 and also at the beginning of the month of February 2018. The spikes could also be due to the increased storm water received from the CBD in Lusaka and WARMA will check against this and monitor the situation. The current situation shows that the water level is above the long term mean. Note also is the very low level of this year as compared to the long term mean hydrograph during the month of January.

Zambezi River at Feira Boma (5-099)

Luangwa - Eastern Province

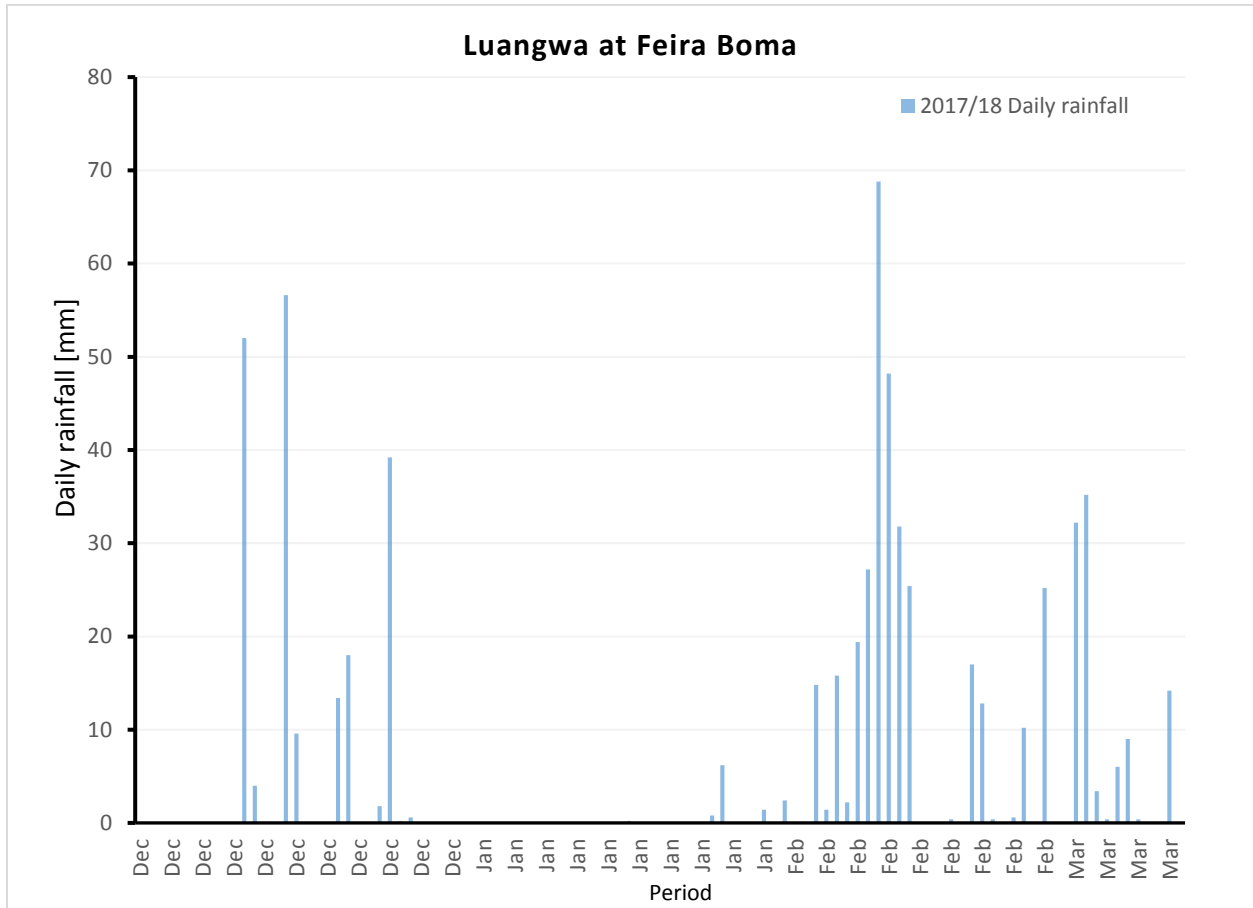


Figure 3: Daily rainfall for the station on the Zambezi River at Feira from 01/12/2017 to 16/03/2018

Records for this station indicate that the rains only began towards the end of November, 2017. There has not been any rains since the end of December, 2017 but the beginning of February 2018, shows that it has been raining up to date. The month of January was very dry with rainfall only recorded in the last week of the month (Fig. 3).



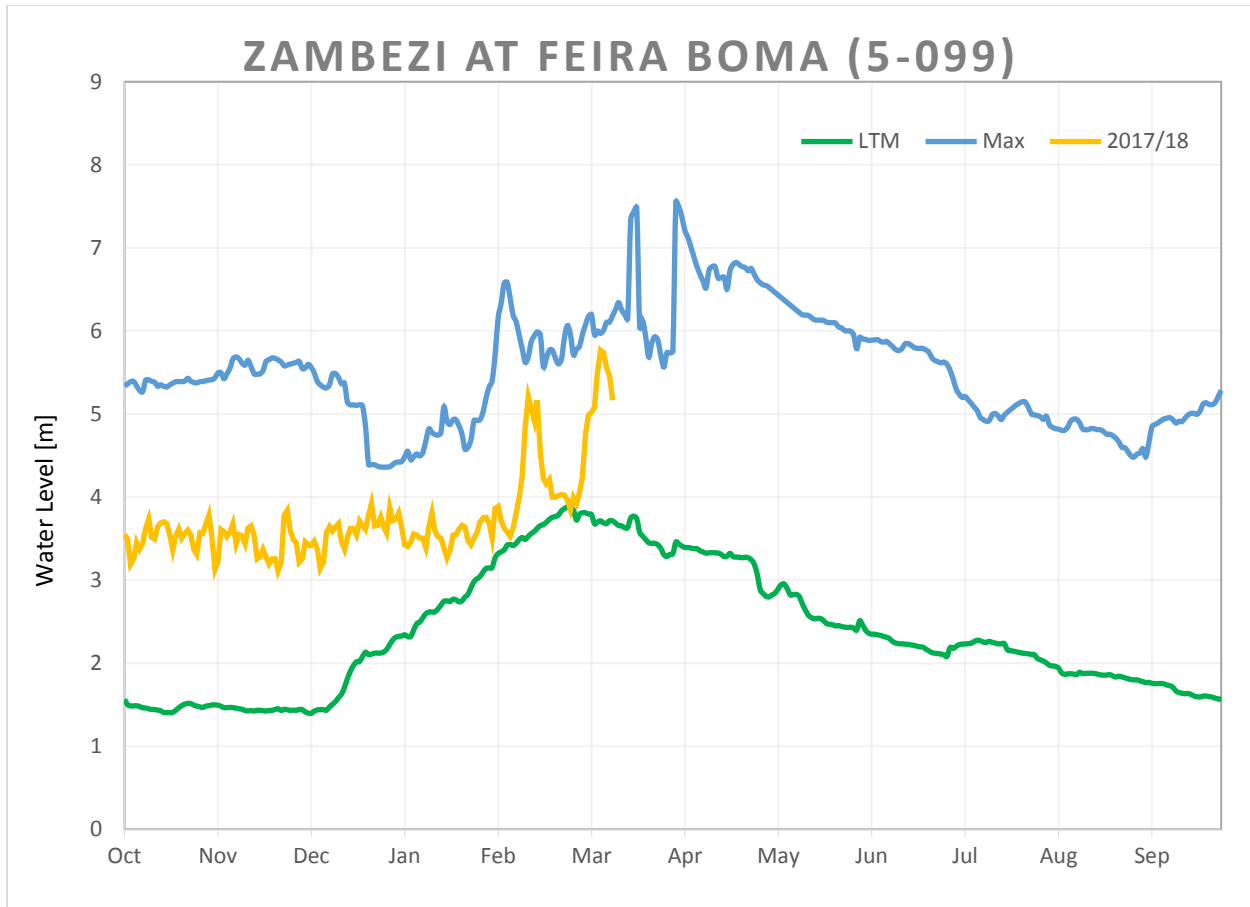


Figure 4: Water level readings for the Station on the Zambezi River in Feira

Water levels have increased very significantly as the station continues to receive more rainfall (Fig. 4)

Kafue at Hook Bridge (4-669)

Mumbwa - Central Province

During the period under review, the station recorded rains almost every day up to the beginning of the year 2018 after which the station has been receiving intermittent rainfall. There was no rainfall from the 20th January until the 29th January, when the station recorded high rainfall of 32mm (Fig. 5). The graph also indicates that there has been lot of rainfall at the beginning of February up to date and the highest recorded being 92.4mm.



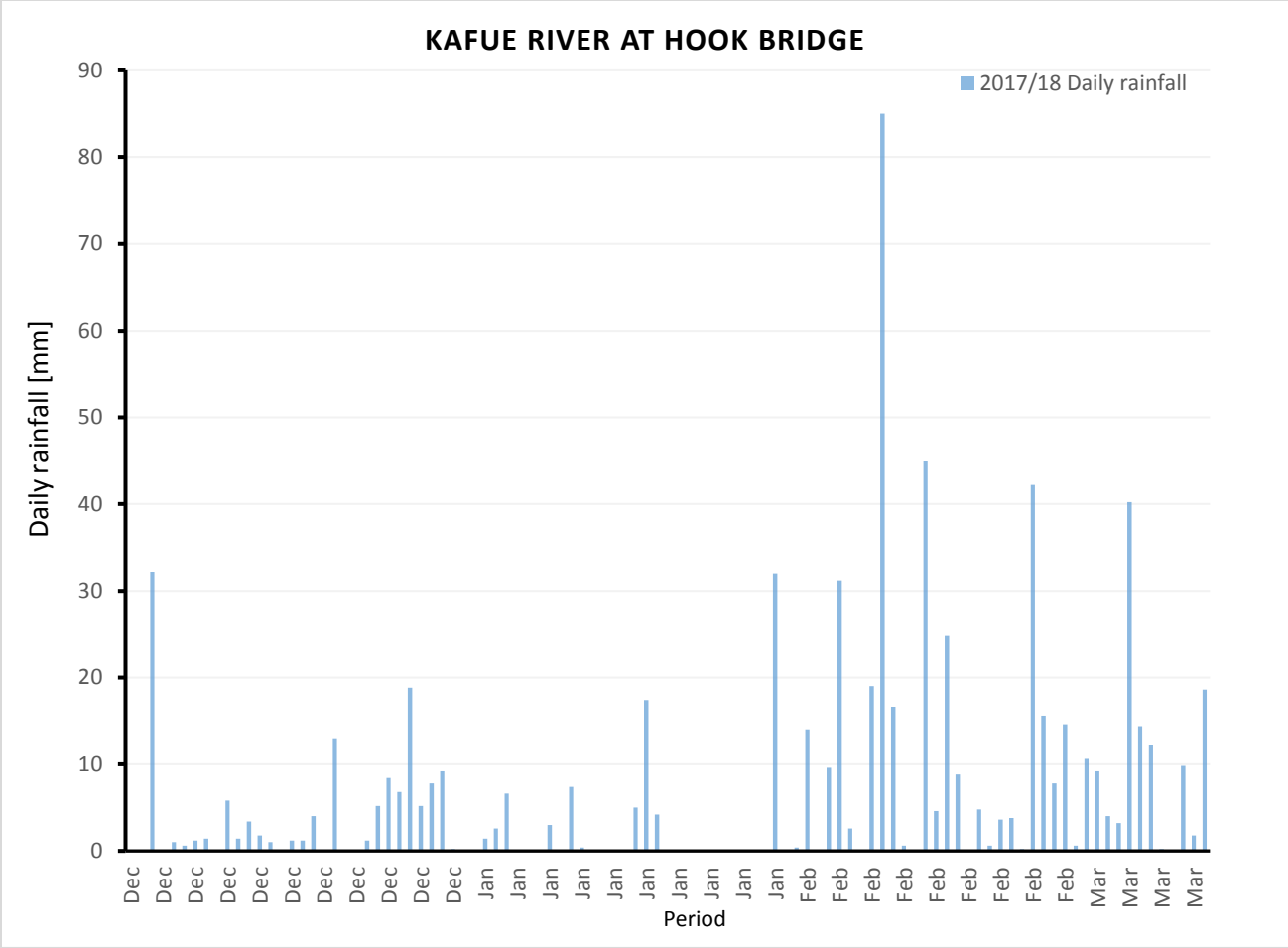


Figure 5: Daily rainfall for Kafue River at Hook Bridge from 01/12/2017 to 16/03/2018

Figure 6 shows the water discharges at the station begun rising from December, 2017 and by the first week of January, were even above the long term average discharge (LTM-green line). However due to the poor rainfall at the station the discharge has levelled off and gone below the LTM. At the beginning of February 2018, there was a sharp increase in terms of water Discharge which went above LTM and as of 16th February 2018 it has reduced to the level below LTM.



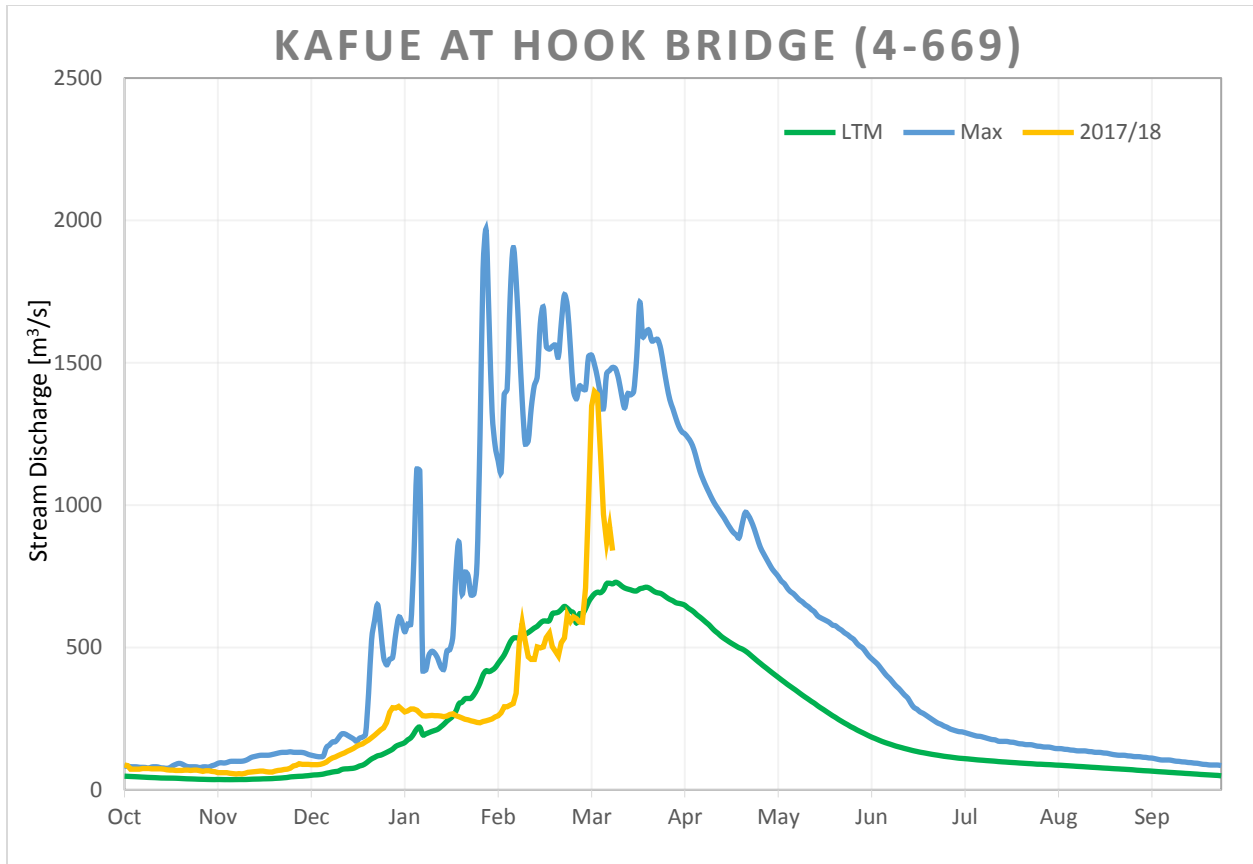


Figure 6 Water level readings for the Station on the Kafue River at Hook Bridge from 01/10/2017 – 05/03/2018

In terms of the hydrological forecast for this particular station the river flow shows a rise during the month of February which is likely to peak around the 20th February after which it will steadily recede up to the end of the forecast period of 16th March, 2018.

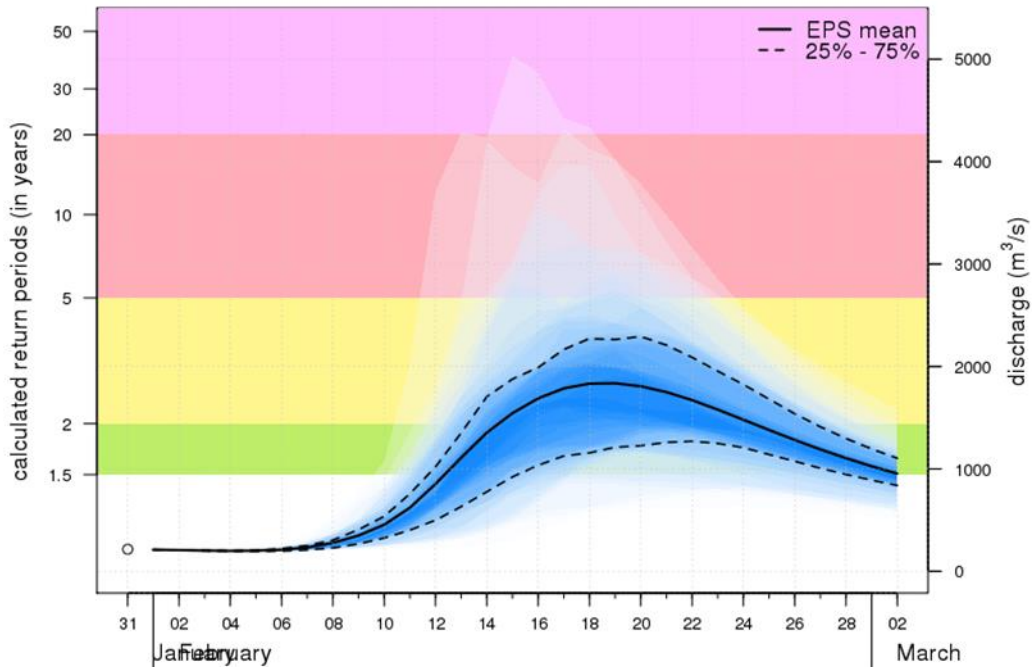


Figure 7: Hydrological Forecast for the station at Hook Bridge from 31st Jan to 2nd March, 2018

Kafue River at Machiya (4-280)

Mpongwe - Copperbelt Province

Fig. 9 shows that the station recorded its highest daily rainfall on the 31st December, 2017 which was 90mm. since then, there has been very little rainfall in the area. There has been poor rainfall recorded for the month of January and on in the last week of the month has there been recorded rainfall above 10mm. The graph also shows that at the beginning of February it has been raining continuously to date.

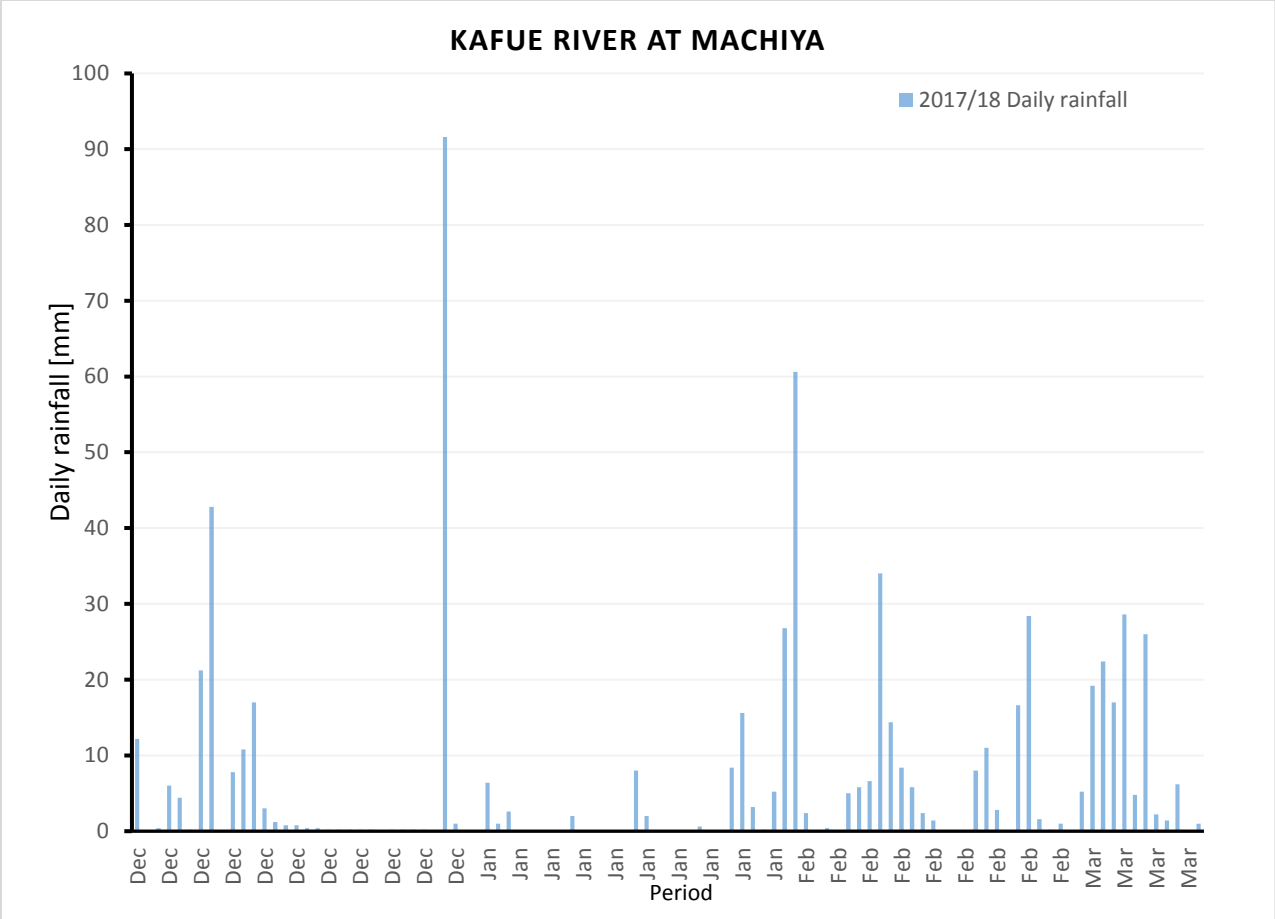


Figure 8: Daily rainfall for the station on the Kafue River in Machiya from 01/12/2017 – 16/03/2018

Similar to the station at the Hook Bridge on the same river, discharges at the station begun rising from December, 2017 and by the first week of January, were even above the long term average discharge (LTM- green line). However due to the poor rainfall at the station the discharge has actually begun to recede going below the LTM during the month of January. Figure 9. The beginning of the month of February 2018 shows that there is an increase in terms of water discharge at this station.



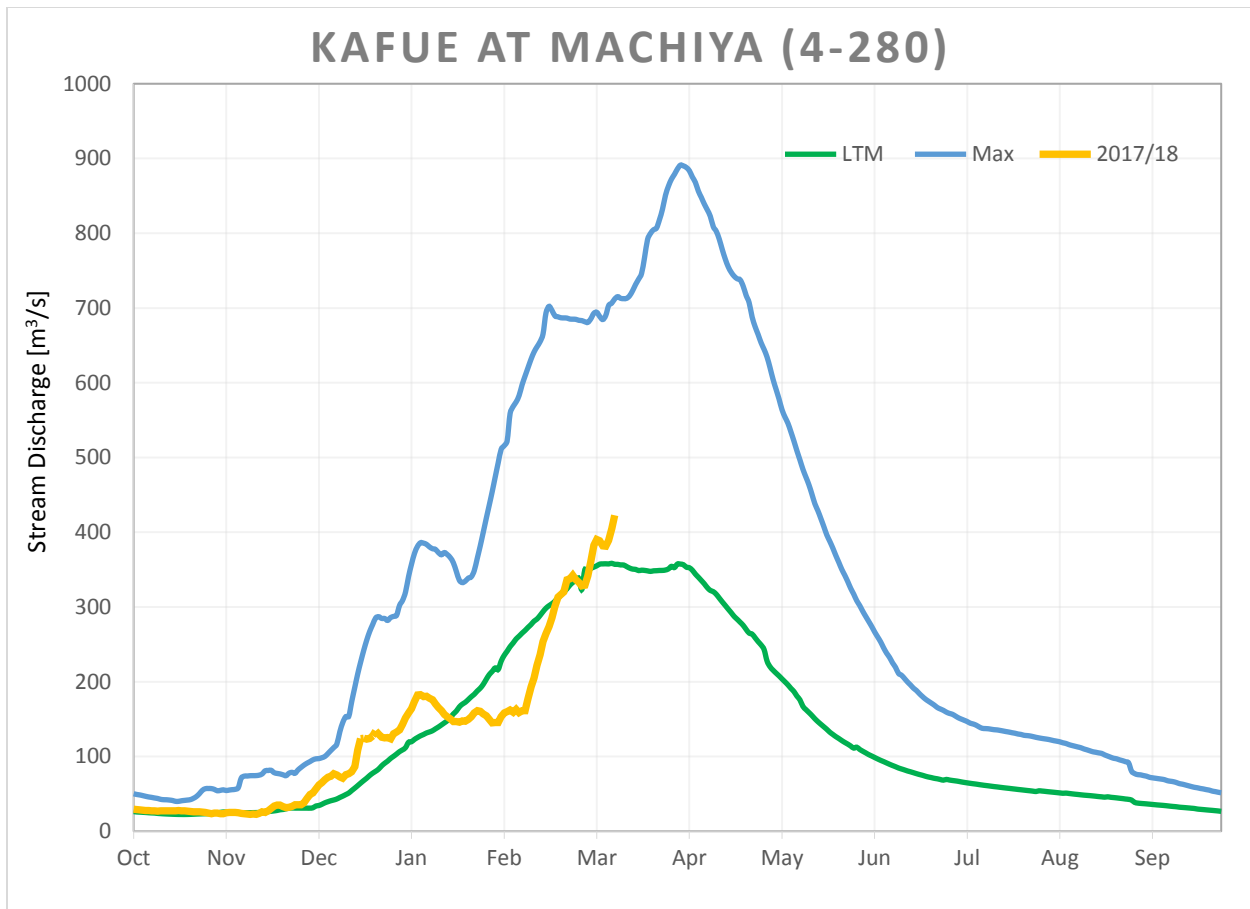


Figure 9: Water level readings for the Station on the Kafue River in Machiya

In figure 10 the hydrological forecast for the station indicates an equally similar trend at that for the station at Hook Bridge which is downstream. The discharge will begin to rise during the period under review and will peak around the 16th February, after which it will then begin to recede up to the end of the period of the forecast.

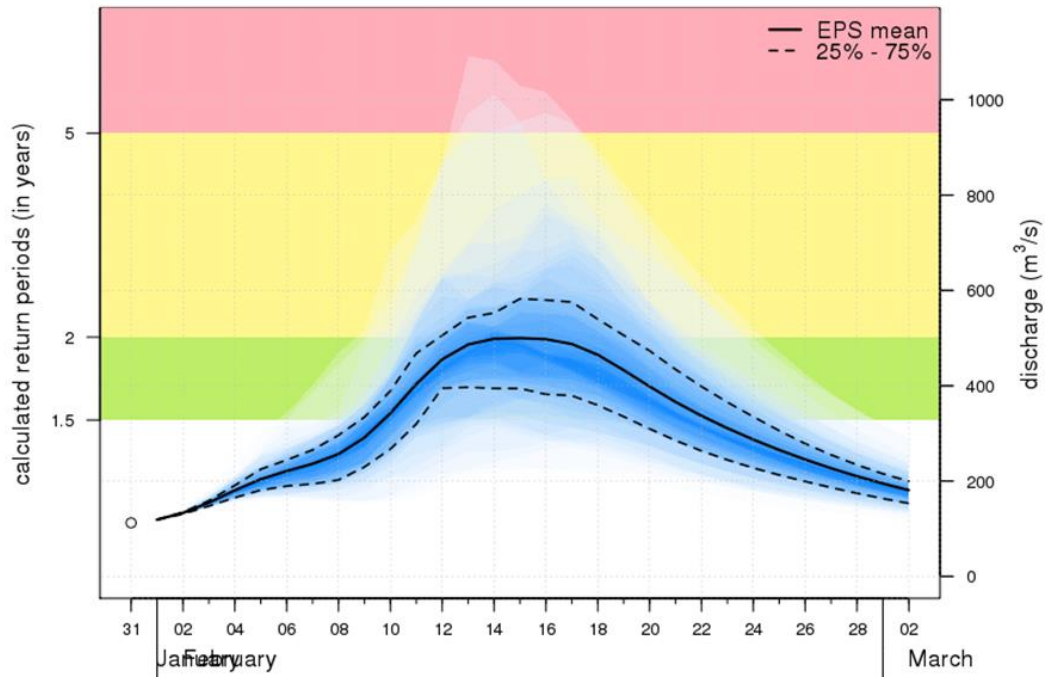


Figure 10: Hydrological Forecast for the station on the Kafue River in Machiya from 31st Jan to 2nd March, 2018

Kabompo River at Kabompo Pump House (1-650)

Kabompo - North Western Province

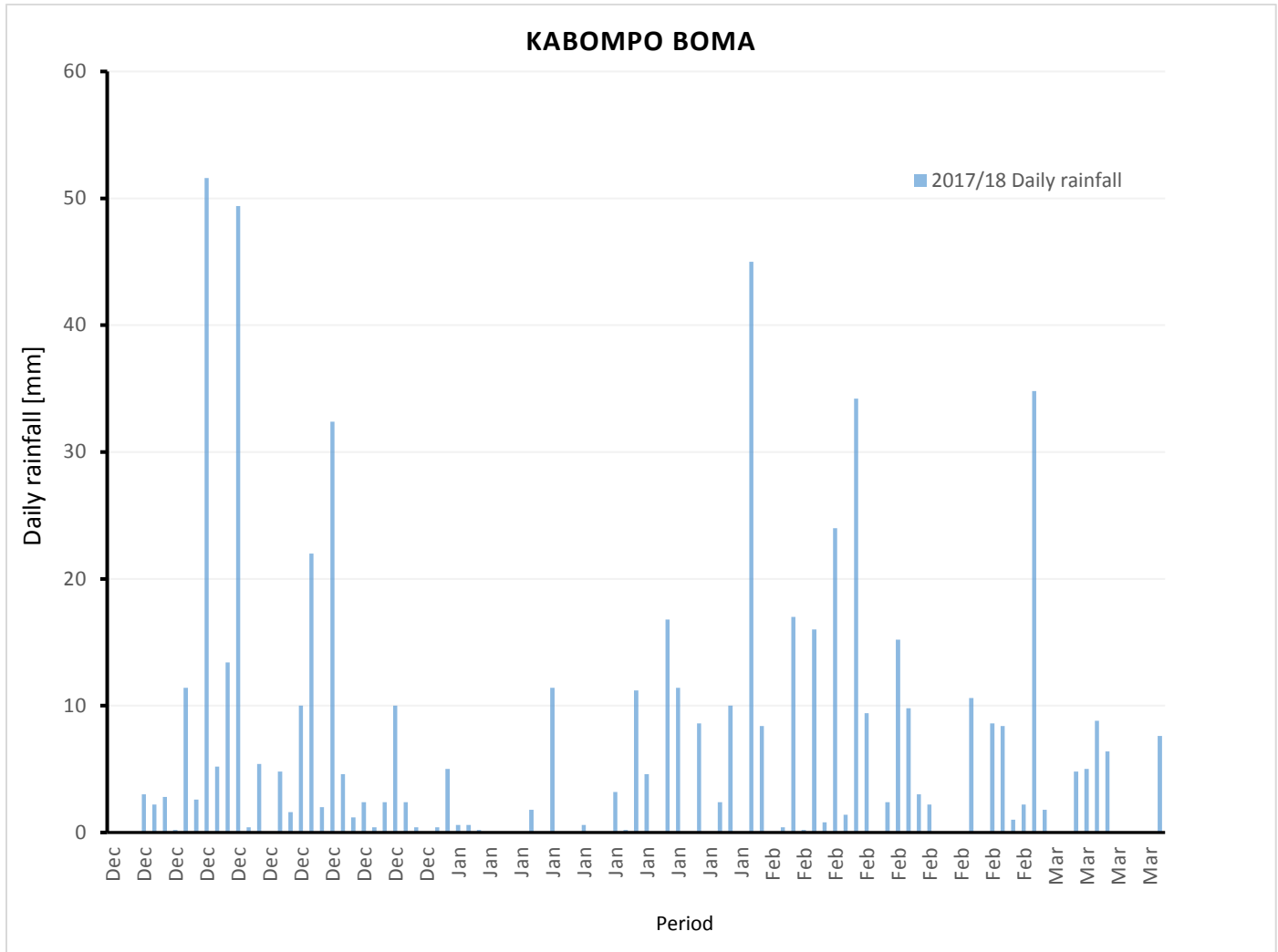


Figure 11: Daily rainfall for the station on the Kabompo river at the Kabompo Pump house

The station has recorded rainfall almost every day from the beginning of December, 2017. During the month of January, the records indicate that it has been raining consistently although not heavily. On the 29th February however 35 mm of rainfall was recorded and as of March 2018 there was an increase in the rainfall intensity.



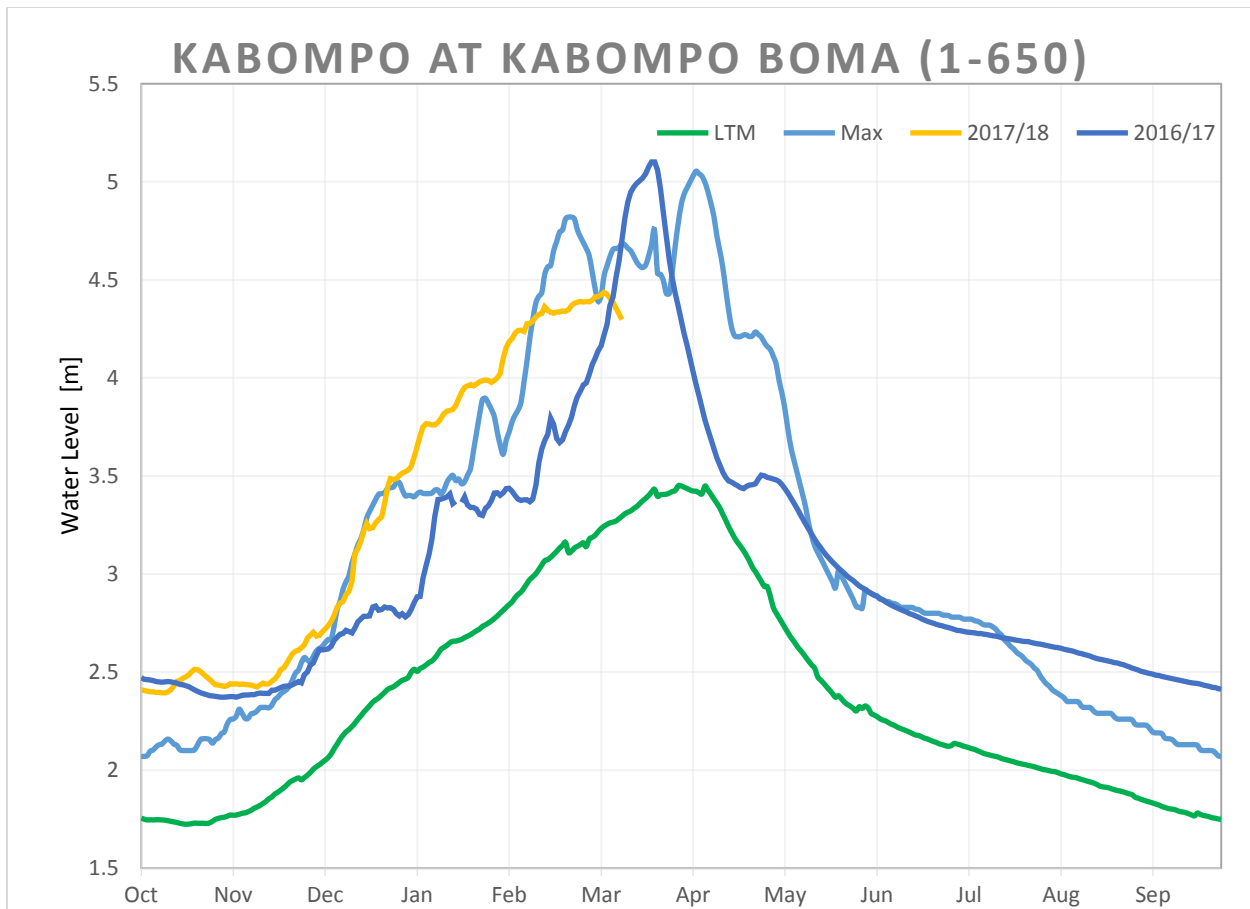


Figure 12: Water level readings for the Station on the Kabompo River at Kabompo Pump station from 01/10/2017 – 16/03/2017

The water levels at the station have been rising steadily. Of note is also the fact that the water levels which surpassed the maximum hydrograph has gone below a bit (Fig 14).

CONCLUSION

From the period under review, it can be concluded that

- During the month of March, rainfall was generally high in most the places
- At the beginning of February there are increases interms of rainfall intensity in all the stations under review.
- The water level in all the monitored rivers showed a corresponding increase in reaction to this high rainfall intensity being recorded.
- The water levels at Kabompo station have gone above the long-term maximum water level for the station.
- Generally, the hydrologic forecasts for the selected stations indicate a rise in discharges from the beginning of the month of February which is likely to peak around the 16th to the 16th February and afterward begin to recede.

Of note is that this year 2017/2018 falls within the 10 year return flood period where it is expected that some areas in Zambia will flood. The figure below gives an overview of the areas in Zambia which are most prone to flooding.

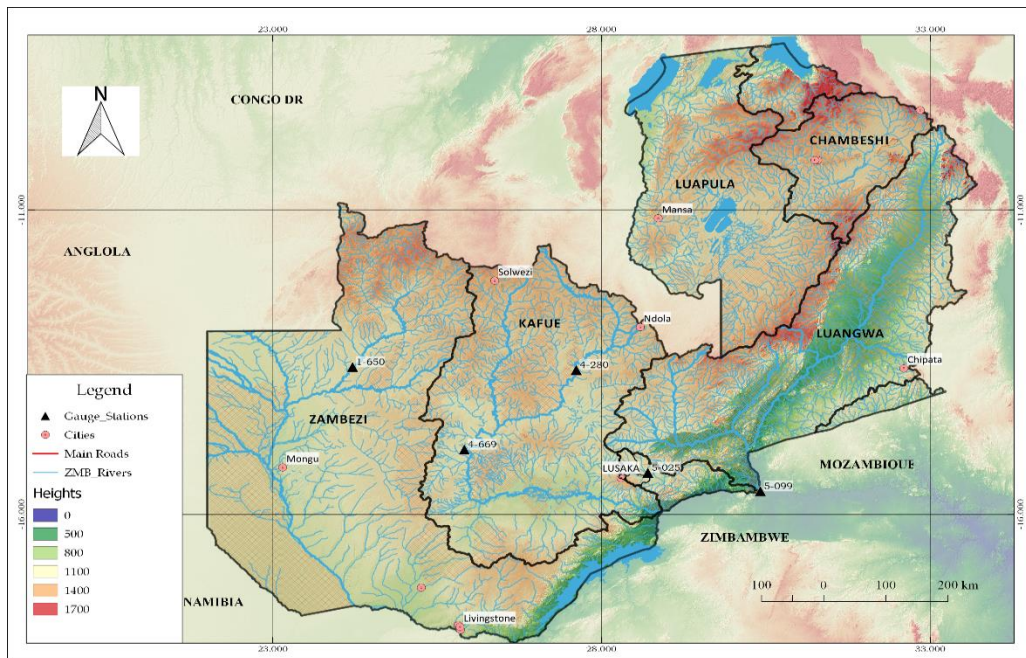


Figure 55 Map Showing the Stations Under Review

Updates of water levels and discharges will continue being given from our telemetric stations.

