6.2 Balance of water availability within the Mgeni WSS

Spring Grove Dam

WATER AVAILABILITY IMBALANCE IN MGENI WSS

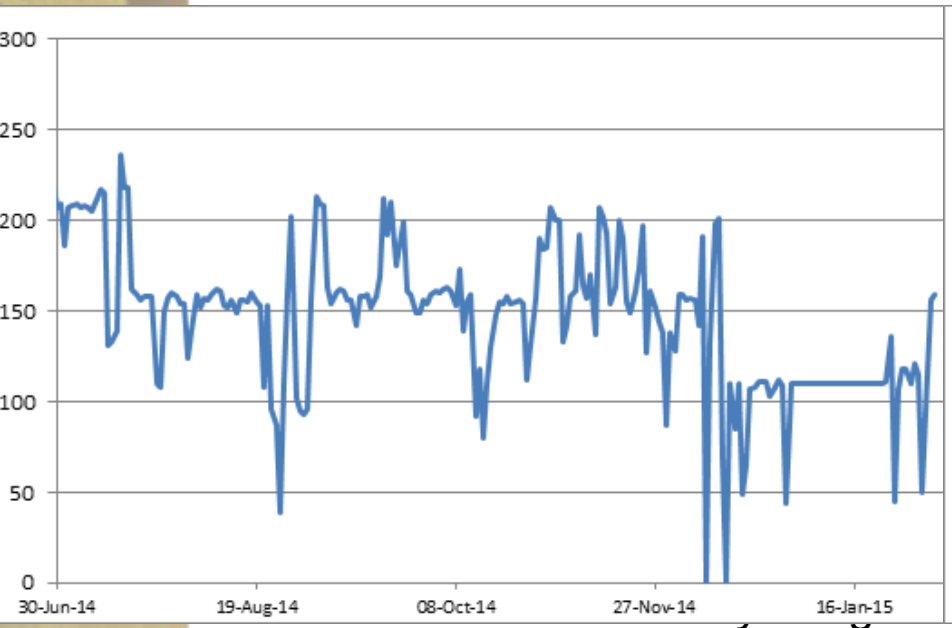
Currently there is not an ideal distribution of water in the various dams of the Mgeni WSS due to:

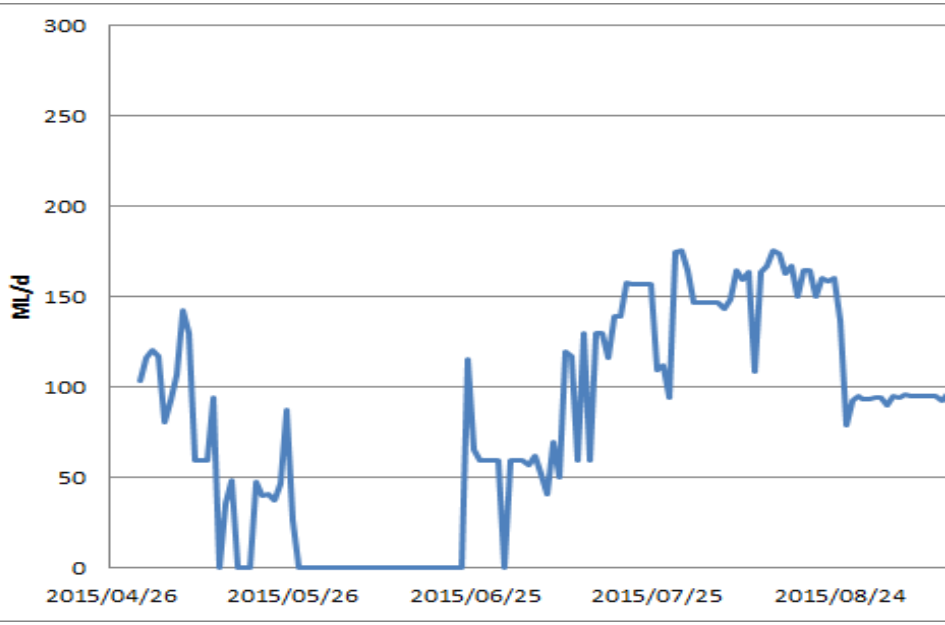
- Drought impacts and distribution of rainfall across the catchment, e.g. escarpment and coastal rainfall better then midlands.
- Not maximising existing pumping capacity, i.e. Inanda pumping below full capacity due to infrastructure issues, the operational constraints of shifting Hazelmere supply areas onto DBN Heights WTP, and the cost of pumping vs. benefits before full onset of the drought.
- Other sources of water potentially increasing volumes in Inanda, i.e. WWTP return flow growth and runoff from urban areas.

➢ Solution – pump to maximum capacity to shift availability from dams that can spill to those which are more critical.

WATER AVAILABILITY WITHIN THE MGENI WSS

Inanda Dam pumping operating at average of 100 Mℓ/d over past year. Possible to increase (2014 max)

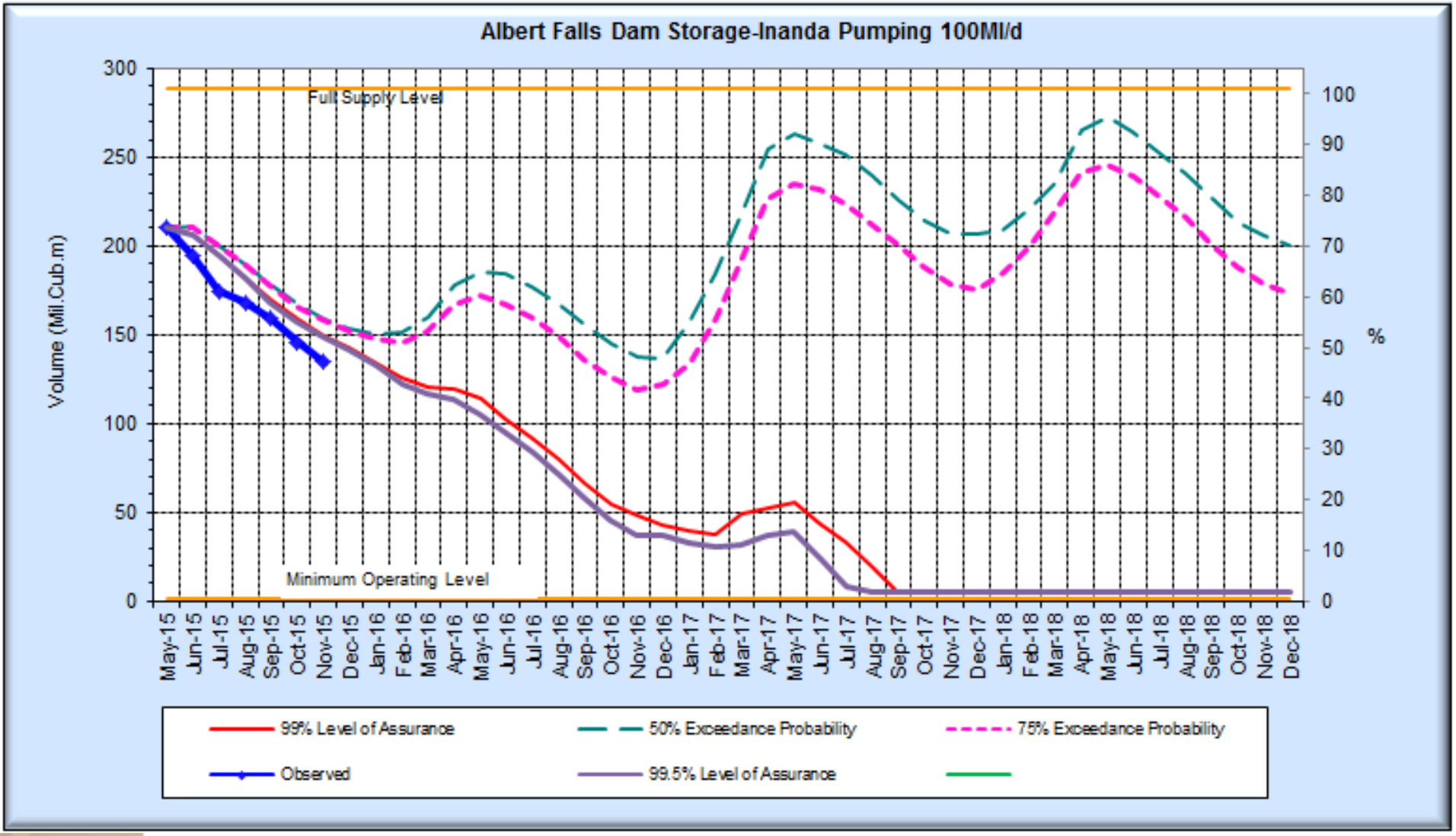




Umgeni Water currently busy with upgrades to Inanda and shaft pumps:

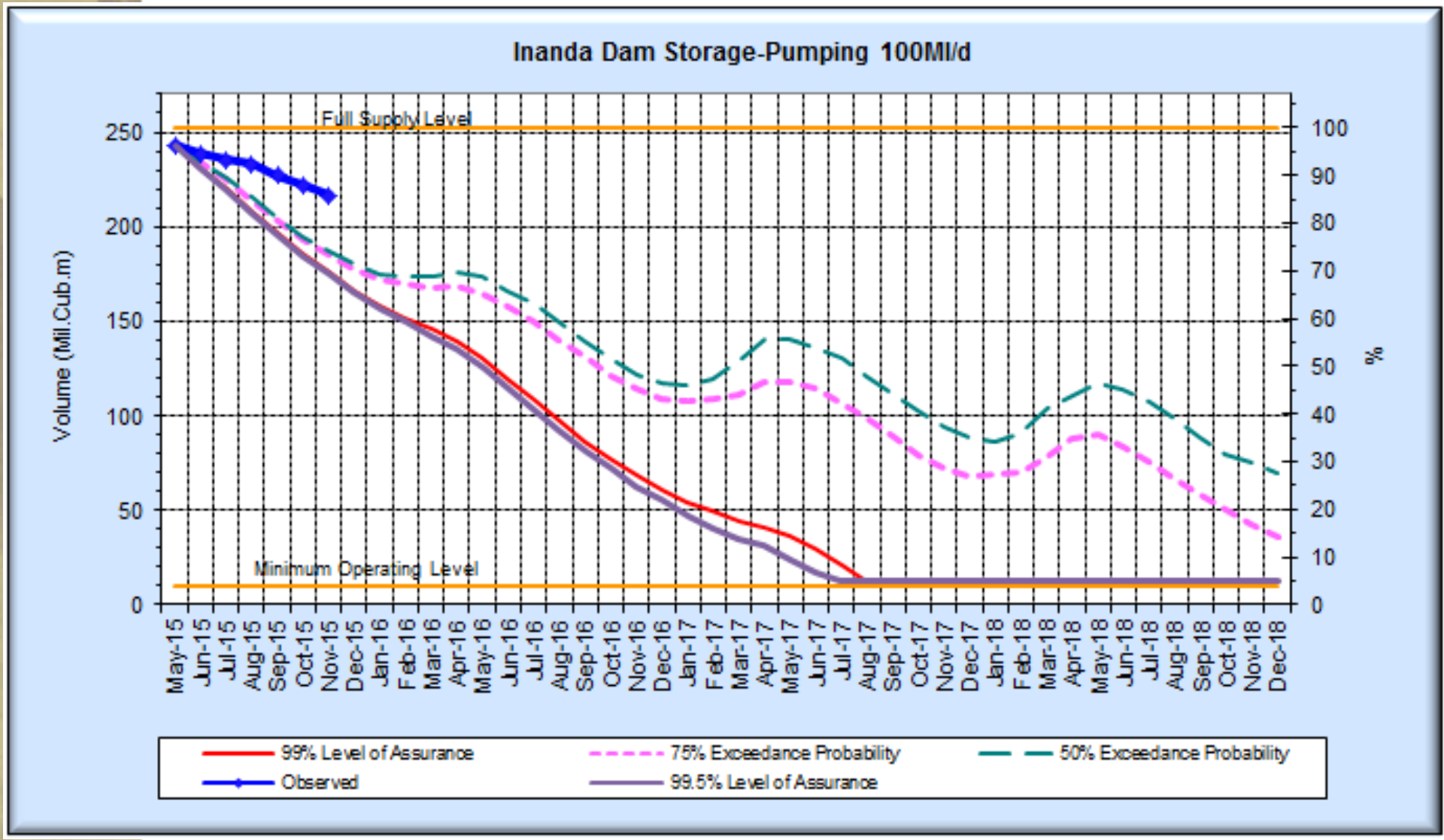
- Replacing a 3rd pump at shaft pumps and capacity will be up to about 250 Mℓ/d.

ALBERT FALLS PROJECTIONS AND MONITORING



ACTUAL VOLUMES TREND BELOW PROJECTION

INANDA DAM PROJECTIONS AND MONITORING



ACTUAL VOLUMES ABOVE PROJECTION (DROUGHT RELATED PERCENTILES)

HIGHER PUMPING TO MIDMAR VIA MMTS

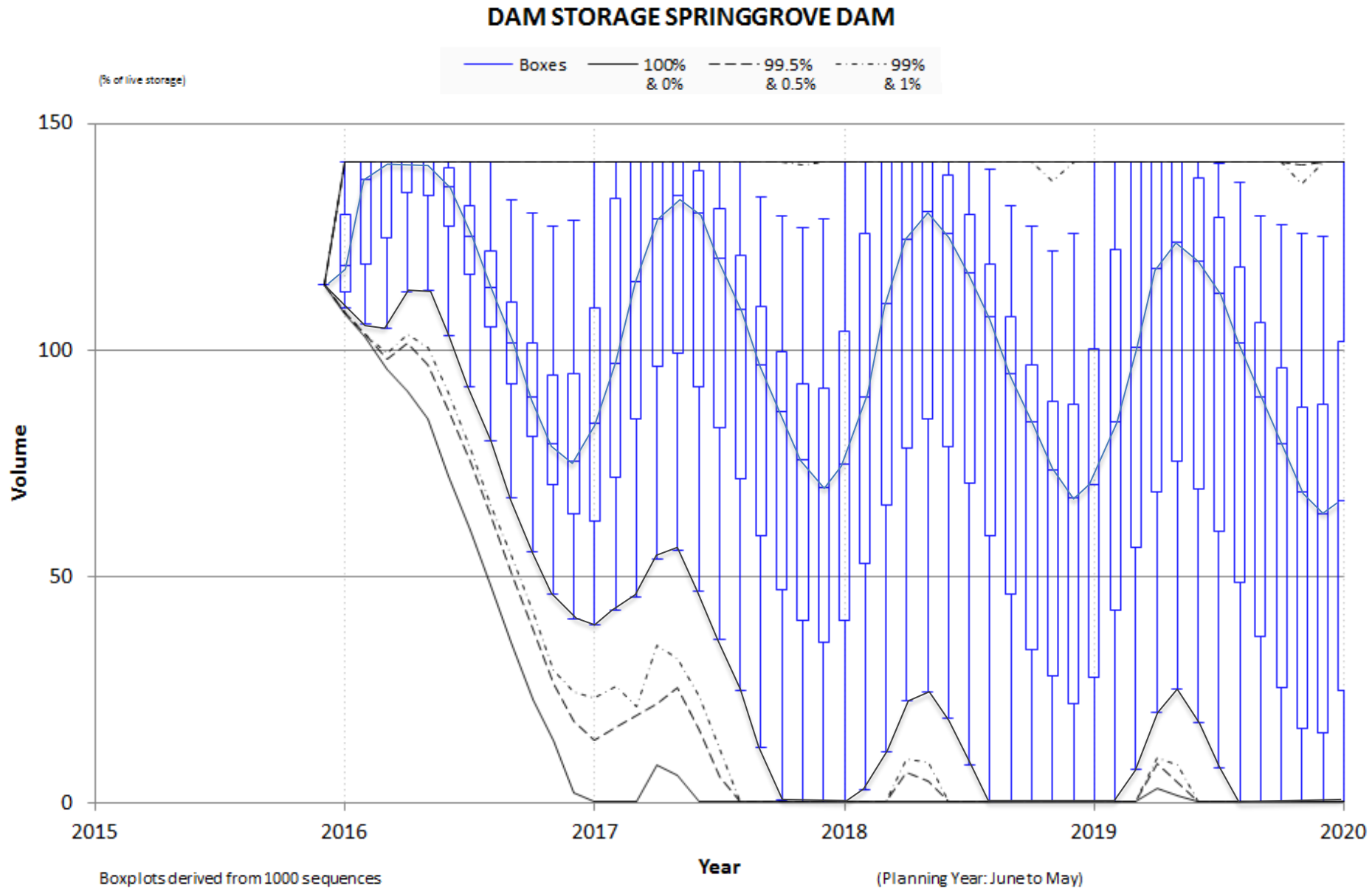
Currently pumping via two phases of MMTS limited to 4.5 m^3/s due to receiving capacity of Mpofana River:

- Total pumping capacity via two phases amounts to 3.2 m^3/s from Mearns Weir and 4.5 m^3/s from Spring Grove (soon to be completed).
- As a short term measure could pumping to the full (or higher) infrastructure capacity provide meaningful increase in yield/improve system balance?
- If so, should be consider reviewing the receiving stream capacity?

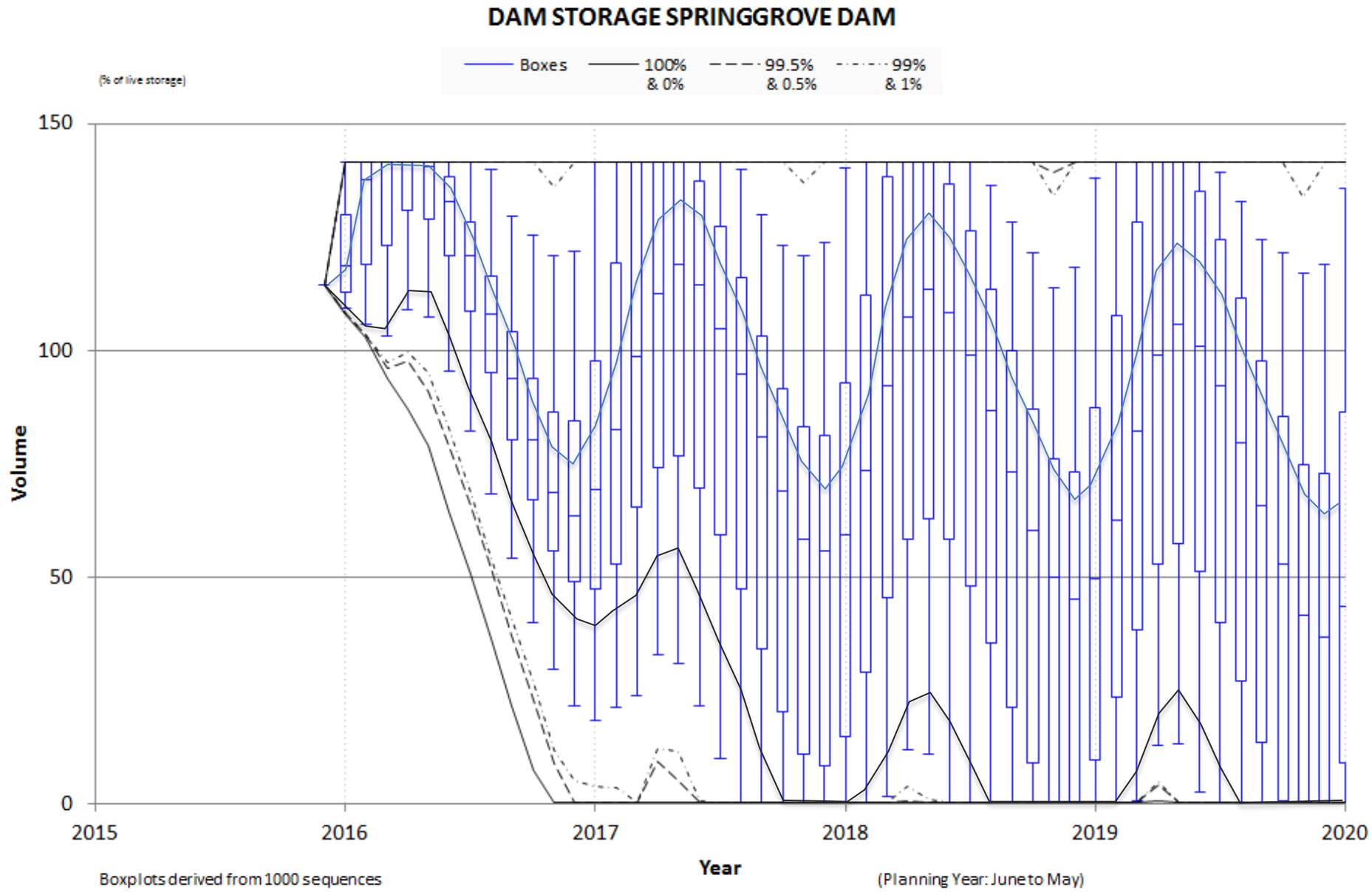
➢ WRPM used to test from an availability perspective:

- 4.5 m^3/s (base), 5.25 m^3/s and 6.1 m^3/s.

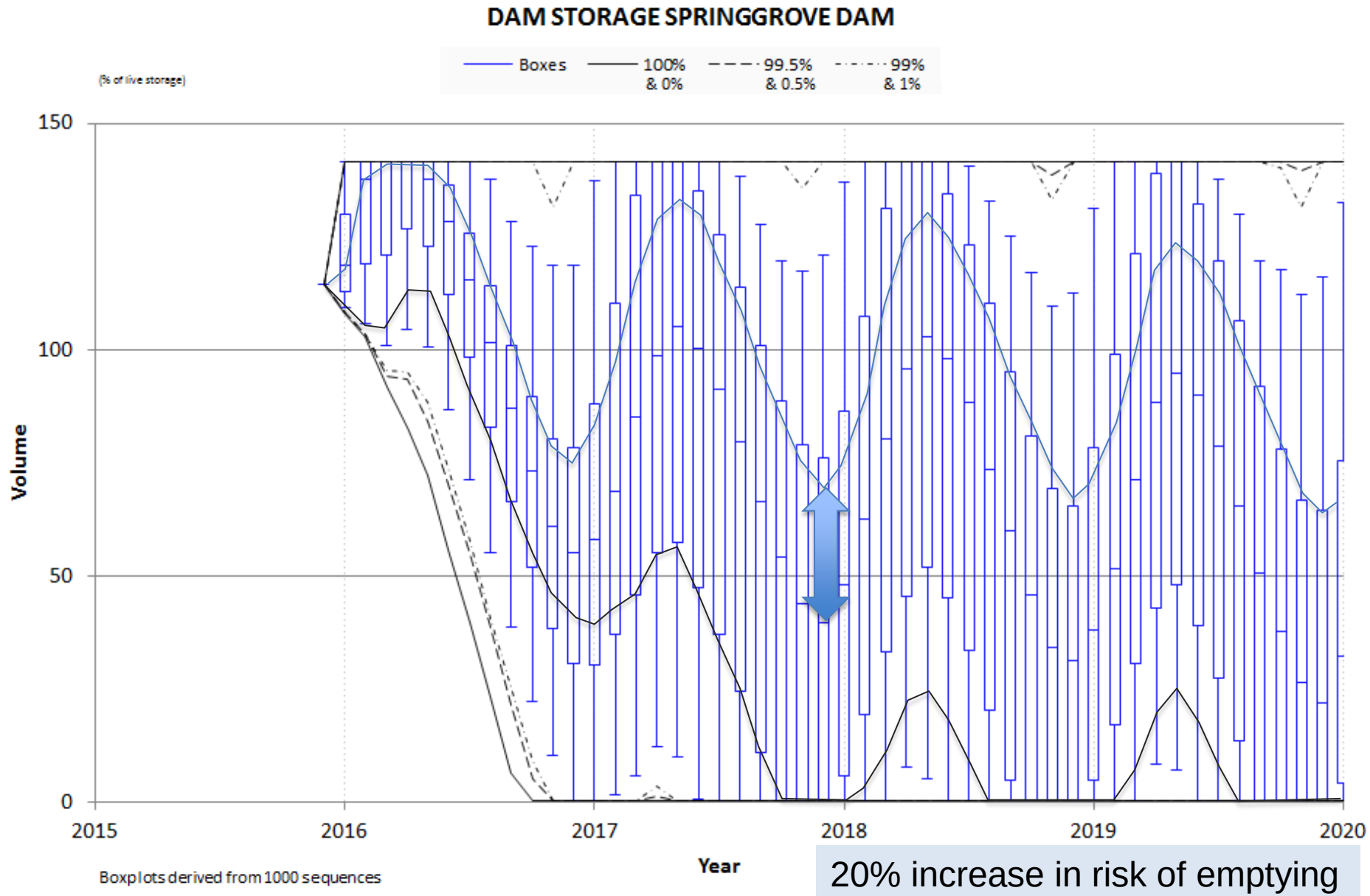
PROJECTION FOR 4.5 m³/s TRANSFER



PROJECTION FOR 5.25 m³/s TRANSFER

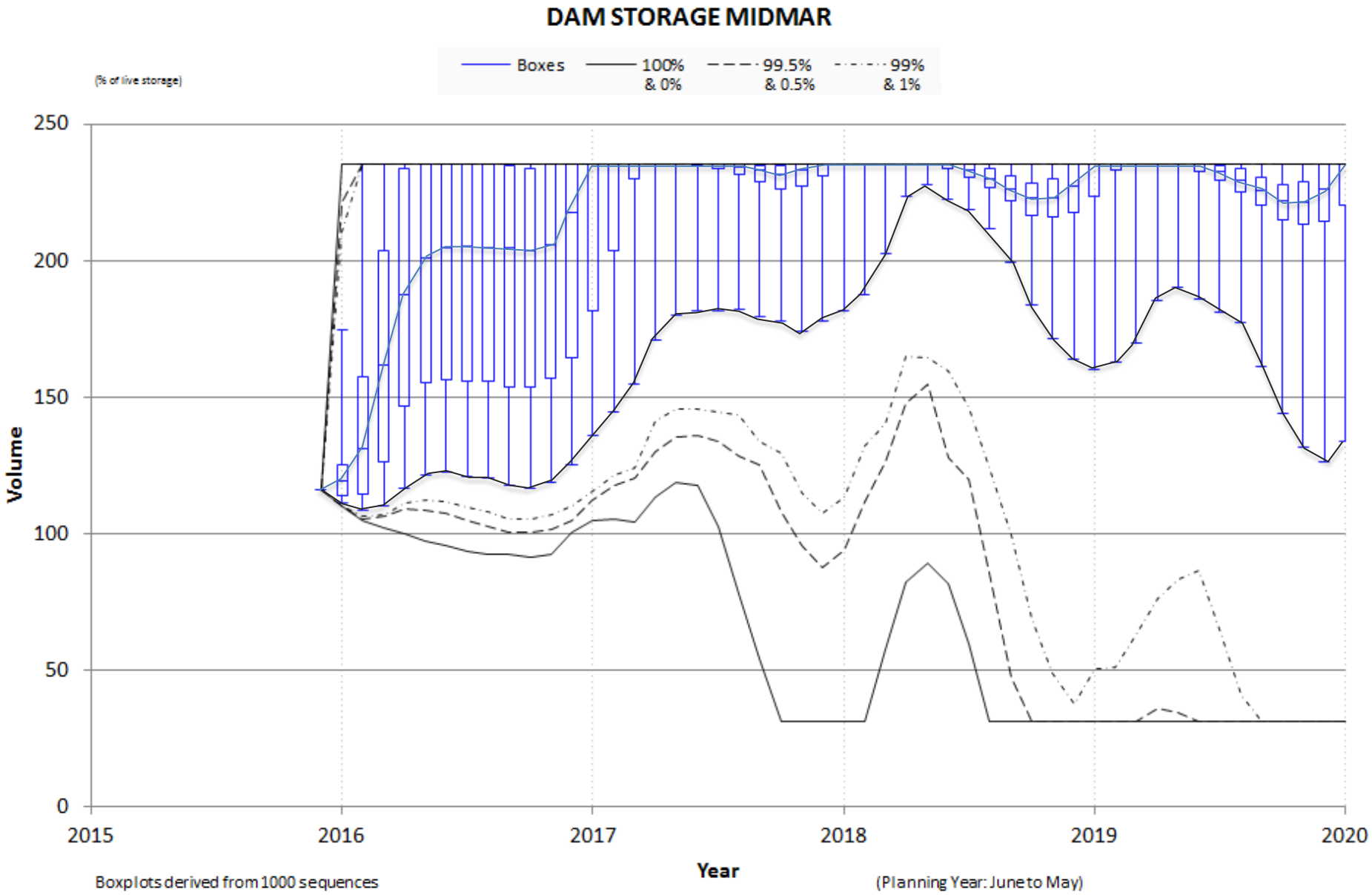


PROJECTION FOR 6.1 m³/s TRANSFER

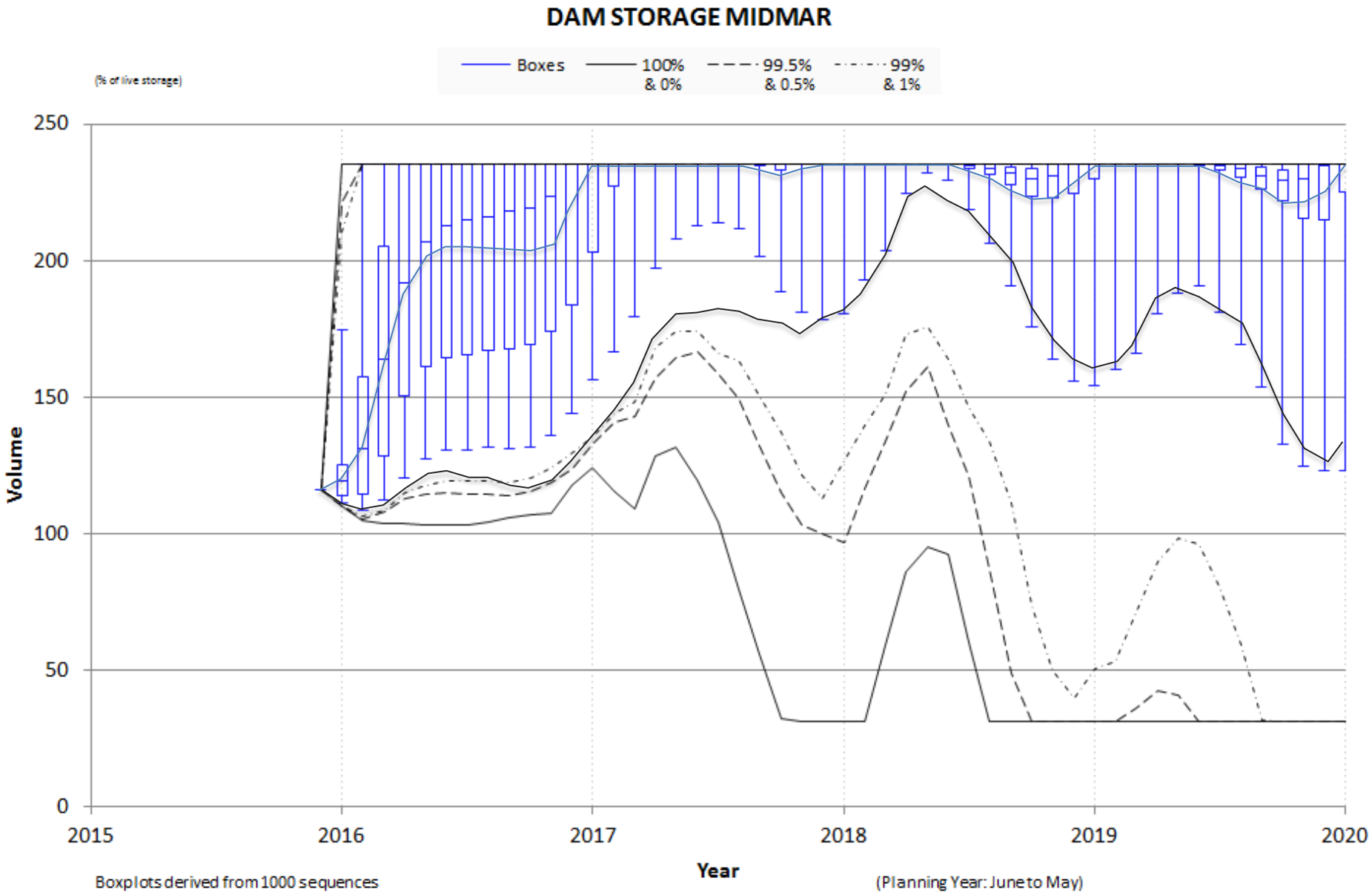


20% increase in risk of emptying

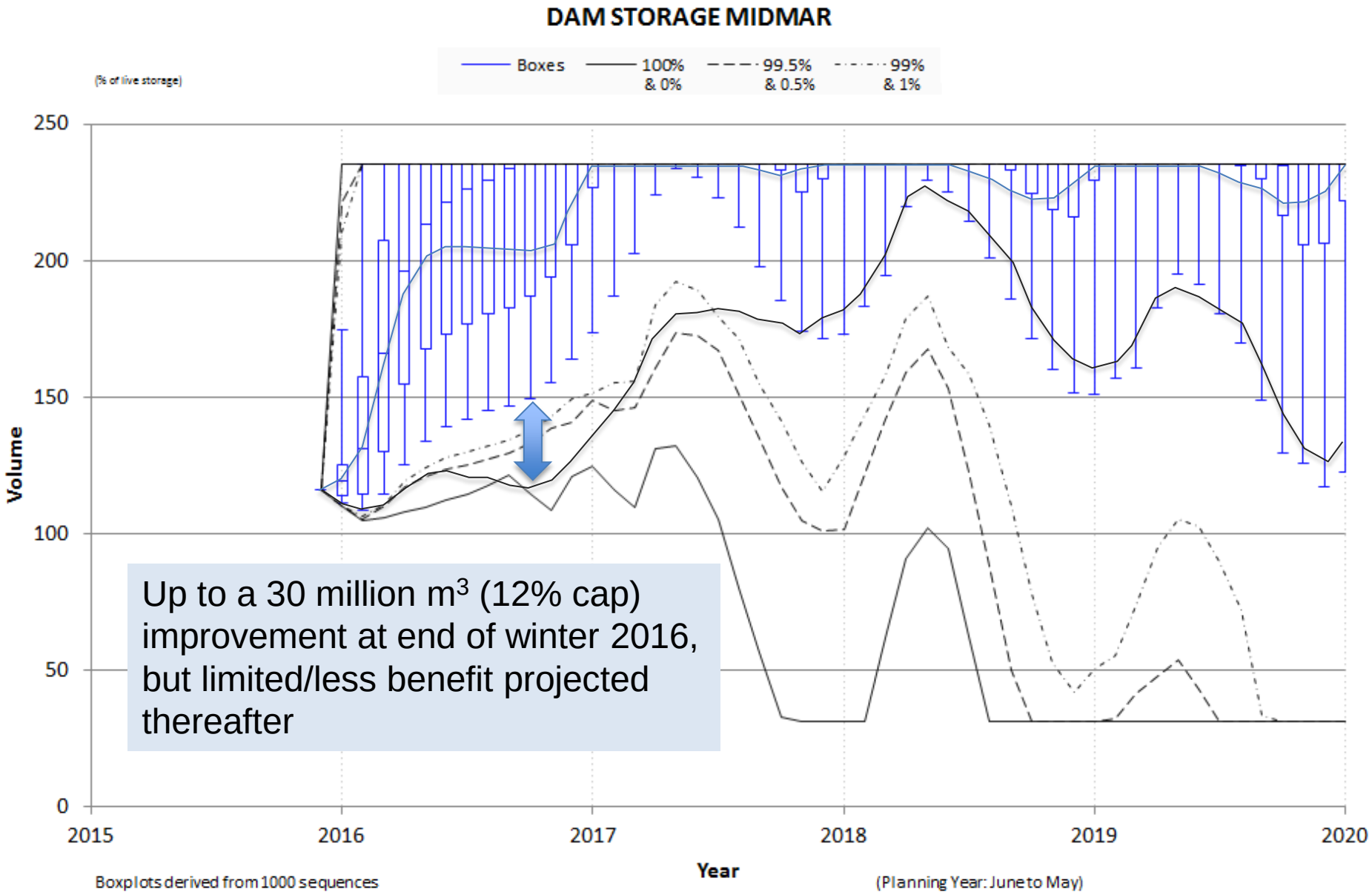
PROJECTION FOR 4.5 m³/s TRANSFER



PROJECTION FOR 5.25 m³/s TRANSFER

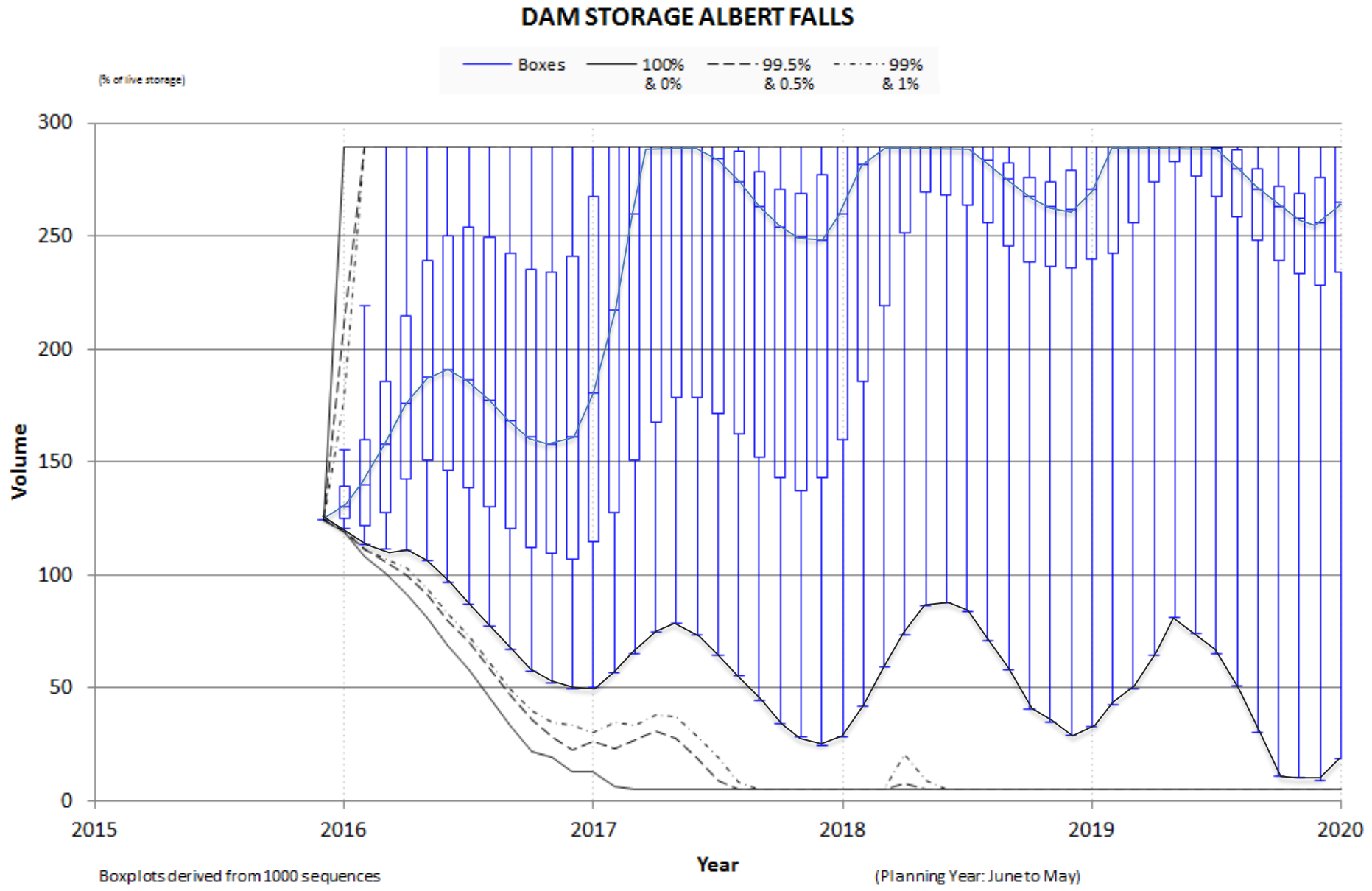


PROJECTION FOR 6.1 m³/s TRANSFER

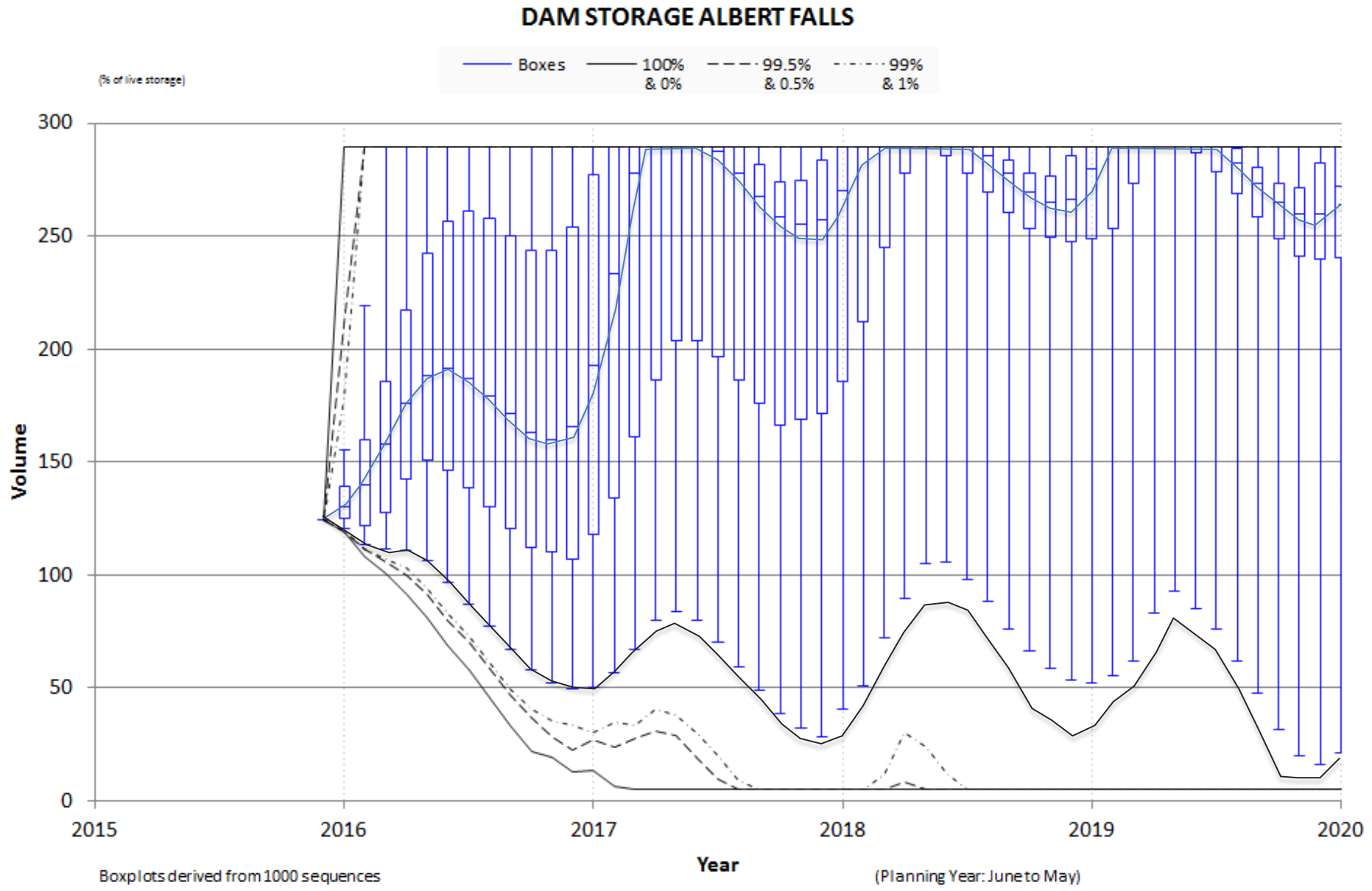


Up to a 30 million m³ (12% cap) improvement at end of winter 2016, but limited/less benefit projected thereafter

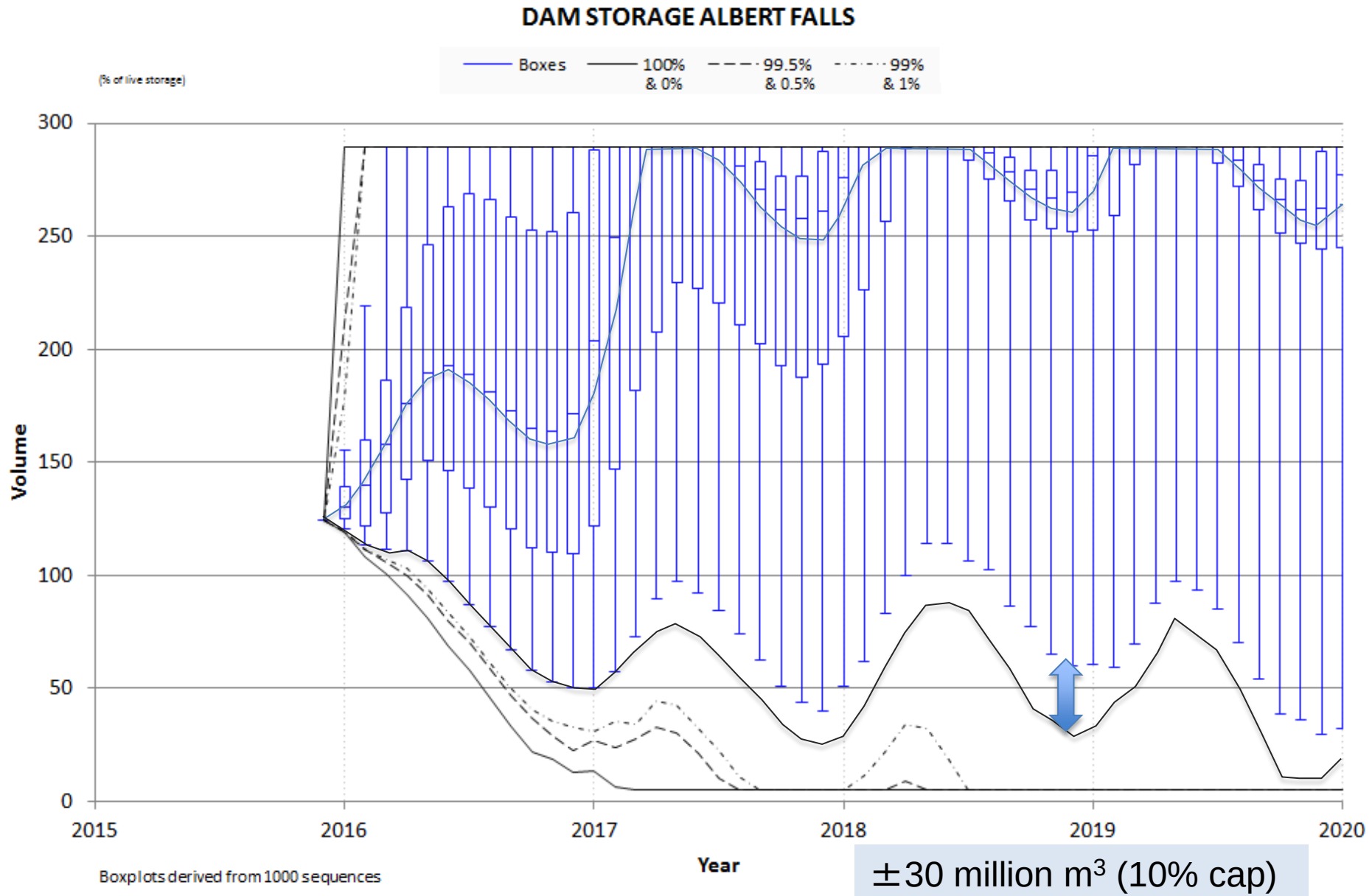
PROJECTION FOR 4.5 m³/s TRANSFER



PROJECTION FOR 5.25 m³/s TRANSFER



PROJECTION FOR 6.1 m³/s TRANSFER



±30 million m³ (10% cap)

PUMPING SUMMARY

From the prelim increased pumping tests, the following may be concluded:

- Increased pumping has some positive impact in 2016 for Midmar Dam (up to 30 million m^3 - 20% by end of winter), but limited longer term benefits (short term shift in storage with limited spills reduction benefit).
- More importantly, the increased pumping can also benefit Albert falls, up to about 30 million m^3 in Alberts by 2018.
- Negative impact on Spring Grove Dam potentially failing earlier needs to be considered,
- Operating rules in prelim tests could be refined to reduce impacts
- Potential impacts on ecology needs to be weighed up against benefits.
- Infrastructure limitations e.g. surge tank need to be confirmed.

INFRASTRUCTURE CONSTRAINT REALITIES

Based on information from design team for MMTS2:

The Mpofana outlet capacity is based on the following:

- MMTS-2 can pump 5.5 m^3/s with Spring Grove Dam at FSL and 4.0 m^3/s at LDDL but the pumps are controlled by the VSD's which is programmed to limit the pumping capacity at 4.5 m^3/s.
- With the 4.5 m^3/s from MMTS-2 plus 3.6 m^3/s from MMTS-1 and all six sleeve valve at Mpofana 100% open the system can discharge 8.1 m^3/s into the Mpofana River.
- The system has not been designed/tested for this high flow rate and the Break Pressure Tank will probably overflow before 8.1 m^3/s is reached.

➢ Further testing is needed, but the assumption of 5.25 and 6.1 m^3/s appear perhaps possible (from an infrastructure perspective)

water & sanitation

Department:
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REPUBLIC OF SOUTH AFRICA

Thank you