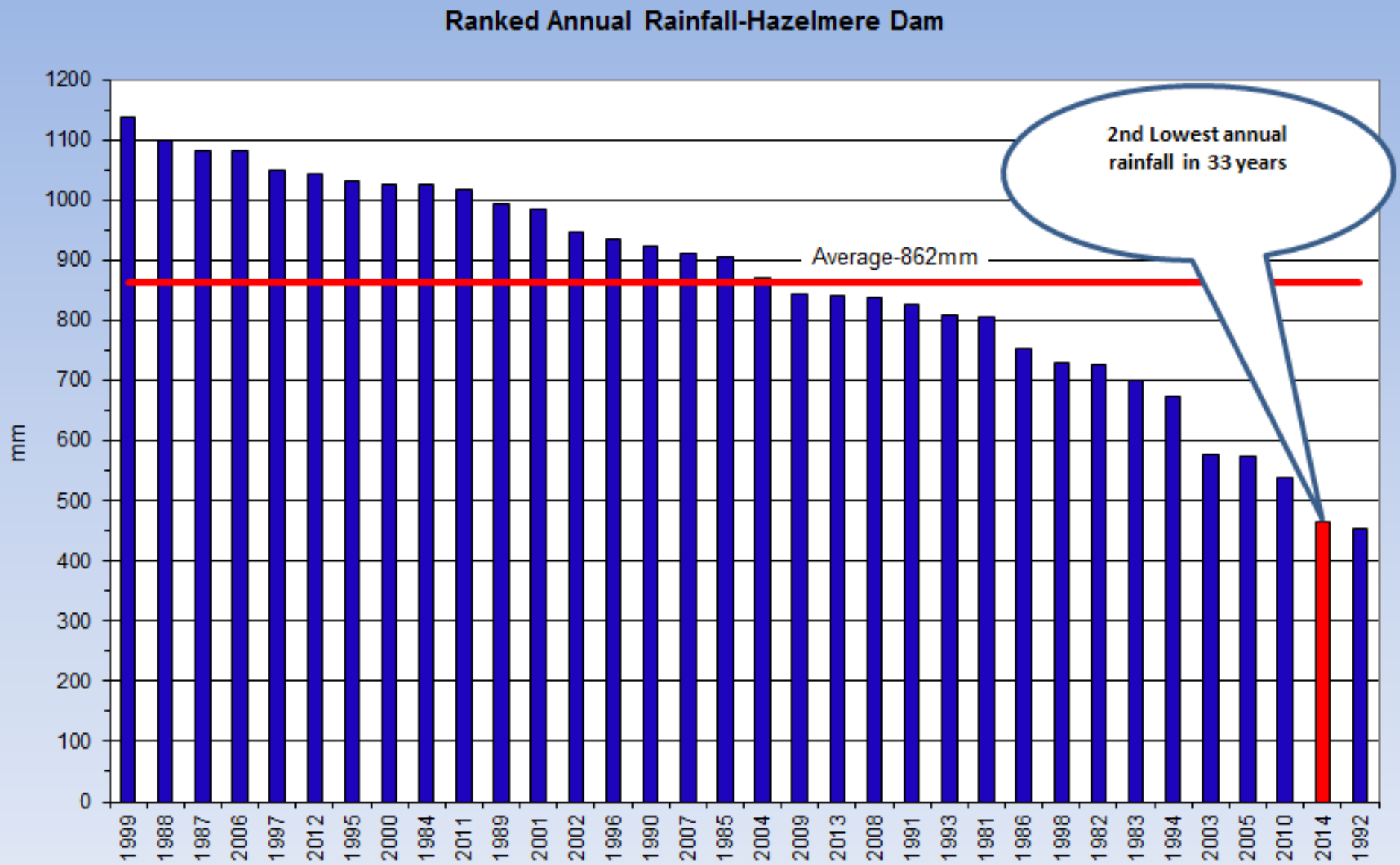
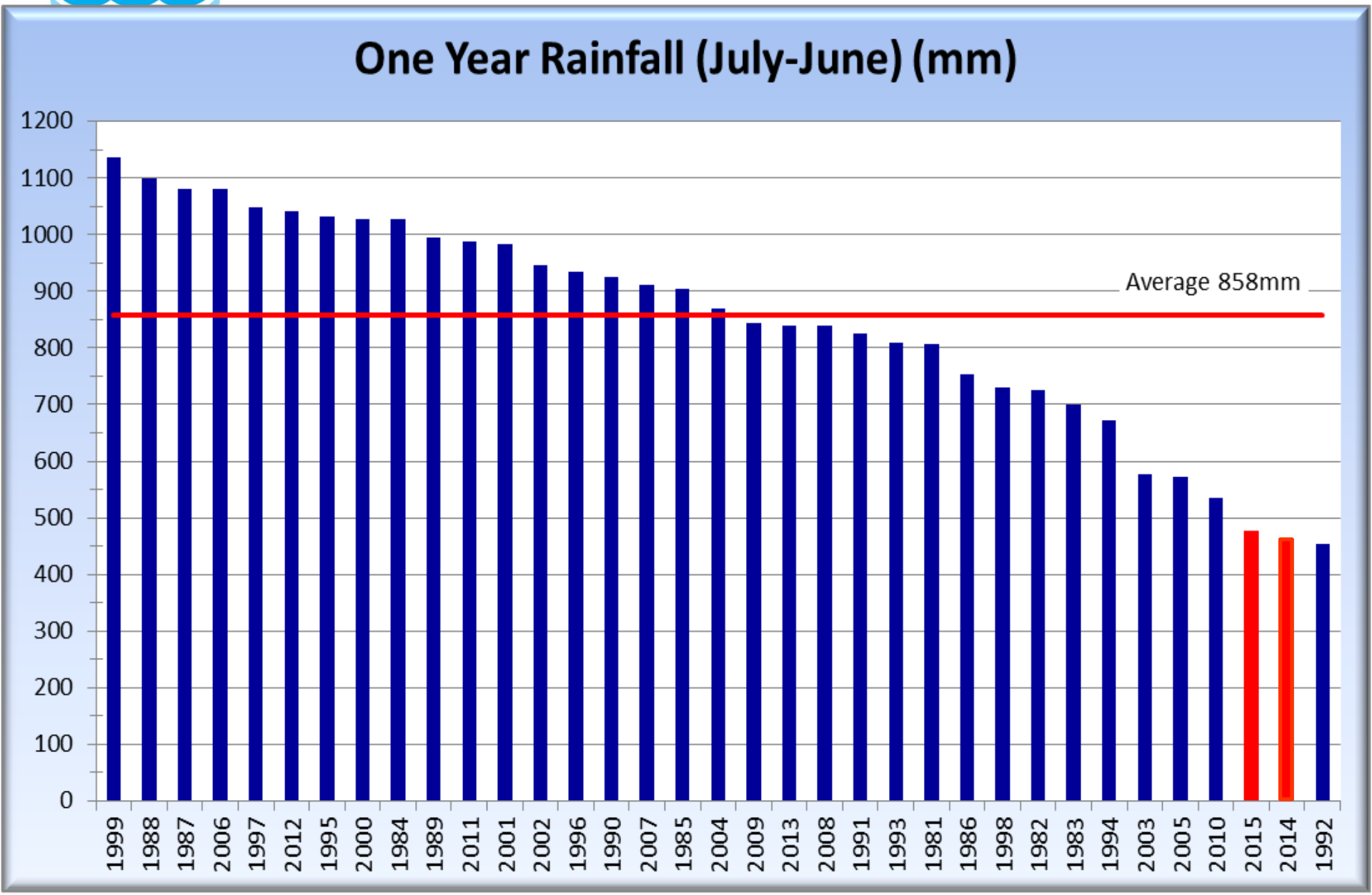
Drought Impacts and Mitigation Measures

Annual Rainfall to 2014



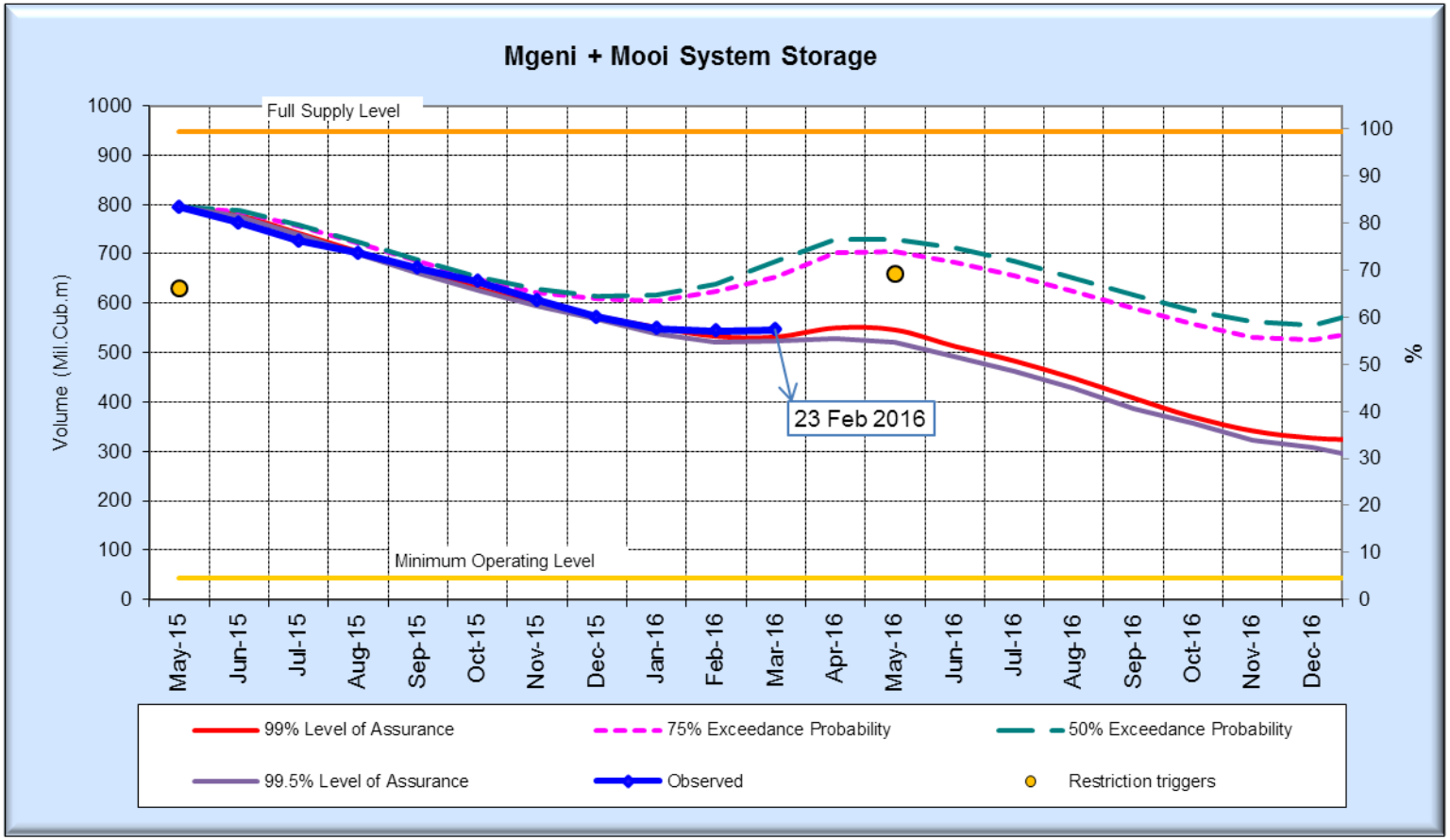
Annual Rainfall Including 2015



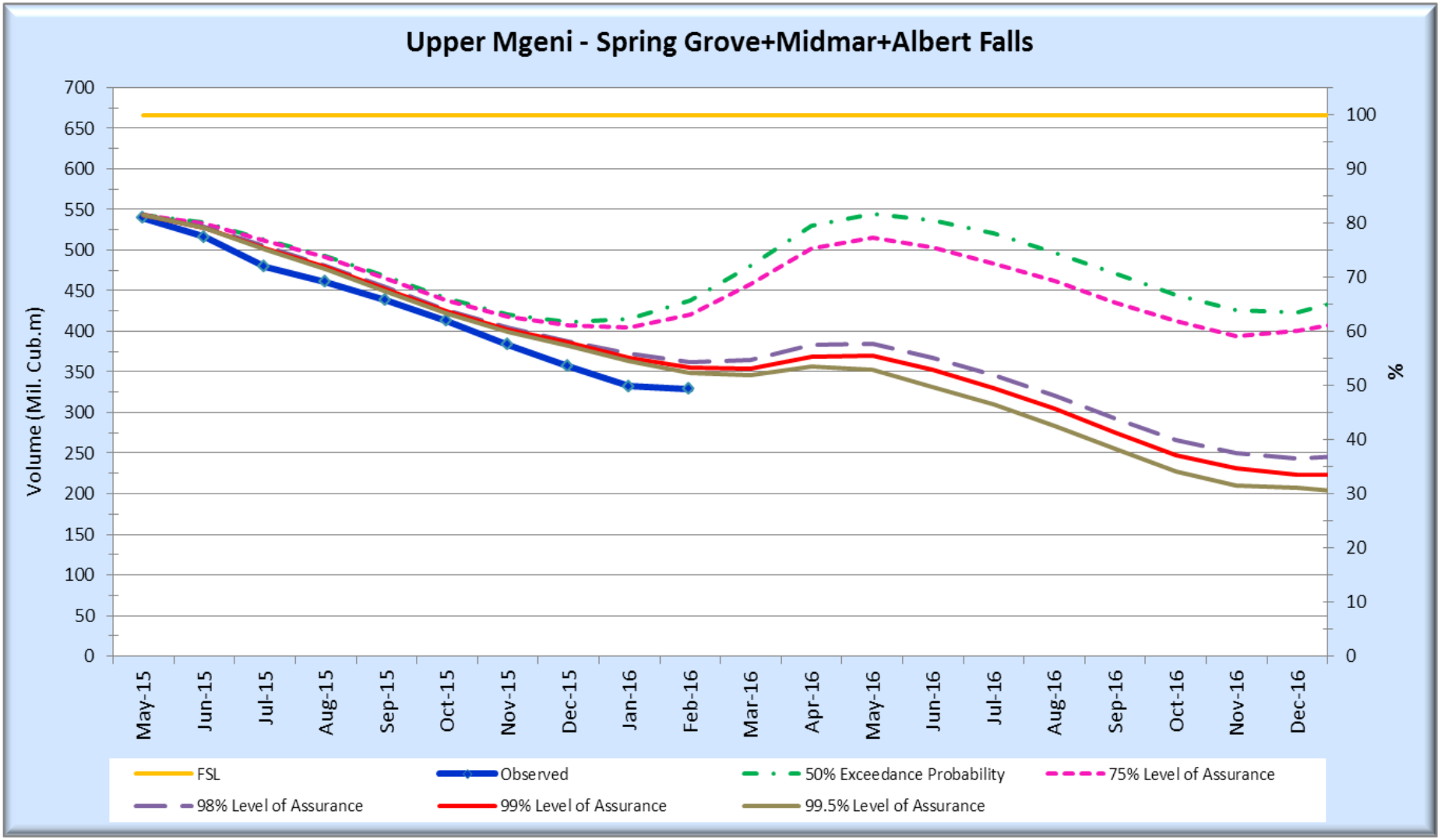
Mgeni System Storage levels on 23 February 2016

Mgeni System	Full Supply Capacity (Mcm)	Dam storage (Mcm)	Dam percentage (%)
Spring Grove Dam	139.5	117.4	84.2
Mearns Weir	5.1	5.2	101.0
Midmar Dam	235.0	110.0	46.4
Albert Falls Dam	289.0	109.0	37.7
Nagle Dam	23.2	18.3	78.6
Inanda Dam	242.0	192.4	79.6

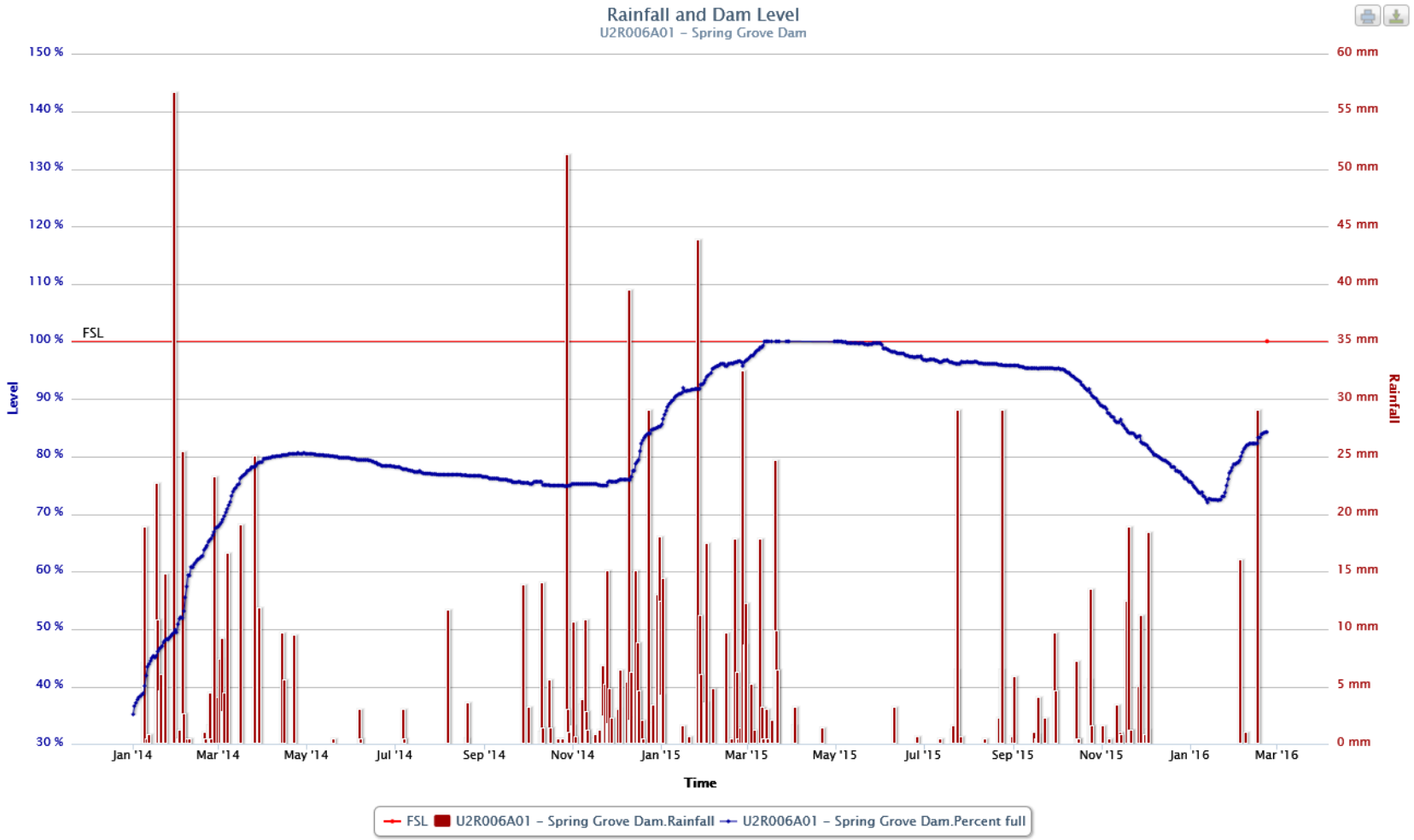
Mgeni System Storage Projection



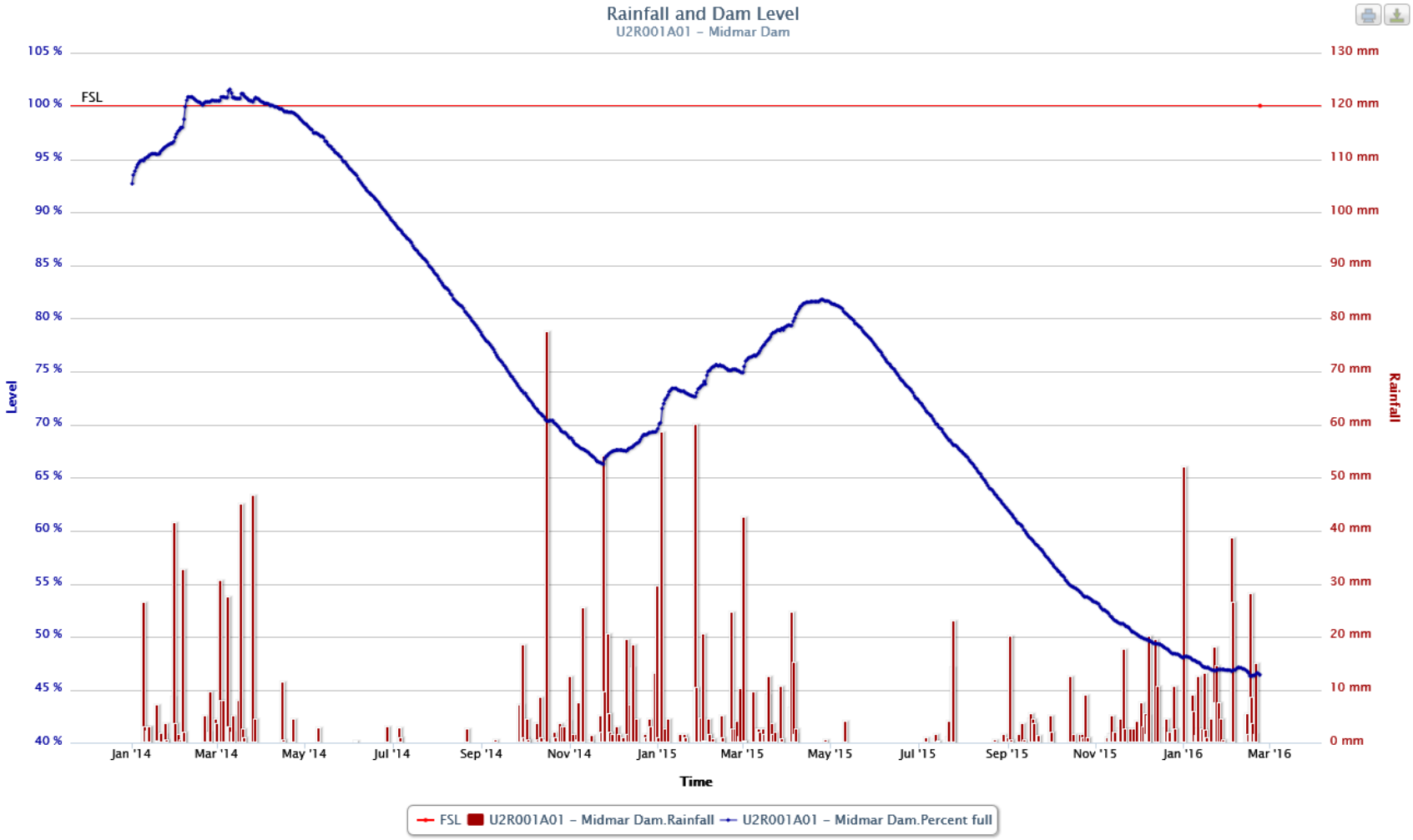
Upper Mgeni System Storage Projection



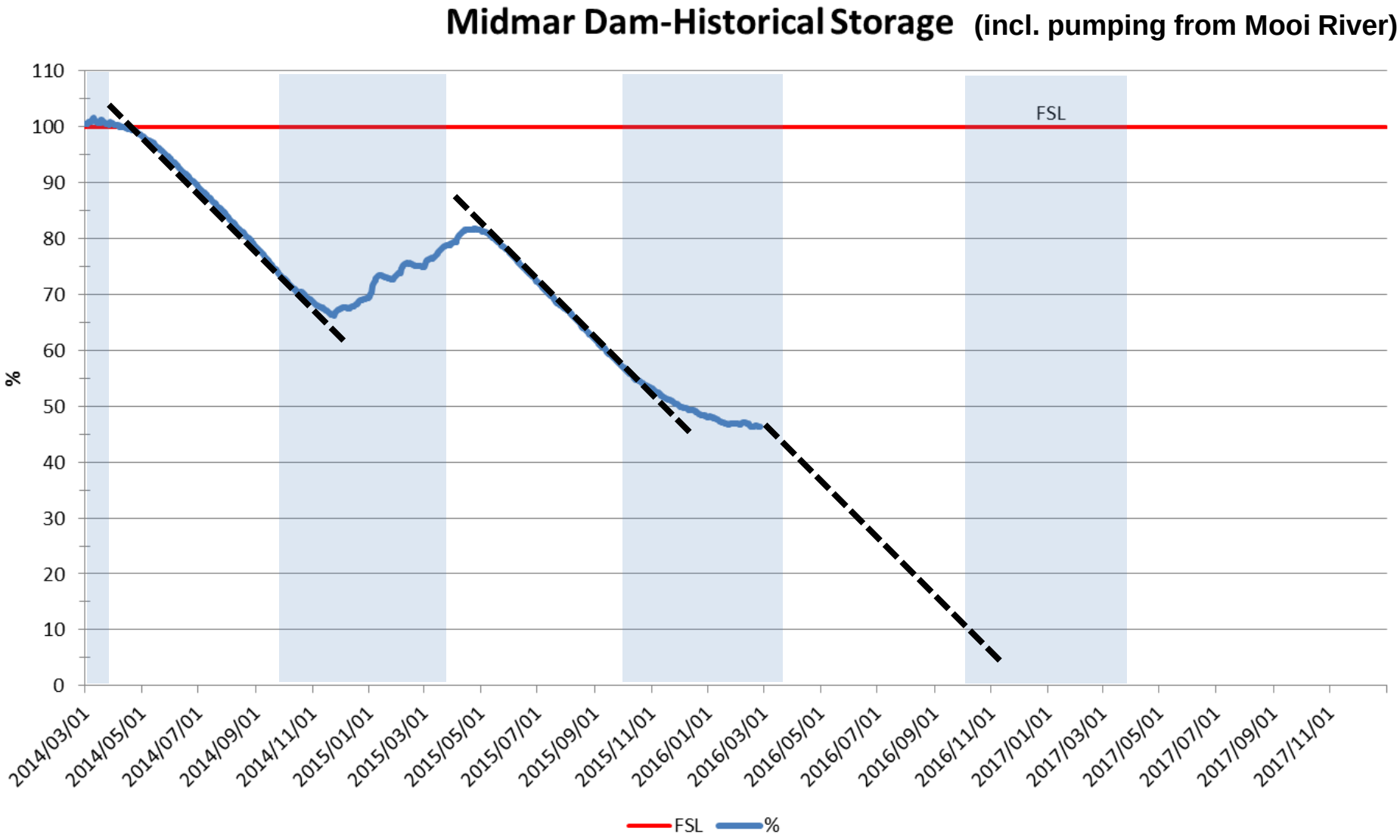
Spring Grove Dam



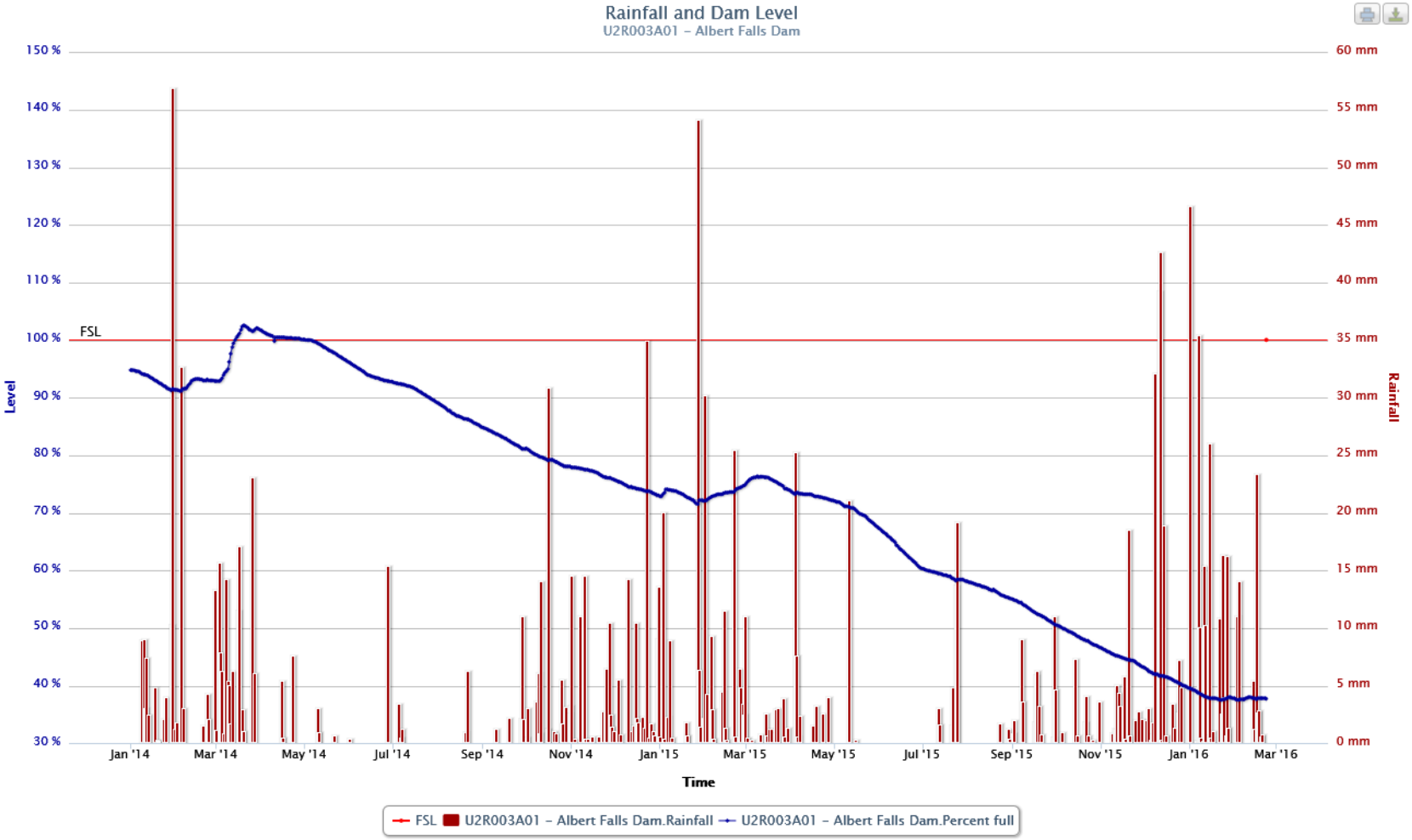
Midmar Dam


Rainfall and Dam Level
U2R001A01 – Midmar Dam
105 %
100 %
95 %
90 %
85 %
80 %
75 %
70 %
65 %
60 %
55 %
50 %
45 %
40 %
FSL
Level
130 mm
120 mm
110 mm
100 mm
90 mm
80 mm
70 mm
60 mm
50 mm
40 mm
30 mm
20 mm
10 mm
0 mm
Rainfall
Jan '14
Mar '14
May '14
Jul '14
Sep '14
Nov '14
Jan '15
Mar '15
May '15
Jul '15
Sep '15
Nov '15
Jan '16
Mar '16
Time
FSL
U2R001A01 – Midmar Dam.Rainfall
U2R001A01 – Midmar Dam.Percent full

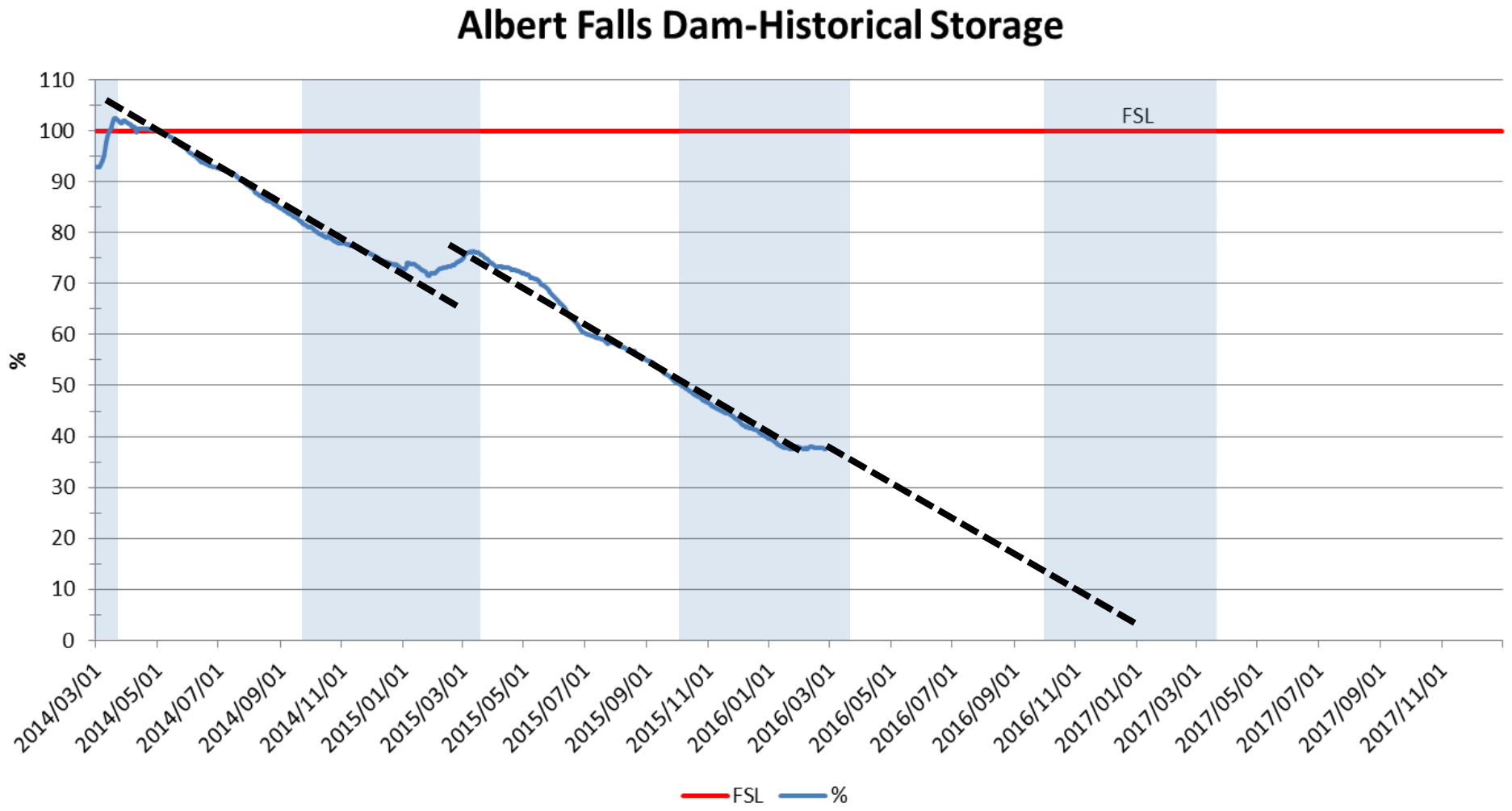
Mgeni System Storage



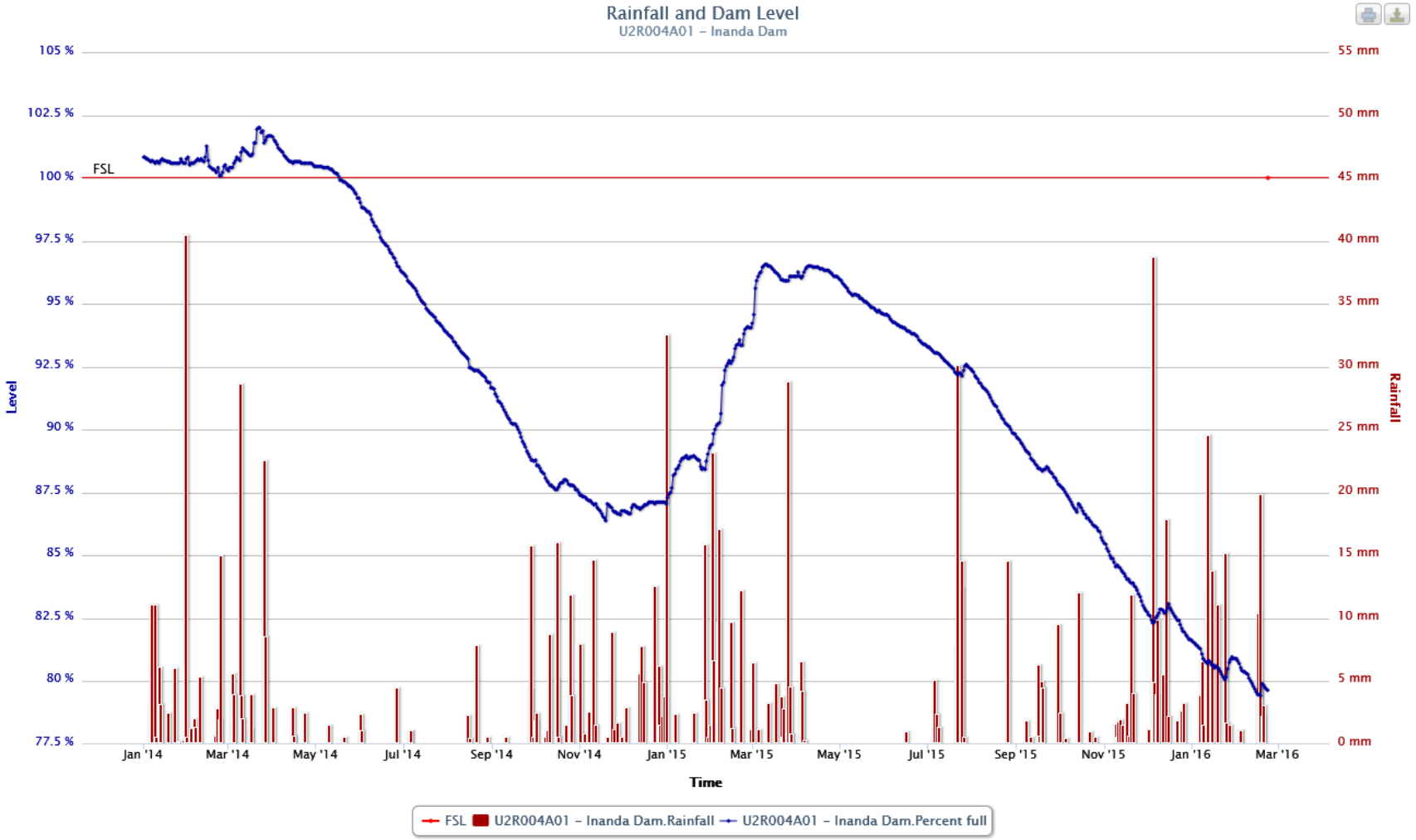
Mgeni System Storage



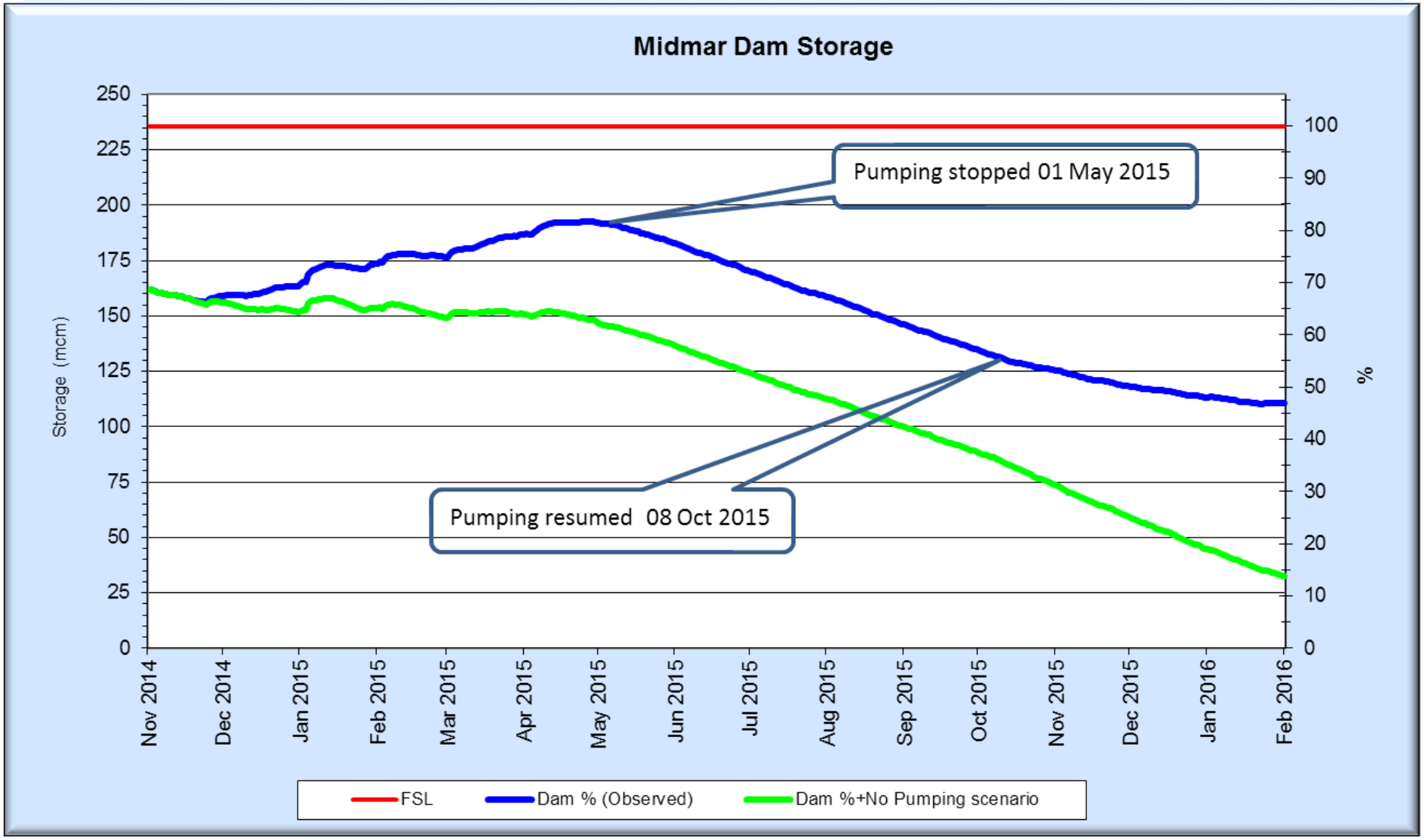
Mgeni System Storage



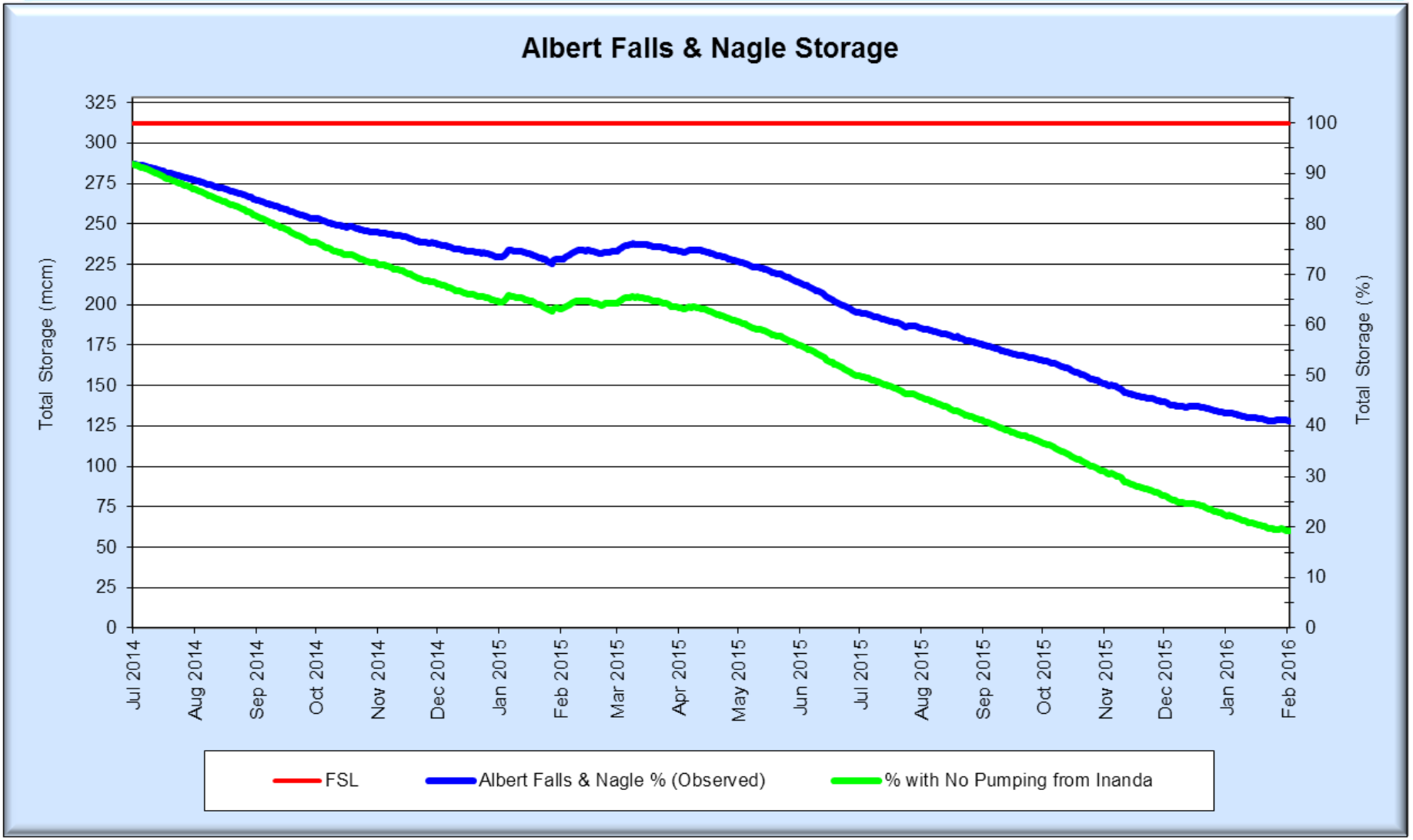
Mgeni System Storage



Midmar Dam – Effect of MMTS



Albert Falls Dam - Effect of Inanda Pumping



Progress

- In December 2015 the Department of Water & Sanitation sent directives to all affected Water Service Authorities regarding the required 15% water saving.
- Restriction Notice to be published in the Government Gazette in March 2016
- Mgeni System Drought Joint Operating Committee (JOC) constituted in December 2015 with representatives from:
  - Department of Water & Sanitation
  - Department of Cooperative Governance & Traditional Affairs
  - Umgeni Water
  - eThekwini Metropolitan
  - uMgungundlovu District Municipality
  - Msunduzi Local Municipality
  - Ugu District Municipality
  - Agricultural sector
- JOC meeting fortnightly to discuss initiatives and achievements to date and to agree on a way forward

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- Each Water Services Authority has developed a Water Saving Plan which is being implemented
- Media awareness campaign aimed at the general public has been running over the past few months
- Daily water treatment plant production figures are distributed for all stakeholders to monitor if the required water savings are being achieved

MORE AREAS AFFECTED BY WATER SHORTAGES

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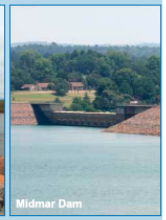
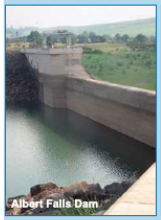
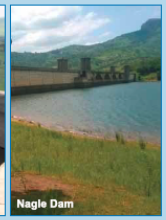
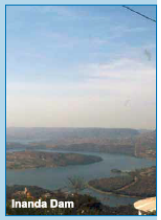
UPPER MGENI



LOWER MGENI







Below average rainfall over the past 30 months in the catchments of the Mgeni System has created a situation in which the levels of at least four major dams have fallen sharply, resulting in the possibility of water shortages this year. This situation has been exacerbated by unusually high temperatures, which cause increased evaporation of water from dam surfaces.

The Mgeni System has two components: the Upper Mgeni and Lower Mgeni. The Upper Mgeni consists of Mearns Dam, Spring Grove Dam and Midmar Dam and associated infrastructure. The Lower Mgeni consists of Albert Falls Dam, Nagle Dam and Inanda Dam and associated infrastructure. The Upper and Lower Mgeni supply potable water to eThekwini Metropolitan Municipality, uMgungundlovu District Municipality, Msunduzi Local Municipality and areas in the north of Ugu District Municipality. A total of 418 million cubic metres per annum of potable water (1 144 Ml/d) are supplied to these customers by Umgeni Water. It is estimated that approximately 5 million people – or 900 000 households – ultimately receive water that is abstracted and treated within the Upper and Lower Mgeni. In addition, industries and other commercial enterprises and the agriculture sector based within these municipalities' jurisdictions receive water from Water Treatment Works (Midmar, DV Harris, Durban Heights, Wiggins and Amanzimtoti) in the Mgeni System.

The prevailing below-average rainfall situation in the Mgeni System and in other parts of the Umgeni Water operational area, coupled with high temperatures, have all the classic characteristics of protracted drought, in the form of the El Nino effect. El Nino is a weather phenomenon that occurs irregularly, usually once in every 3 to 7 years. It leaves in its trail low rainfall in some parts of the world, drought in some countries and floods in many other parts of the globe.

Meteorologists in South Africa have predicted that the trend of low rainfall experienced thus far is likely to continue into the second half of 2016. This means that all the systems within the Umgeni Water operational area, already in a deficit situation insofar as rainfall is concerned, will continue to experience water shortages in the Autumn and Winter months of 2016 if good rains are not received. It is worth noting that the deficit has occurred partially as a result of low rainfall during the past Spring and Summer months - a period in which KwaZulu-Natal generally records its highest rainfall.

Towns and districts that already have water restrictions in place as a result of water shortages are: the entire supply areas of Hazelmere System (Verulam, Waterloo, Ballito, Sea Tides, La Mercy, Umhlali, Groutville and Ndwedwe) and the supply areas of Ixopo Water Treatment Works (Ixopo and surrounds).

Umgeni Water is concerned about the continuing trend of below-average rainfall within the Mgeni System, which is currently in a rainfall deficit state of between 50mm and 100mm. This has had serious impact on the levels of all the dams in the Mgeni System. In the Upper Mgeni, Mearns Dam is currently at 103.64%; Spring Grove Dam at 82.19% and Midmar Dam at 46,28%. The levels of dams in Lower Mgeni are: Albert Falls 37,64%; Nagle 80,97%, and Inanda 79,44%. The levels of all six (6) dams are lower than they had been a year ago, indicating again the impact of low rainfall. The levels of Midmar Dam and that of Albert Falls are the lowest they have been since the 1983 and 1993 droughts. It is important to note that Midmar Dam remains at this level despite water transfer into it from Spring Grove Dam via Mearns Weir.

It has been estimated that the level of Albert Falls Dam is dropping at a rate of 4% per month and Midmar Dam at 3% per month. This means that if good rainfalls – above-average – are not received and consumption continues at its current rate, both dams could reach dead storage by the end of 2016. Dead storage means that only silt remains and that no more water would be available to treat and supply to eThekwini Metro, uMgungundlovu DM, Msunduzi LM and Ugu DM.

In order to manage the current water resources to last until the next rains and, in the process, avert a situation of crisis proportions, a Joint Operations Committee has been established by Umgeni Water. The Committee comprises Senior Managers of Umgeni Water, eThekwini Metro, Msunduzi Local Municipality, uMgungundlovu DM, Ugu DM, Department of Water and Sanitation and KwaZulu-Natal Department of Co-operative Governance and Traditional Affairs.

At times of water shortages one of the most effective ways of ensuring future water resource availability and supply, albeit not necessarily at normal levels, is to manage demand. At the first meeting of the Joint Operations Committee, held on 14th December 2015, a decision was unanimously taken that measures would be implemented through a 15% reduction in domestic, business and industrial water usage. This means that Umgeni Water will cut its supply of potable water production by 15% and the municipalities, in turn, have to save 15% on potable water normally supplied to their customers. Reduction in water usage has already been implemented. It is important for consumers to note that in order for municipalities to achieve savings of 15%, restrictions in one form or another have been applied.

It is imperative for consumers to begin entrenching or developing a culture of water conservation by using water sparingly. To assist domestic users save water, the following tips are provided. If applied consistently, they will be effective in preventing water wastage – and will also save you money on your water bill:

WATER-USE REDUCTION

15%

DOMESTIC & BUSINESS

HOW TO SAVE WATER THE EASY WAY

- Turn the tap off between washing your face, brushing your teeth or shaving.
- Taking a five-minute shower a day, instead of a bath, will use a third of the water used for bathing in a bath tub, saving up to 400 litres a week. Showering can use up to 20 litres of water per minute.
- If you prefer to bath, don't fill up the bath tub. Taking a bath can use between 80 and 150 litres of water at a time.
- Use low-flow showerheads, dual-flush toilet mechanisms and water-efficient washing machines.
- Kettles should not be filled to the brim but should contain just enough water for your needs. This will also reduce your electricity bill.
- Don't over-fill containers like cooking pots as this may result in using more energy to heat the water.
- Reducing the toilet flush volume alone can save 20% of total water consumption. This can be done by putting a 2-litre soft drink bottle, filled with water and a little sand to add weight, into the cistern.
- Fix a leaking toilet otherwise it can waste up to 100 000 litres of water in one year.
- Avoid flushing the toilet unnecessarily. Dispose of tissues, insects and other waste in the trash rather than the toilet. Every time you flush the toilet, 12 litres of water is used.
- Use "grey water" - used water from baths, washing machines and other safe sources - to flush your toilet.
- Use a bucket rather than a hose to wash your car. A garden hose could use as much as 30 litres of water per minute.
- Do not pour paint and chemicals down the drain.
- Farmers must ensure that they keep toxic insecticides away from water sources and streams.

Issued jointly by Umgeni Water, eThekwini Metro, Msunduzi Local Municipality, uMgungundlovu District Municipality, Ugu District Municipality and the Department of Water and Sanitation

UMGENI WATER · AMANZI

Head Office:
310 Burger Street
Pietermaritzburg
3201
South Africa

PO Box 9,
Pietermaritzburg
3201,

Tel: +27(33) 341 1111
Fax: +27 (33) 341 1084
Email: info@umgeni.co.za

www.umgeni.co.za
@umgeniwater
/umgeniwater
/uwa1974

City of Choice eThekwini Municipality · uMgungundlovu District Municipality · eThekwini Municipality · Ugu District Municipality · water & sanitation Department: Water and Sanitation REPUBLIC OF SOUTH AFRICA

Daily Monitoring

Daily Monitoring of Water Treatment Plant Output

	Critical Upper Mgeni System Demands					Other Mgeni Dystem Demands				
Water Treatment Plant	Durban Heights	Midmar	DV Harris	Total	% Savings	Wiggins	Maphephetwa	Amanzimtoti	TOTAL	% Savings
Historical Average (Ml/d)	508.47	275.25	62.05	845.77		218.51	2.71	71.08	1138.07	
Reduced Demand (Ml/d)	432.20	233.96	52.74	718.90		185.73	2.30	60.42	967.36	
08/02/2016	504.86	286.75	94.36	885.97	-4.75%	214.68	3.40	73.82	1177.87	-3.50%
09/02/2016	516.57	276.28	74.64	867.49	-2.57%	223.16	3.50	70.34	1164.49	-2.32%
11/02/2016	486.89	277.66	82.94	847.49	-0.20%	228.09	3.50	77.41	1156.49	-1.62%
12/02/2016	533.75	277.22	61.59	872.56	-3.17%	225.02	3.30	68.98	1169.86	-2.79%
13/02/2016	555.59	280.00	57.19	892.78	-5.56%	221.62	3.00	75.28	1192.68	-4.80%
14/02/2016	480.84	267.40	75.10	823.34	2.65%	230.77	3.09	72.69	1129.89	0.72%
15/02/2016	489.06	279.31	87.10	855.47	-1.15%	224.64	3.00	70.08	1153.19	-1.33%
16/02/2016	525.80	277.50	96.55	899.85	-6.39%	229.60	3.40	72.29	1205.14	-5.89%
17/02/2016	485.10	280.56	91.04	856.70	-1.29%	221.90	2.80	65.61	1147.01	-0.79%
18/02/2016	497.31	274.21	56.80	828.32	2.06%	192.40	2.80	71.60	1095.12	3.77%
19/02/2016	506.32	261.60	71.33	839.25	0.77%	229.71	2.80	68.78	1140.54	-0.22%
20/02/2016	518.83	285.42	64.52	868.77	-2.72%	232.99	2.80	72.65	1177.21	-3.44%
21/02/2016	486.70	267.00	86.28	839.98	0.68%	229.09	2.90	71.61	1143.58	-0.48%
22/02/2016	465.43	260.98	49.55	775.96	8.25%	226.40	2.80	72.07	1077.23	5.35%
23/02/2016	518.89	273.00	97.86	889.75	-5.20%	224.13	2.90	72.22	1189.00	-4.48%
24/02/2016	517.36	272.27	86.14	875.77	-3.55%	217.48	2.90	76.52	1172.67	-3.04%
25/02/2016	498.31	256.85	95.99	851.15	-0.64%	226.64	2.90	76.76	1157.45	-1.70%
26/02/2016	524.05	264.04	87.30	875.39	-3.50%	231.22	4.80	74.38	1185.79	-4.19%
27/02/2016	513.65	251.10	88.79	853.54	-0.92%	239.02	2.90	71.48	1166.94	-2.54%
28/02/2016	482.76	285.99	51.12	819.87	3.06%	234.80	3.10	69.70	1127.47	0.93%
29/02/2016	463.61	276.00	60.95	800.56	5.35%	183.18	3.10	75.79	1062.63	6.63%
01/03/2016	528.93	253.28	72.41	854.62	-1.05%	226.29	2.91	79.47	1163.29	-2.22%

Conclusions

- Require immediate reduction in water consumption of:
  - 15% for Domestic /Commercial/Industrial
  - 50% for Agriculture

- Agricultural sector is currently well organised and achieving their target saving

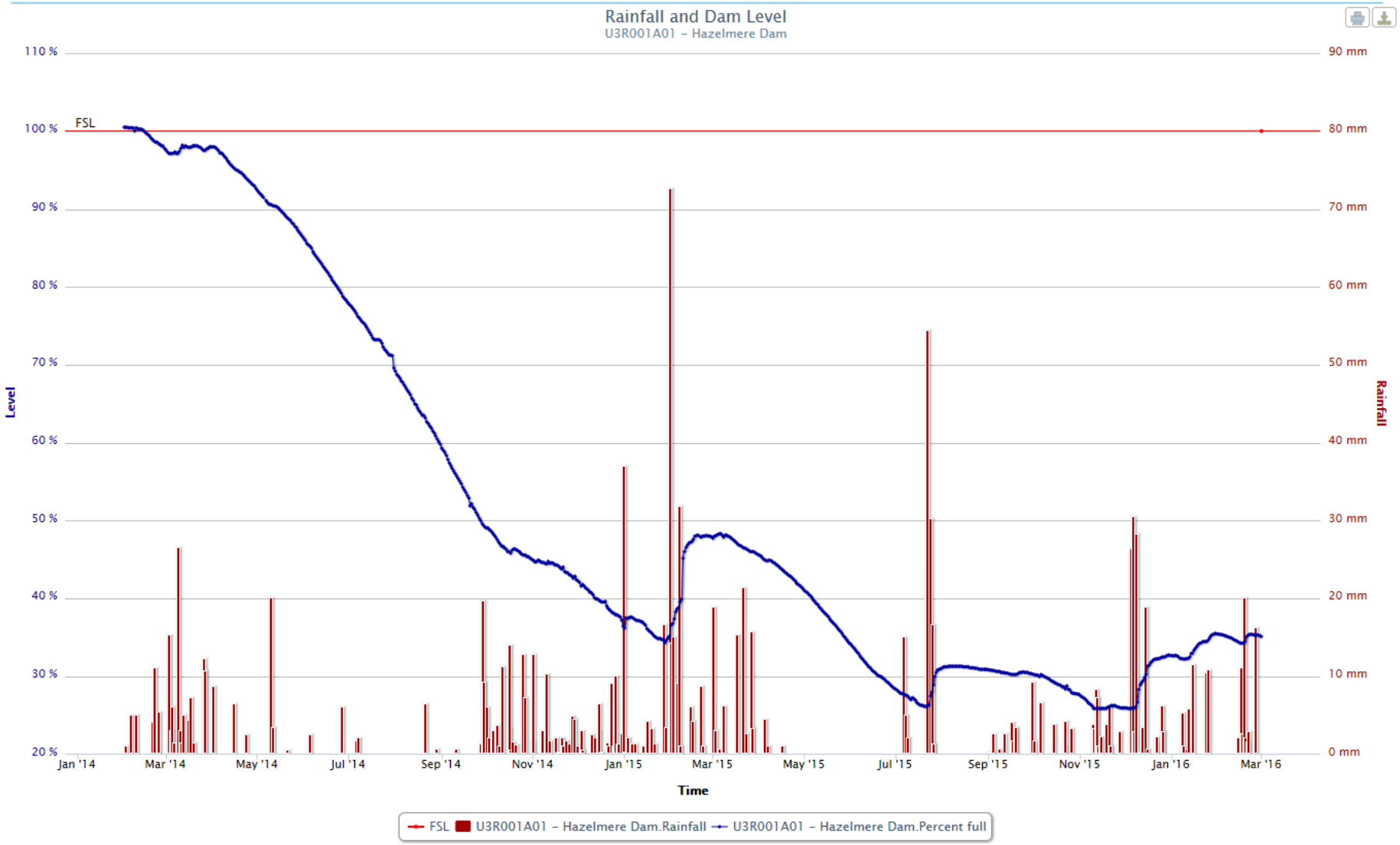
- Domestic/Industrial sector not achieving their target saving

- Urgent need for Water Service Authorities to expedite the implementation of their respective Water Saving Plans

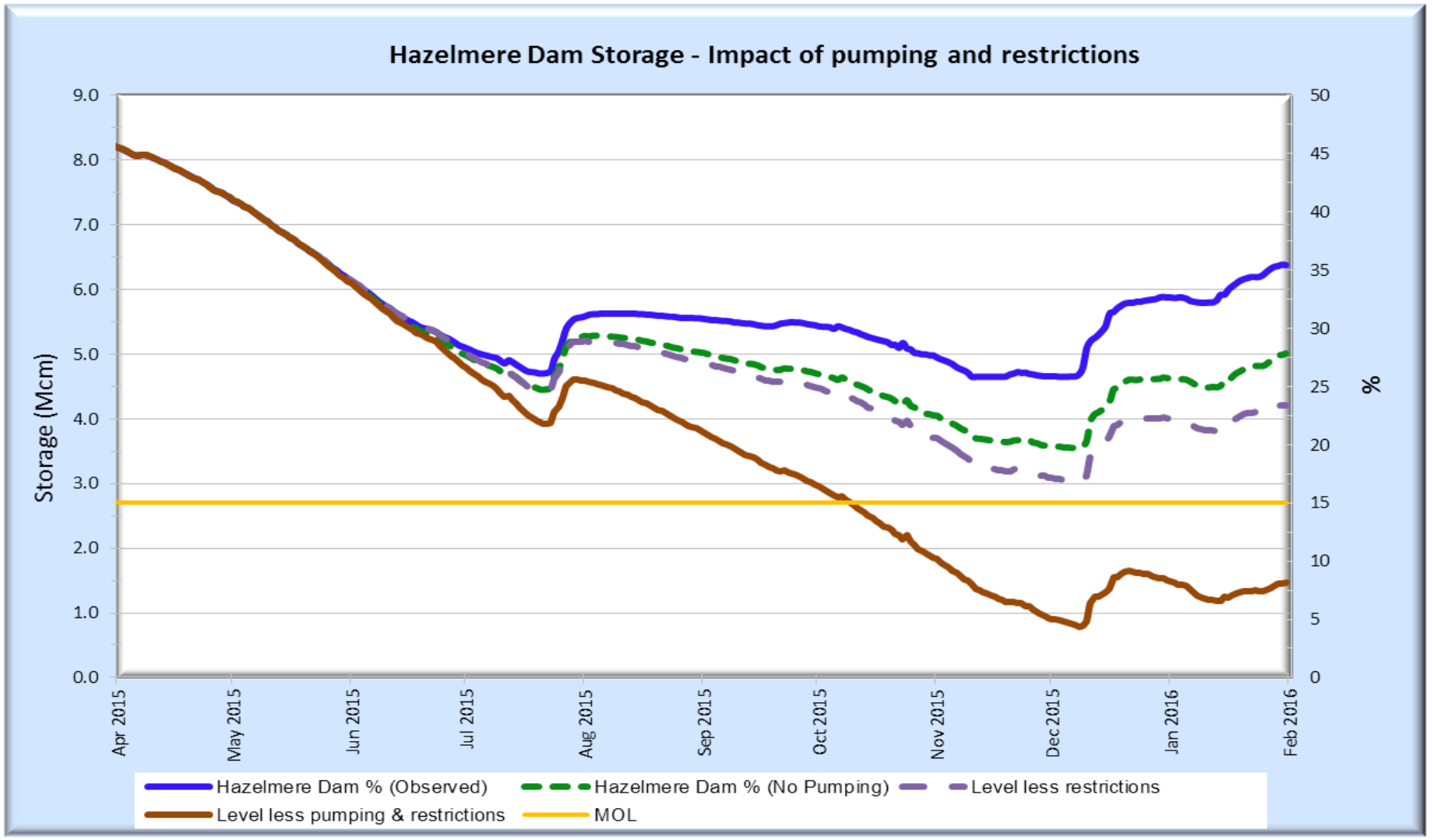
- The implementation of daily water rationing (as has been implemented for Hazelmere) may be necessary if the required water savings are not achieved

- A reassessment of the water restriction level required for the Mgeni System will be undertaken in April/May 2016

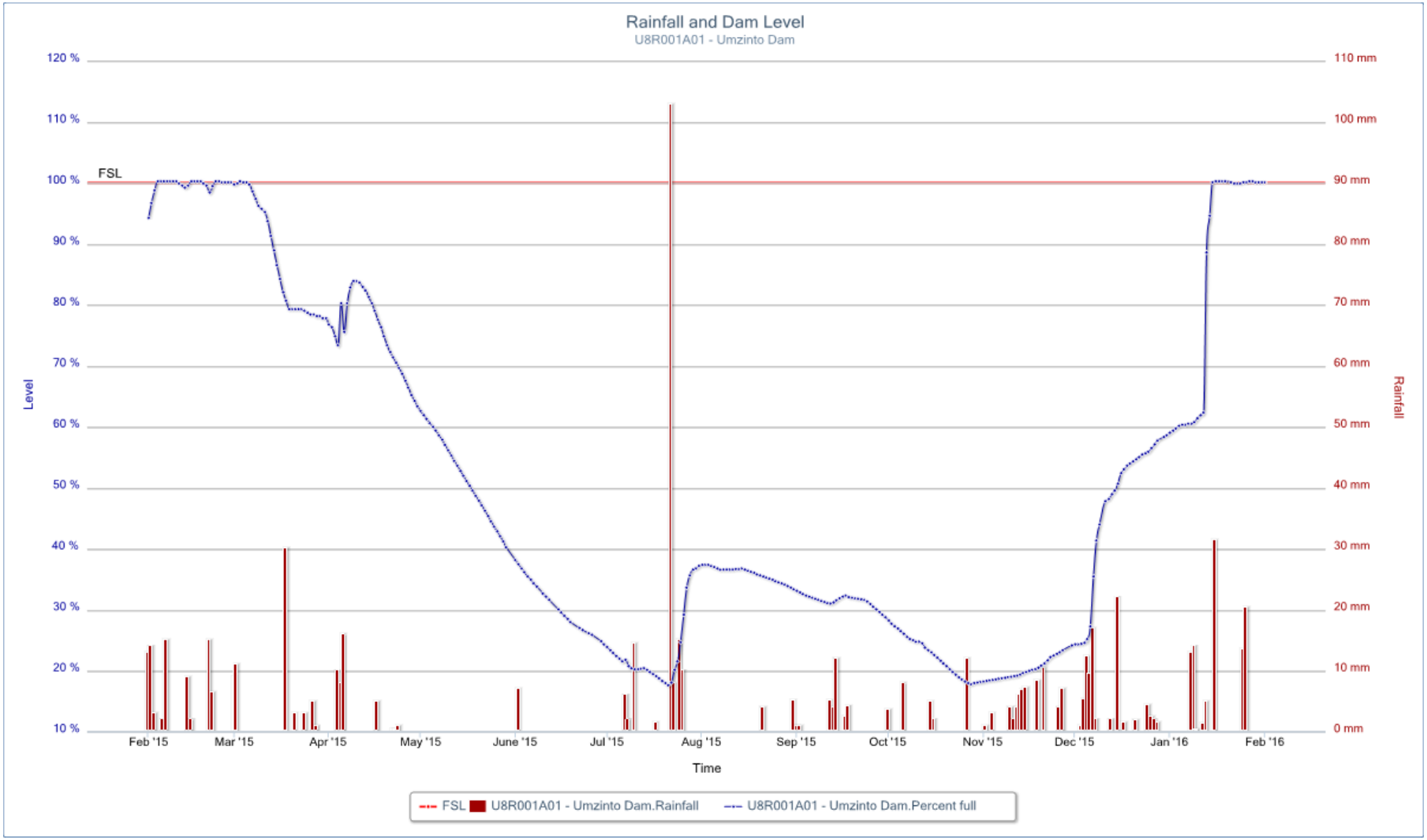
Hazelmere Dam



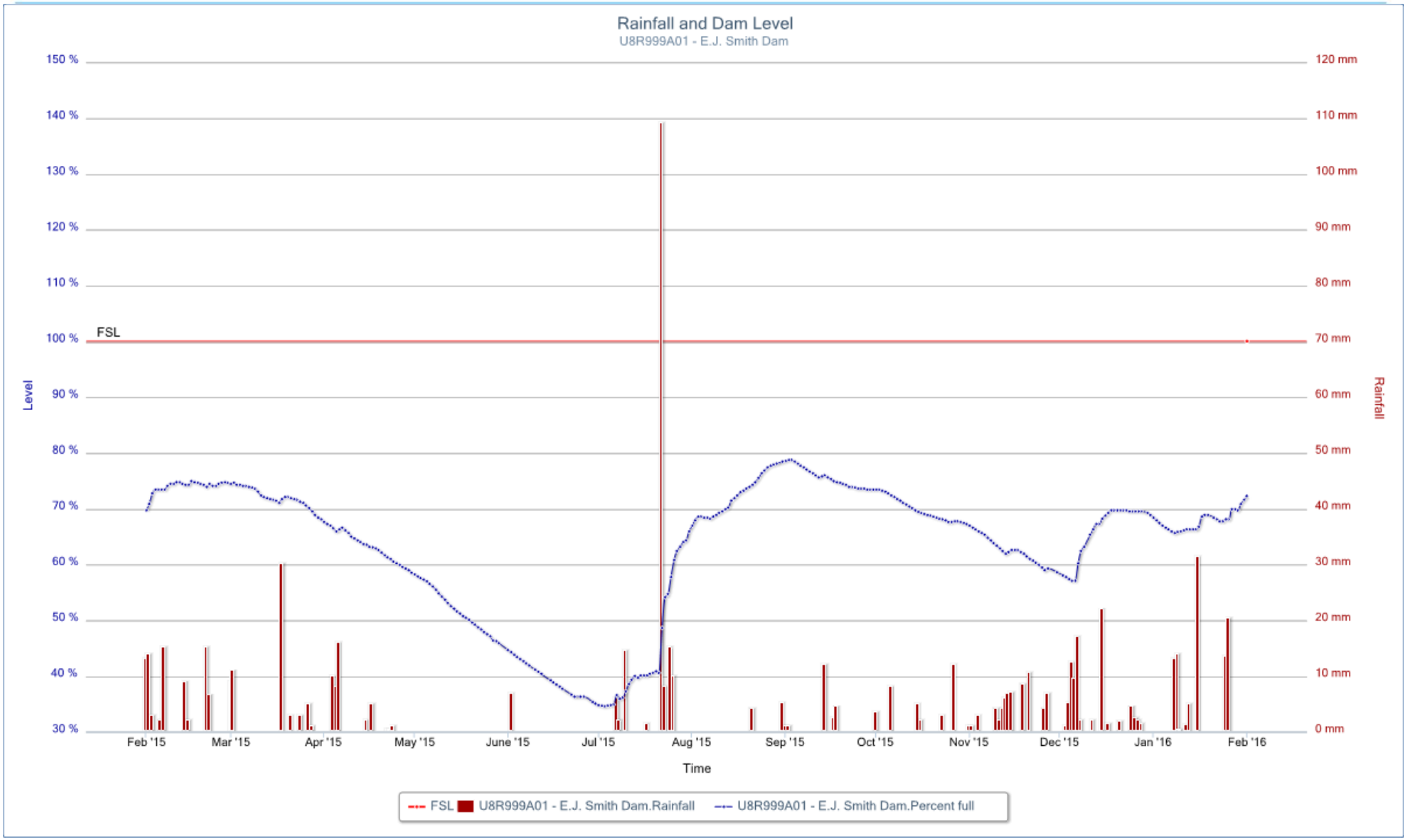
Hazelmere Dam – Effects of uThongathi Pumping



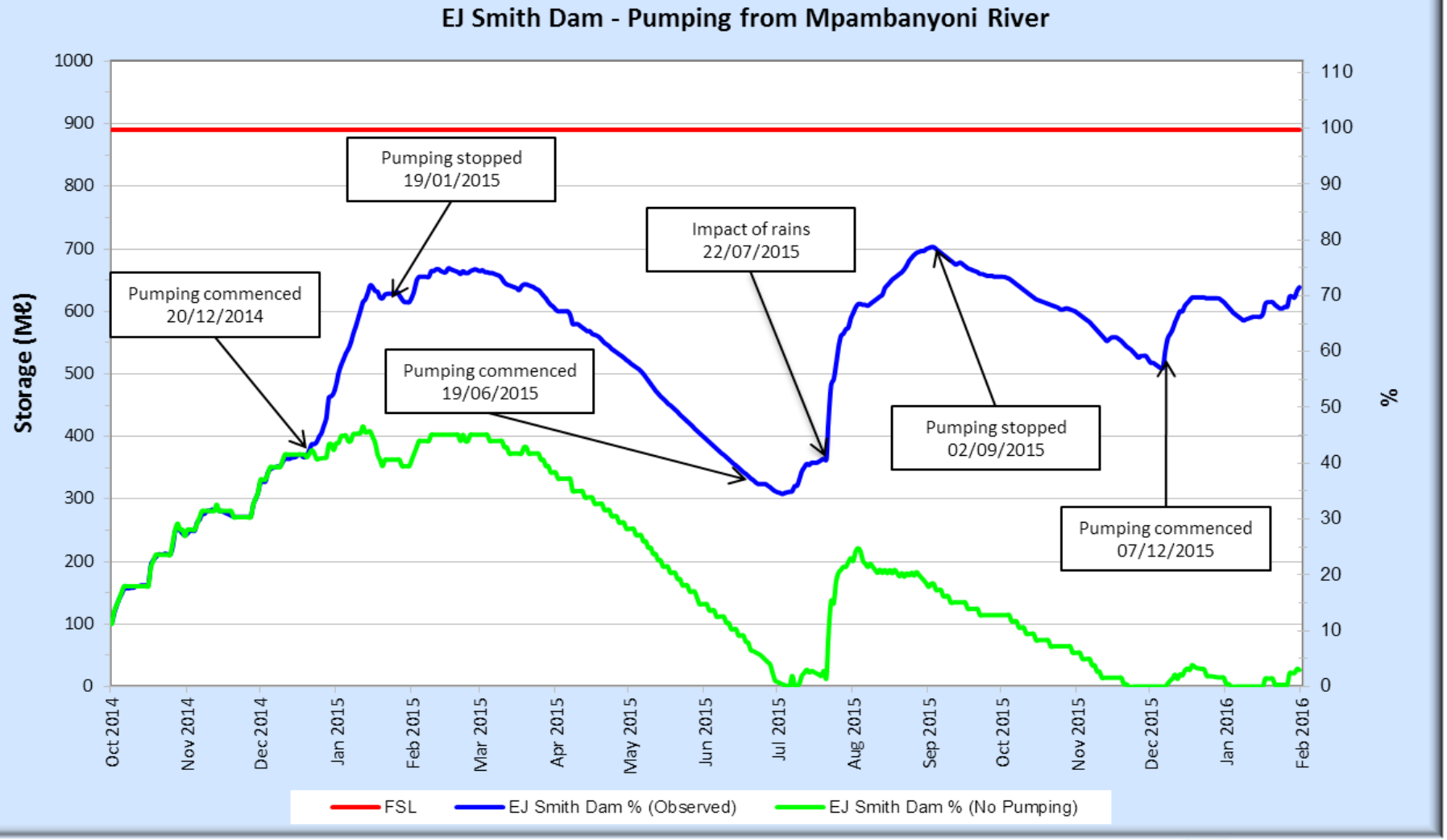
Umzinto Dam


Rainfall and Dam Level
U8R001A01 - Umzinto Dam
120 %
110 %
100 %
90 %
80 %
70 %
60 %
50 %
40 %
30 %
20 %
10 %
FSL
Level
110 mm
100 mm
90 mm
80 mm
70 mm
60 mm
50 mm
40 mm
30 mm
20 mm
10 mm
0 mm
Rainfall
Feb '15
Mar '15
Apr '15
May '15
June '15
Jul '15
Aug '15
Sep '15
Oct '15
Nov '15
Dec '15
Jan '16
Feb '16
Time
FSL
U8R001A01 - Umzinto Dam.Rainfall
U8R001A01 - Umzinto Dam.Percent full

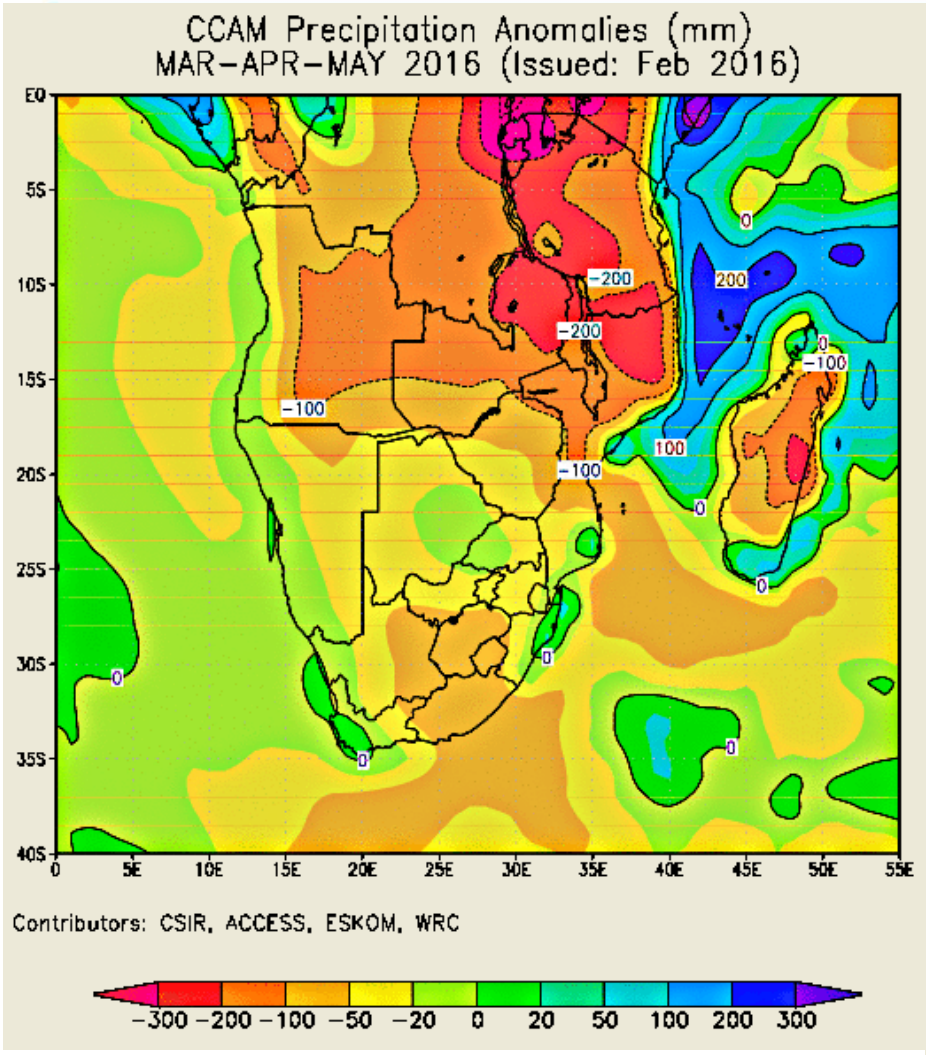
E J Smith Dam

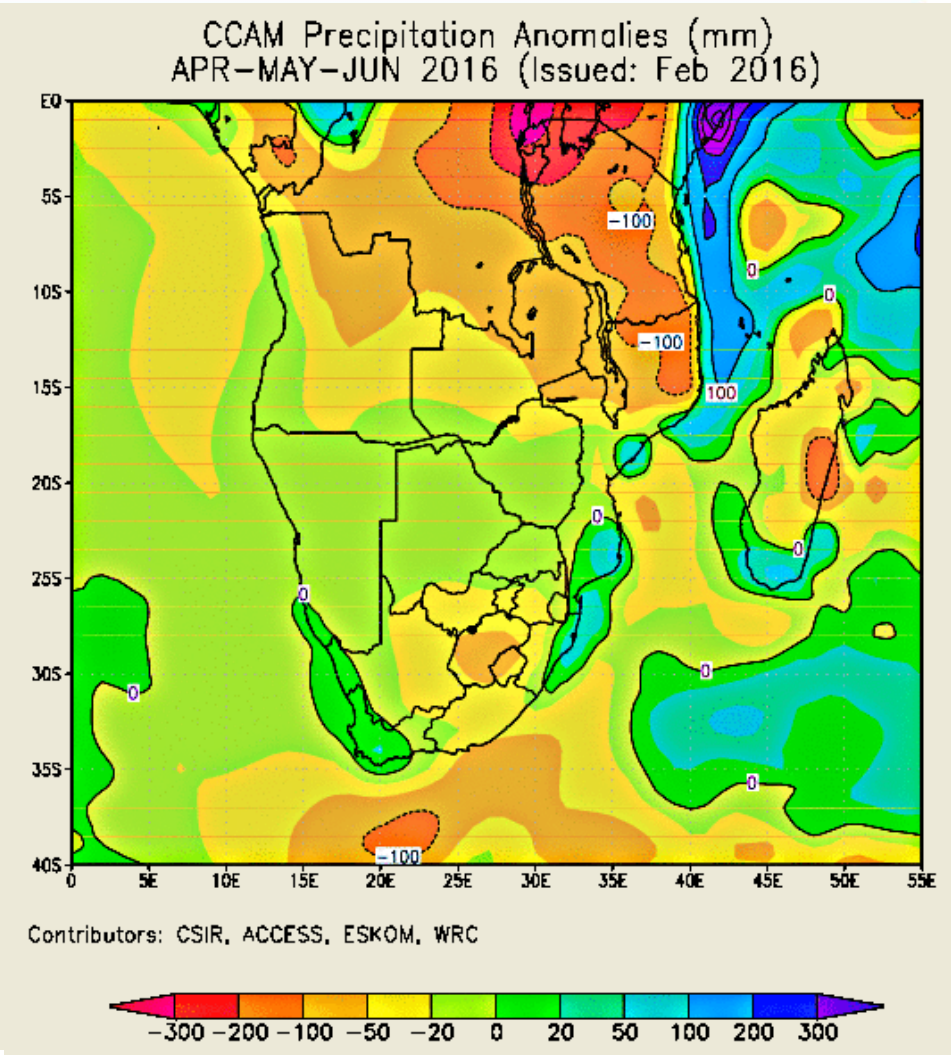

Rainfall and Dam Level
U8R999A01 - E.J. Smith Dam
150 %
140 %
130 %
120 %
110 %
100 %
90 %
80 %
70 %
60 %
50 %
40 %
30 %
FSL
Level
120 mm
110 mm
100 mm
90 mm
80 mm
70 mm
60 mm
50 mm
40 mm
30 mm
20 mm
10 mm
0 mm
Rainfall
Feb '15
Mar '15
Apr '15
May '15
June '15
Jul '15
Aug '15
Sep '15
Oct '15
Nov '15
Dec '15
Jan '16
Feb '16
Time
FSL
U8R999A01 - E.J. Smith Dam.Rainfall
U8R999A01 - E.J. Smith Dam.Percent full

E J Smith Dam – Effects of Mpambanyoni Pumping

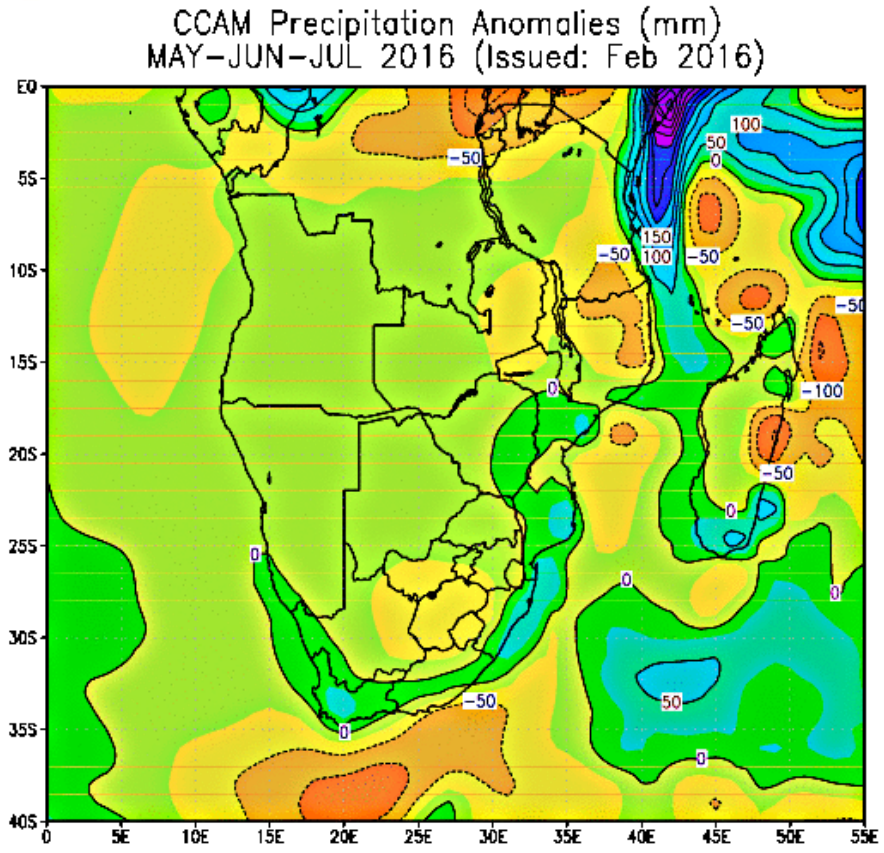


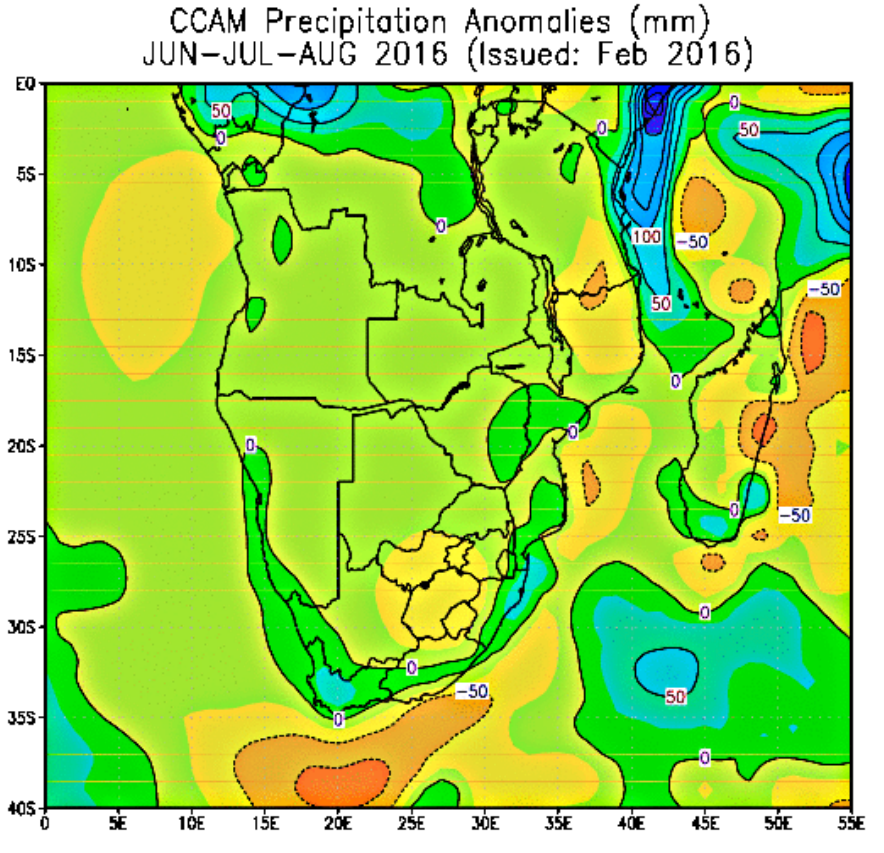
Weather Forecasts



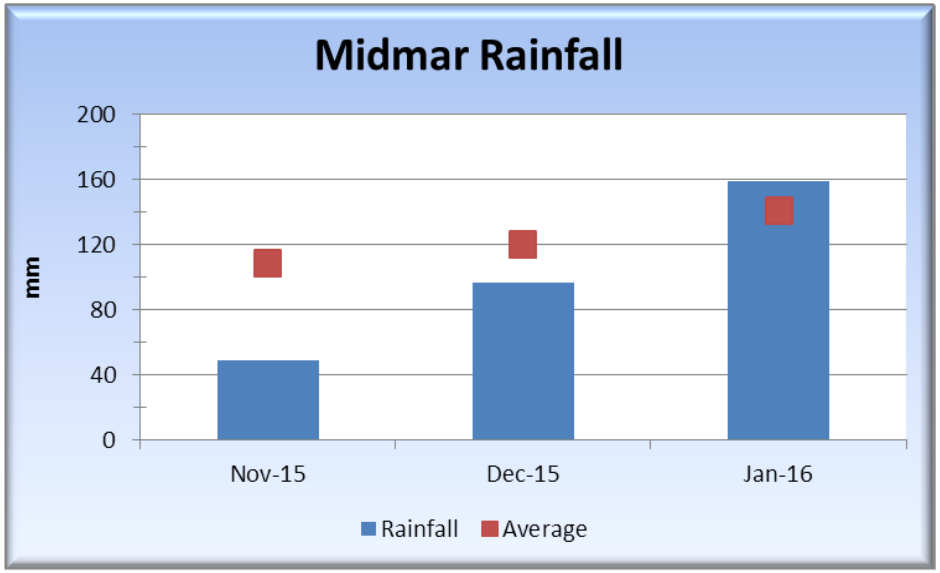


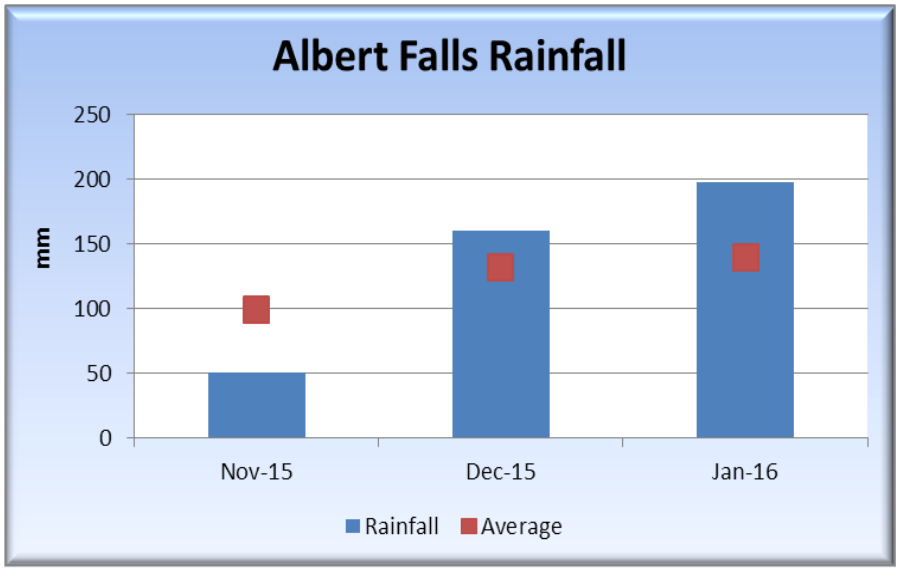
Weather Forecasts

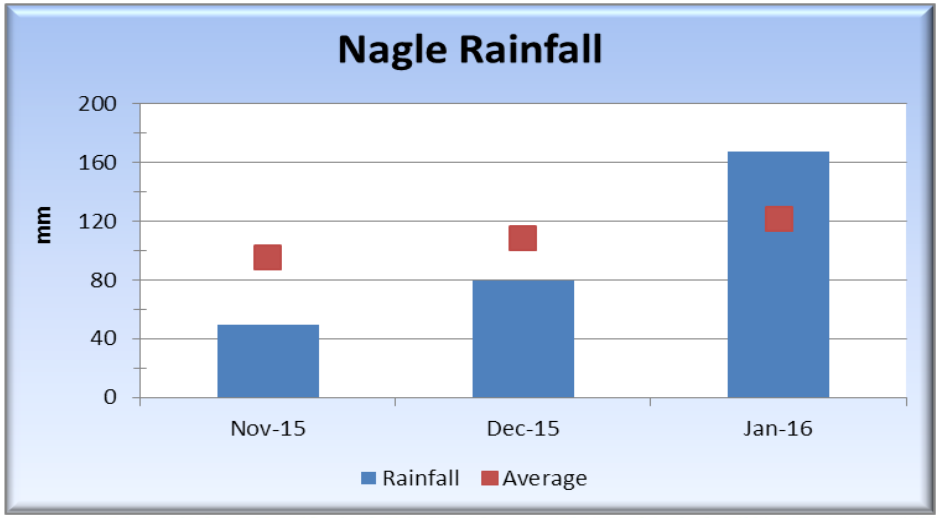


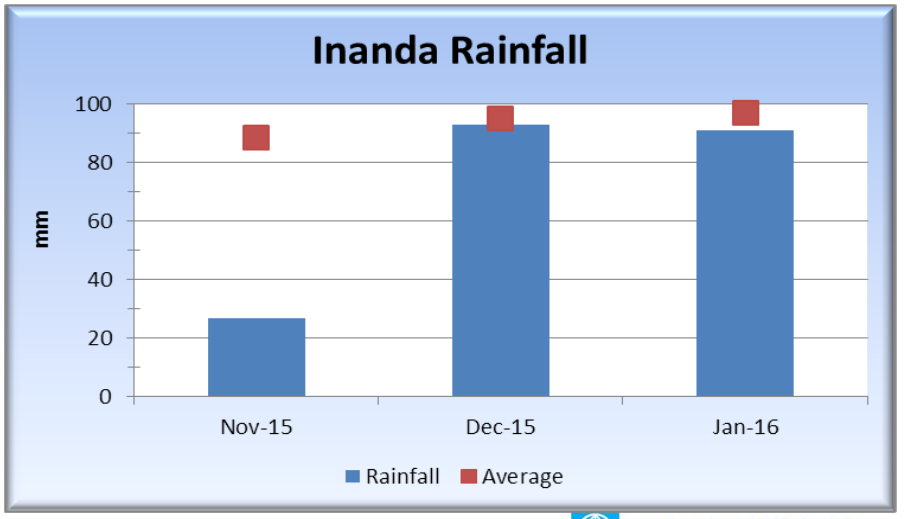


Rainfall (Nov 15 – Jan 16)

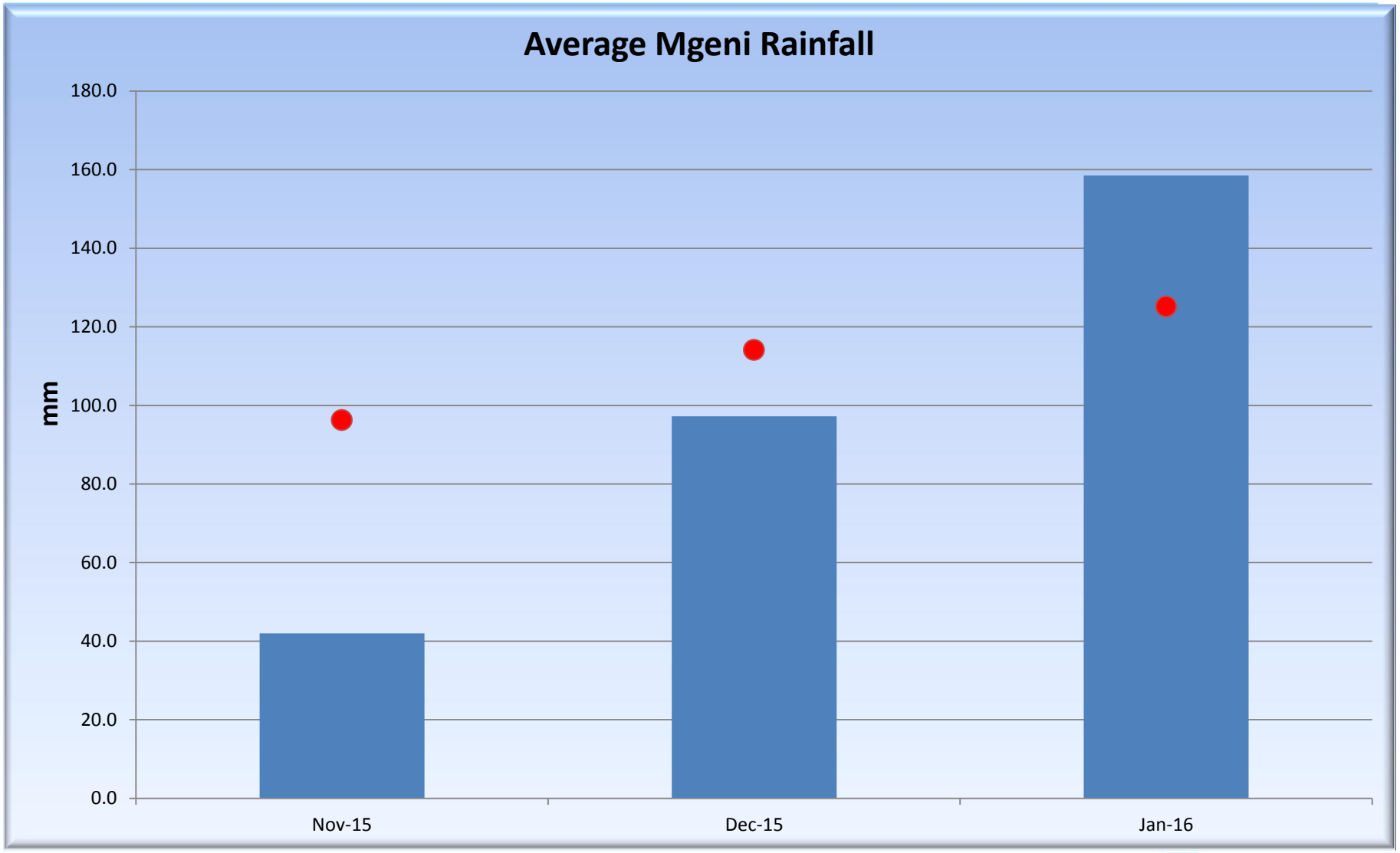




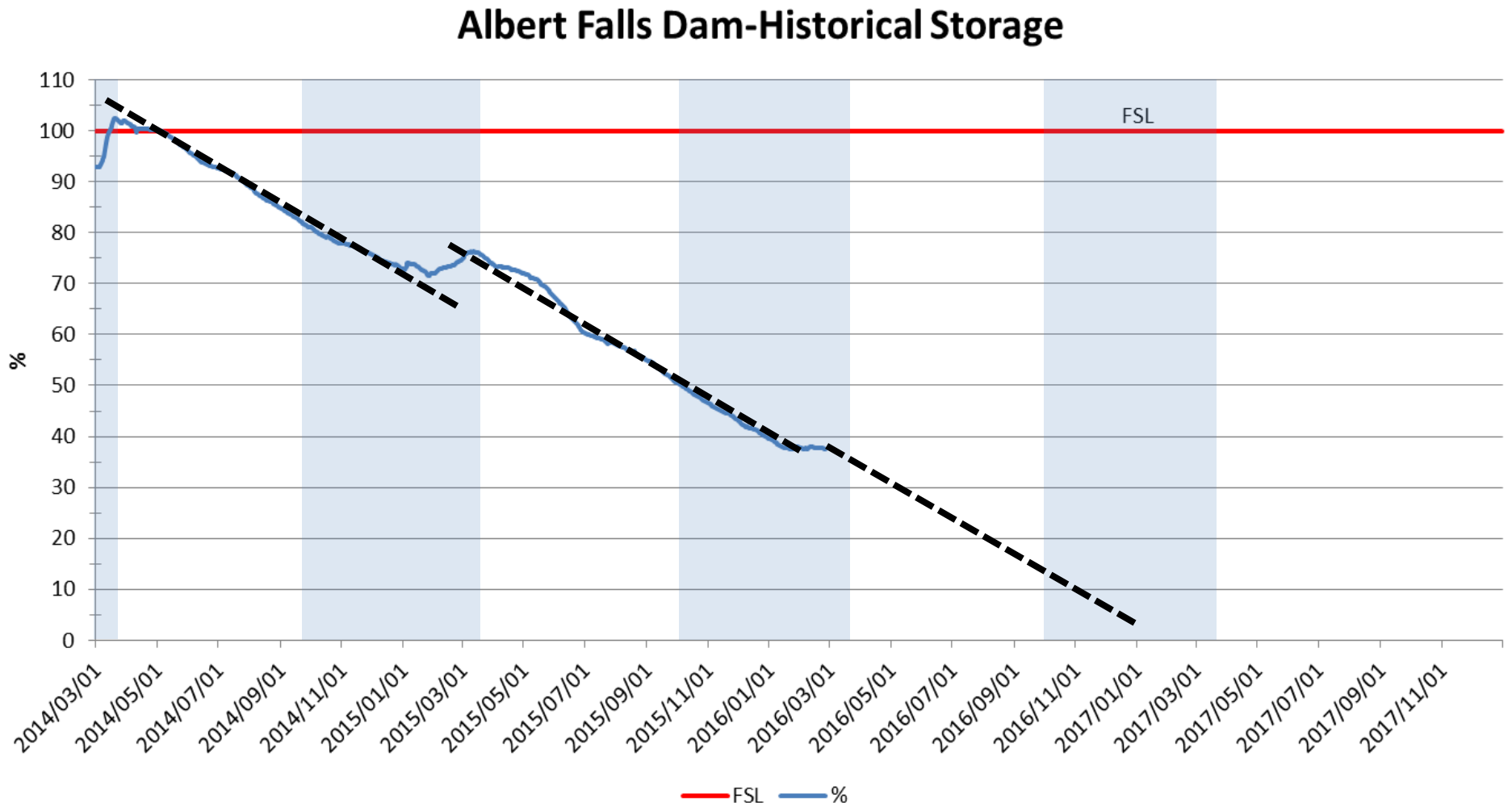




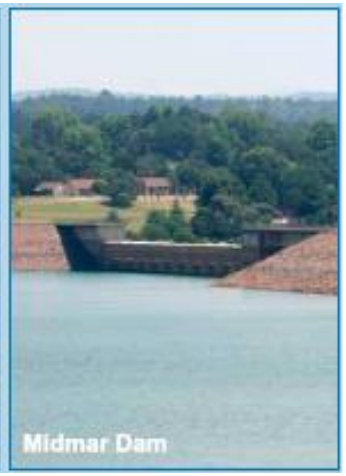
Average Rainfall – Mgeni Catchment



Mgeni System Storage



UMGENI WATER · AMANZI



THANK YOU