



## **Streamflow Monitoring**

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The National Water Act (Act No. 36 of 1998) mandates the Department of Water and Sanitation (DWS) to form an establishment and management of national monitoring programmes to facilitate the continued and coordinated monitoring of water resources in the country. This is established by collecting relevant data and information that are sufficient and responsive to the present and future challenges for efficient management of the country's water resources. With this information, we can put in place plans to overcome for example disasters (droughts and floods) in the future.

Various disciplines in the water sector use this Information to put in place plans and solutions to overcome for example unavailability of water during periods of drought or diminishing flood damage. Engineers when planning reservoirs use this information to know what the availability and variability of the runoff is in order to design the capacity of the reservoir to supply a specific yield. A Reliable and long term streamflow records are a prerequisite for effective planning.

The Department of Water and Sanitation currently monitors about 680 surface water flow stations across the country. These monitoring network stations are managed by the regional offices who are also responsible for downloading raw data from the stations in a three months' interval.

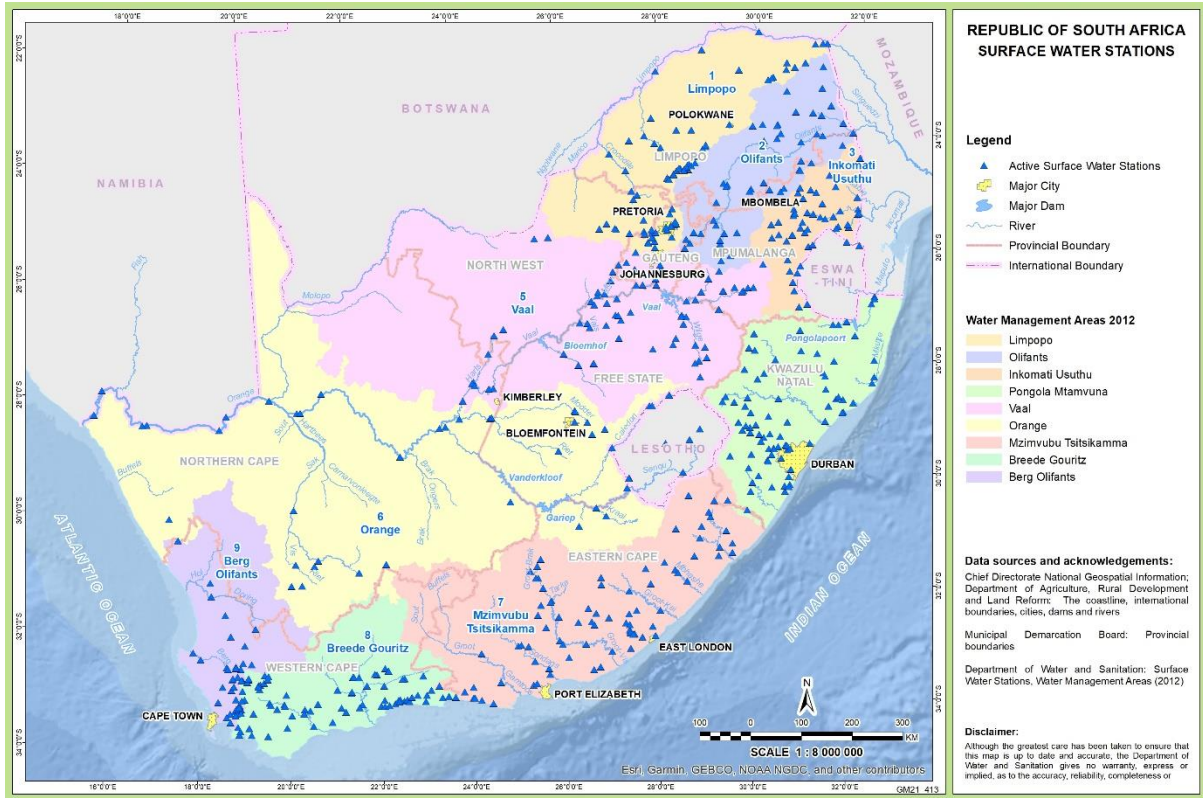


Figure 1: Active surface water stations map

The data is collected Manually, electronically and Mechanically as shown on the table below.

Type of raw data.	Sources	Collected by
Mechanical	Chart data	Data Collectors
Loggers	Electronic data	Data Collectors
		Real time System
Observed readings (gauge plate readings)	Flow readings; Inspection reports;	Hand delivery, post, telephone, fax or email.

Upon collection, the regional offices capture and process data onto the regional database where is promoted onto the central database overnight. The data undergoes checking, verification, auditing, promotion and archiving into the Hydstra data management system at the head office.



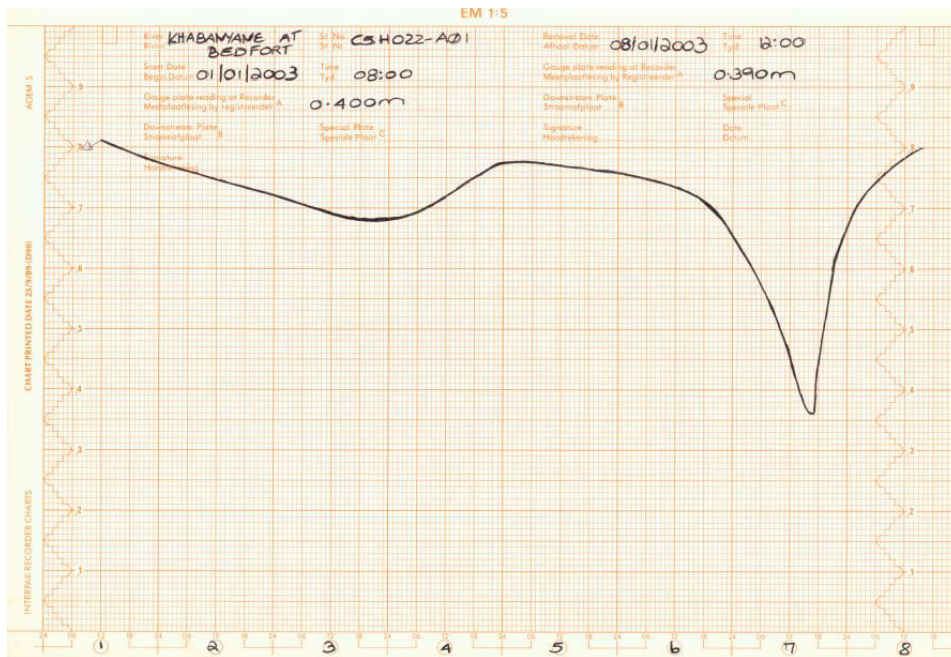
Below are the examples of equipment used to collect data



Gauge Plate



loggers



Chart

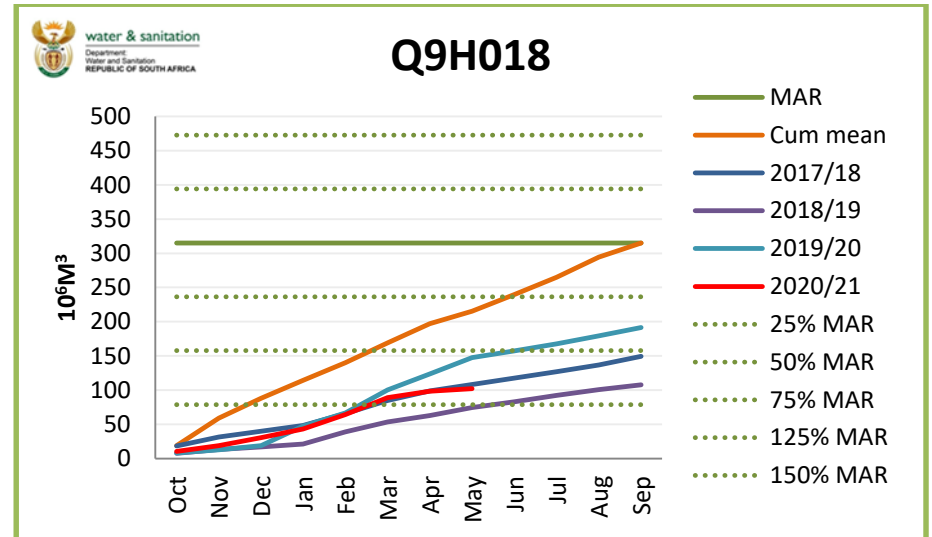
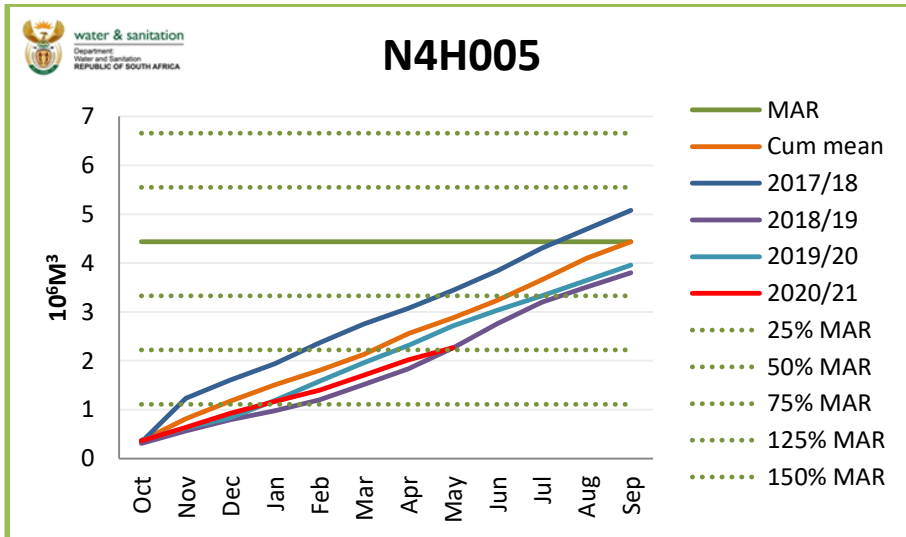
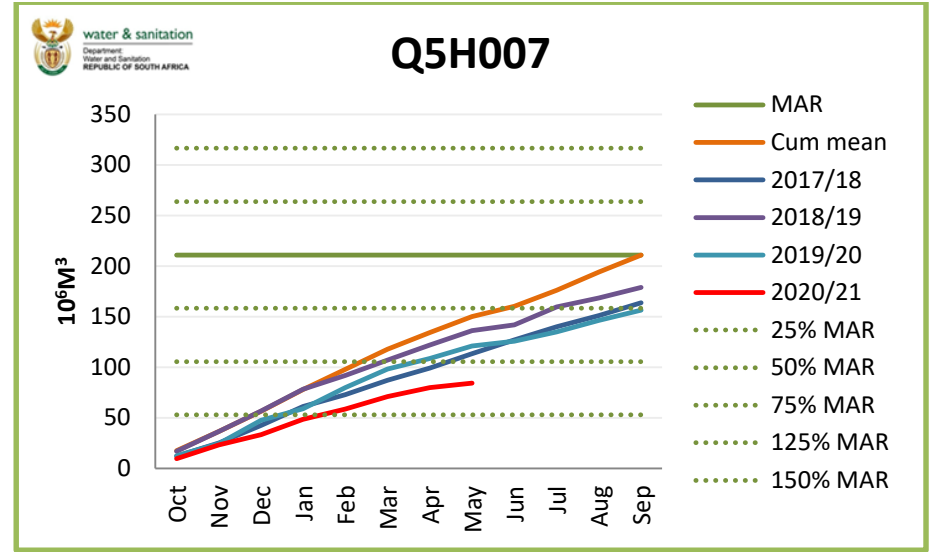
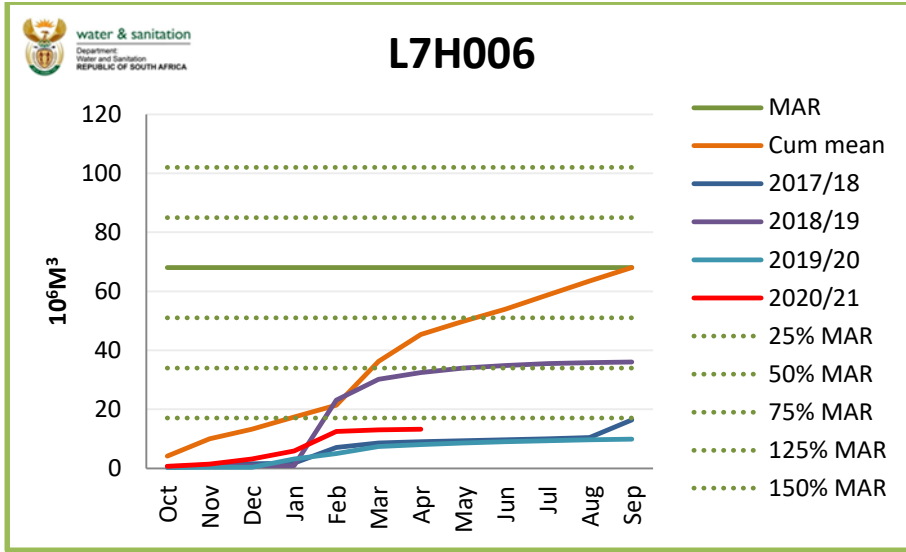
The graphs below show a recent analysis that was done for the Hydrological yearbook using the streamflow data in our database. The analysis was based on comparing the monthly cumulative flows for the 2020/21 hydrological year with the previous hydrological years, MAR and the average cumulative mean of the entire period.





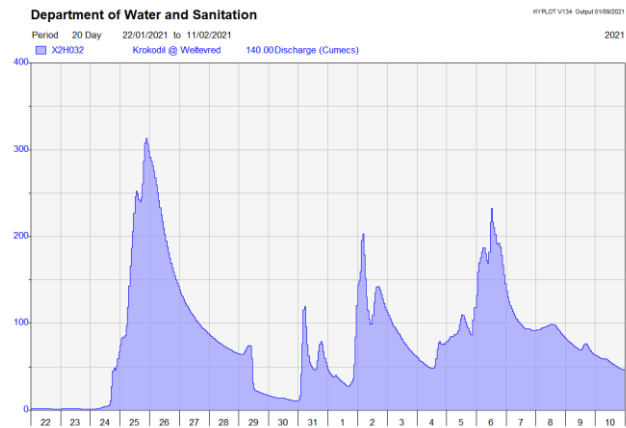
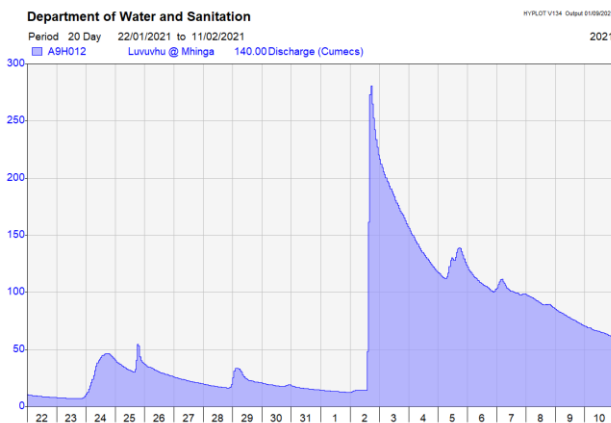
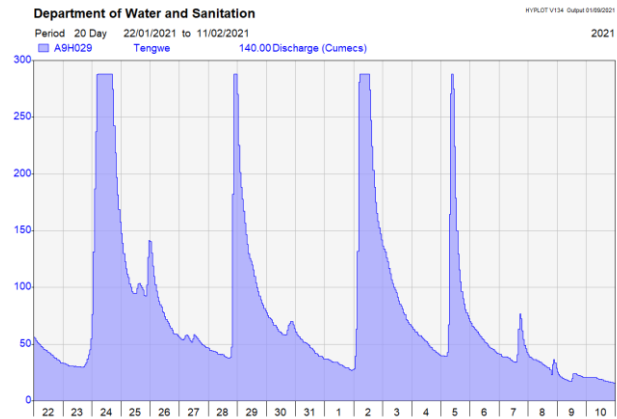
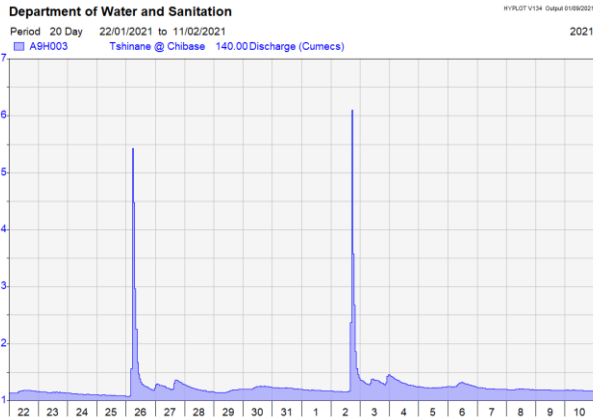
# water & sanitation

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Another analysis was done for Annual Report on National status of water to show the effect of Tropical Cyclone Eloise on some parts of Limpopo, Kwa-Zulu Natal and Mpumalanga province. These provinces received significant amounts of rainfall from the 23<sup>rd</sup> of January that resulted in floods. Below are observed hydrographs from the flow gauging stations within the vicinity of where the flood events were observed in Limpopo and Mpumalanga.



Sustainable Development Goal 6 is to ensure the availability and sustainable management of water and sanitation for all; and it targets to protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes by 2020 (Target 6.6). River and estuary discharge, or the volume of water moving downstream per unit of time, is an essential metric used in indicator 6.6.3 (*Change in water quantity (a) Rivers and (b) Estuaries*) to understand water quantity within an ecosystem and availability for human use.

The department of water and sanitation together with other stakeholders commenced a scientific review (*Scientific Review Report of the study (DWS, 2016)*), in order to develop an optimised National Monitoring Network design. The review was undertaken to ensure that the



Monitoring Network provide adequate national and regional spatial coverage and scientifically sound measurement of the quantity, quality and biophysical properties of water resources at appropriate time intervals. According to this Scientific review, 1066 surface water monitoring sites are required in order to sufficiently meet the National Water Resource Monitoring Objectives. To achieve these objectives, it was recommended that More sites need to be constructed; and closed (inactive) sites which need replacement or require an upgrade will need to be prioritised for reopening.