

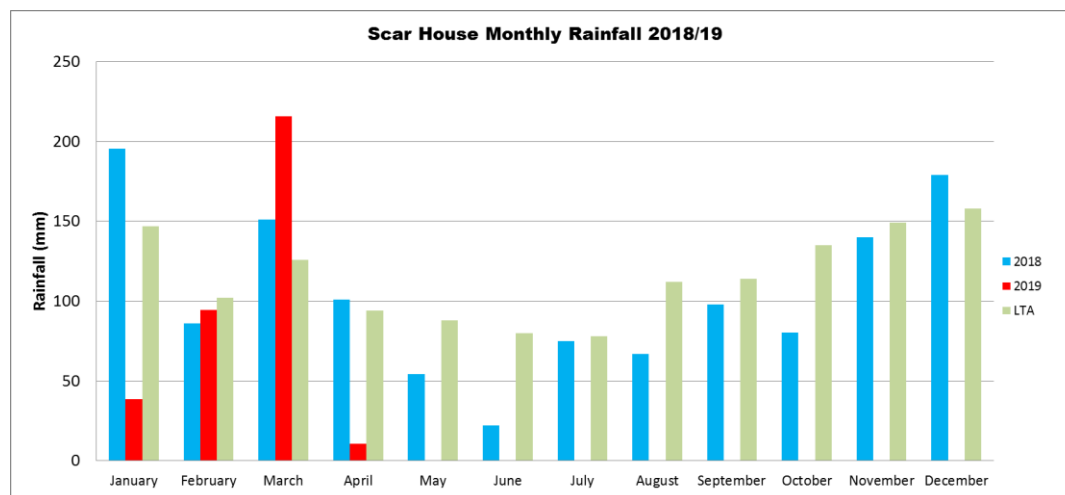
Report to Gouthwaite Board of Management Hydrological Conditions of the Nidd Catchment – 2018/19

Rainfall

Graph 1 below shows the monthly rainfall totals recorded in the Upper Nidd catchment at Scar House Reservoir rain gauge during 2018 and 2019 to date. All recorded rainfall is compared to the calculated Long Term Average totals (LTA).

Total rainfall for 2018 at Scar House was 90% of LTA, caused by the wet start to the year which preceded a sustained period of dry weather and high temperatures. The May to November rainfall was consistently below monthly LTA. Rainfall in those months, and especially in September and October, were largely the result of storms on one or two days in each month separated by days of no rainfall. In the Nidd catchment as a whole it was the driest summer since 1995 and the 15th driest April to October since 1910.

Since April 2018 there have been only two months with above average rainfall. March 2019 rainfall was the highest monthly total in over a year. It was also the product of the longest period of sustained rainfall for some time.



Graph 1: Monthly rainfall totals at Scar House Reservoir compared to the LTA for 2018/19

River Flow

Graph 2 overleaf shows the monthly mean flows recorded at Birstwith flow gauge (River Nidd) during 2017/18. They are compared to the calculated LTA.

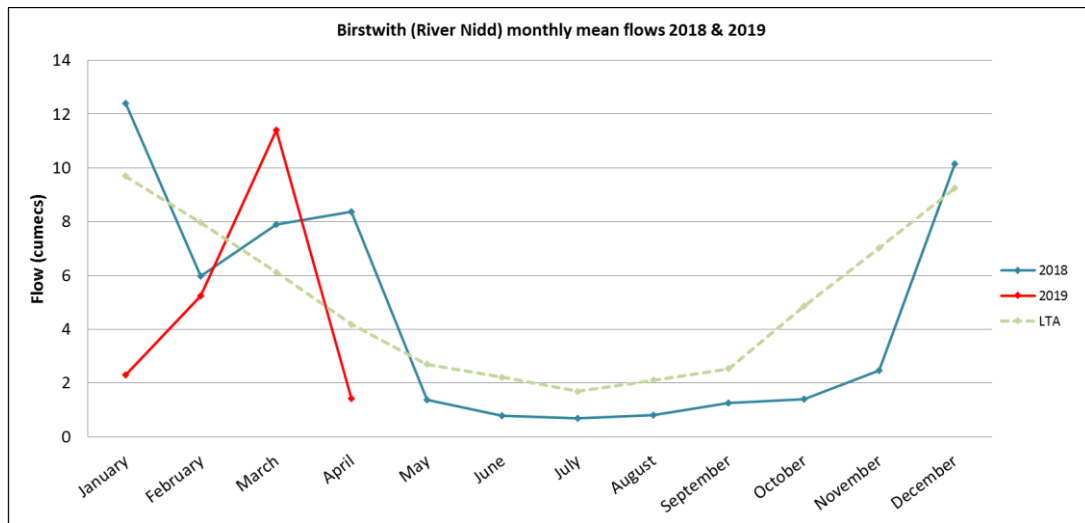
Reflecting the rainfall pattern, 2018 began with high flows. After a drier February flows increased above average during March and April before falling away with the onset of dry weather in May. Between June and November monthly average flows remained below 50% LTA. The monthly average flow did increase marginally in September and October in response to the storm days in those months.

Flows during the summer 2018 were similar to those of previous drought years but have not been as low, for so long a period, since 1995. There have been only three months of above average monthly flow since March 2018

The intense rainfall in March 2019 produced high flood flows for a short period which affected the monthly average but the underlying trend in 2019 remains one of short responses to rainfall before flows return to levels more typical of last summer than a normal winter and spring.

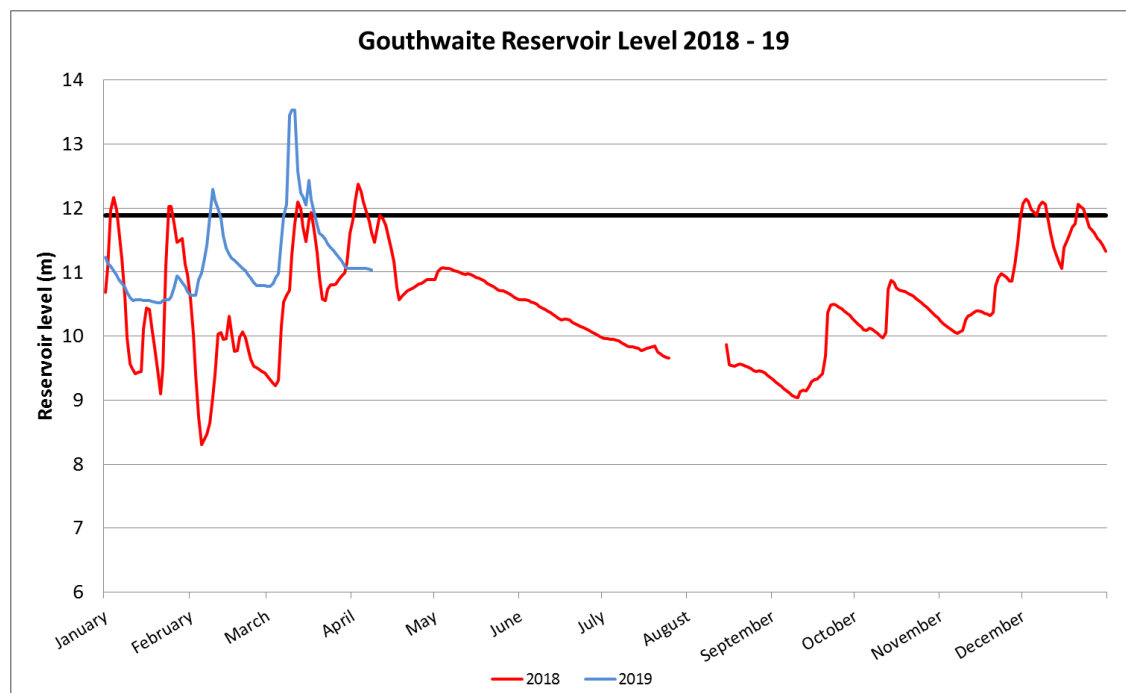
Hydrology

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Graph 2: Monthly mean flow at Birstwith (River Nidd) compared to the LTA for 2018 & 2019
Reservoir Level

Graph 3 below shows the reservoir level at Gouthwaite during 2018 and 2019 relative to the spill level of 11.89m. In the early part of 2018 there were limited spills reflecting periods of heavier rainfall. Levels fell quickly during February before returning to high levels in response to the spring rainfall. From mid-April there was a long period of steady decline in reservoir levels. The level measurement equipment failed during early August resulting in three weeks of missing data. Levels started to recover following mid September rainfall to reach overspill for short periods in response to specific rainfall events in December.

The decline in reservoir levels was not a steep as previous drought years; most notably compared to 2003 when levels reached a low of 5m.


Graph 3: Gouthwaite Reservoir levels 2018 / 19

Hydrology

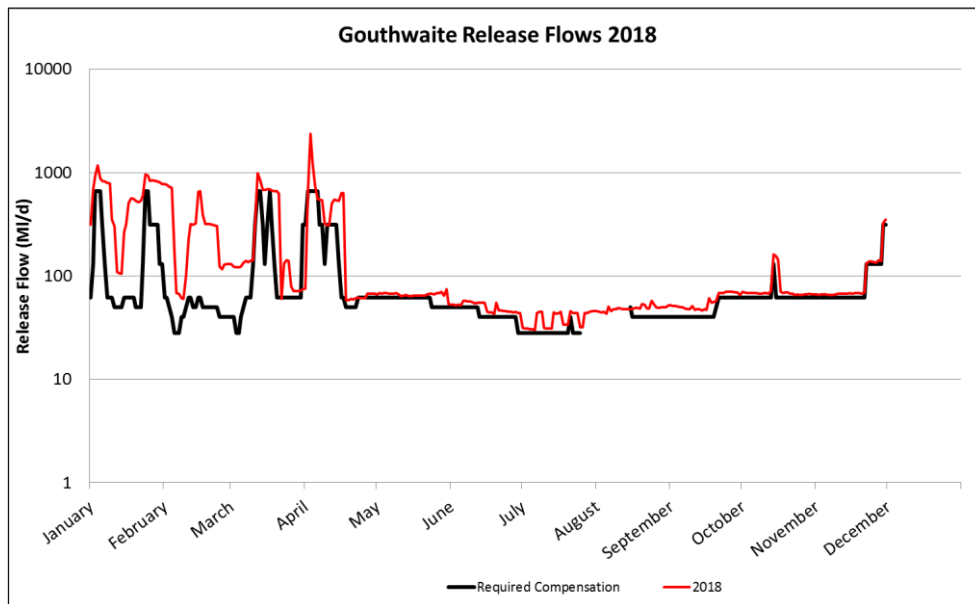
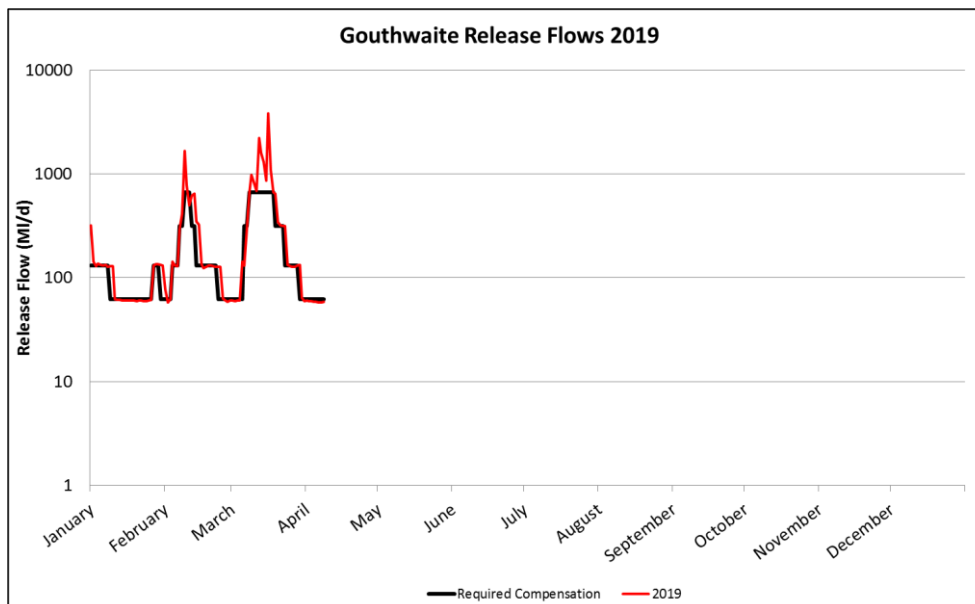
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Compensation Releases

Graphs 4 and 5 below show the reservoir release flows, including any spill, for 2018 and 2019 together with the required compensation releases under the current rules.

In 2018 the early part of the year shows greater release than required by the current rules. This is particularly the case during February, when rainfall was low and reservoir levels were falling rapidly. For the rest of the year release flows closely mirrored the required compensation. During July there were periods of stepped release flows which increased from 30 to 40 MI/d for short periods. Although reservoir levels returned to overspill in late 2018 releases continued to be restricted to the minimum requirements.

In 2019 the close match of releases to required compensation has been largely maintained reflecting the continuing lack of rainfall.


Graph 4: Compensation releases 2018

Graph 5: Compensation releases 2019