

Draft

Drought Plan 2020:

Annex 1d – Bala WRZ

March 2019



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1. Bala – WRZ Reference no. 8020

1.1. Bala Water Resources Overview

This is our smallest water resource zone, serving a population of less than 4,000. It covers the town of Bala and the immediate surrounding area (see Figure 1).

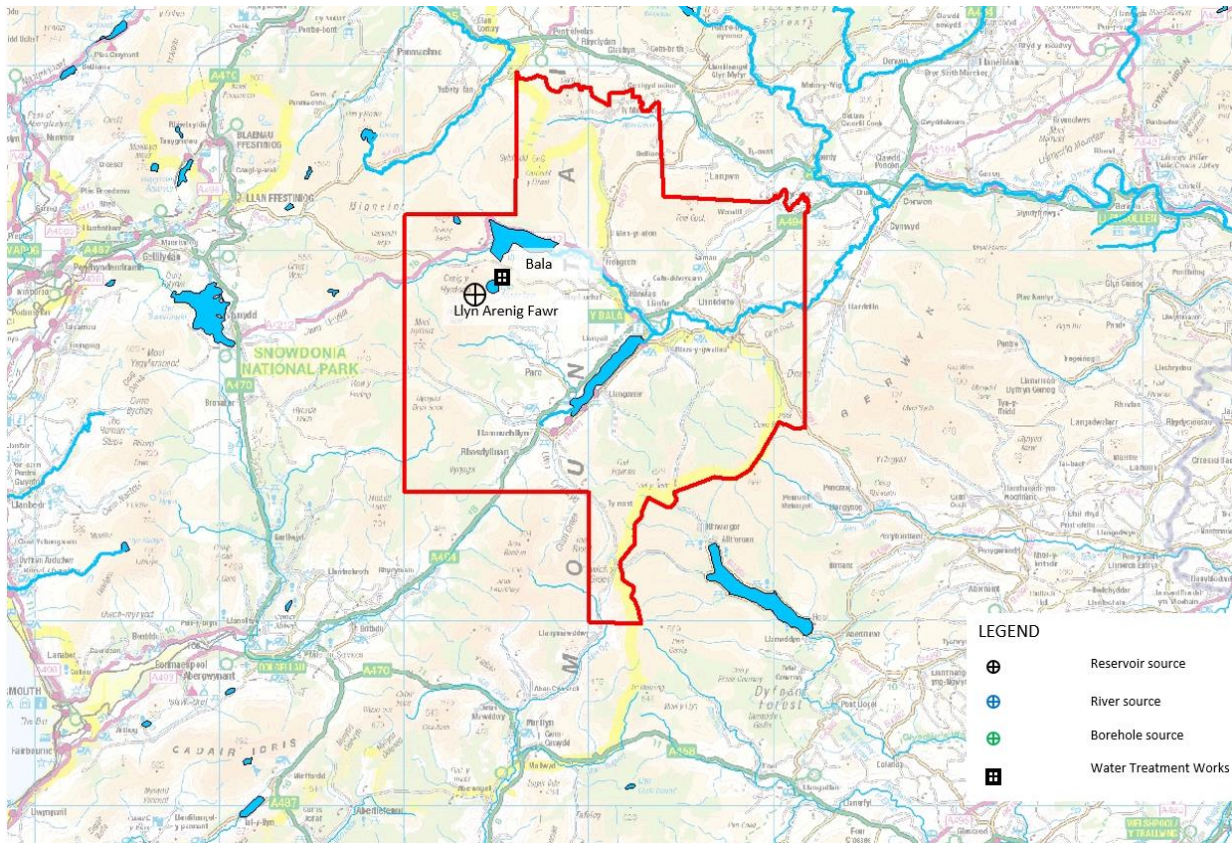


Figure 1 - Map of the Bala WRZ

The water resources within the zone consist of one impounding reservoir, Llyn Arenig Fawr (see Table 1).

Site Name	Licence No.	Source Type	Status
Llyn Arenig Fawr	24/67/2/0006	Impounding Reservoir	Operational

Table 1 - Licensed sources in the Bala WRZ

The water from Llyn Arenig Fawr is treated at Bala water treatment works; during the summer the demand can increase significantly due to tourism.

There are no exports or imports of water in the zone.

1.2.Drought Triggers

The drought status of the zone is assessed by the reservoir storage position at any time in relation to the Drought Action Zones (DAZs) for Llyn Arenig Fawr, see Figure 2. The use of the DAZs are described in more detail in Section 2 of the main report.

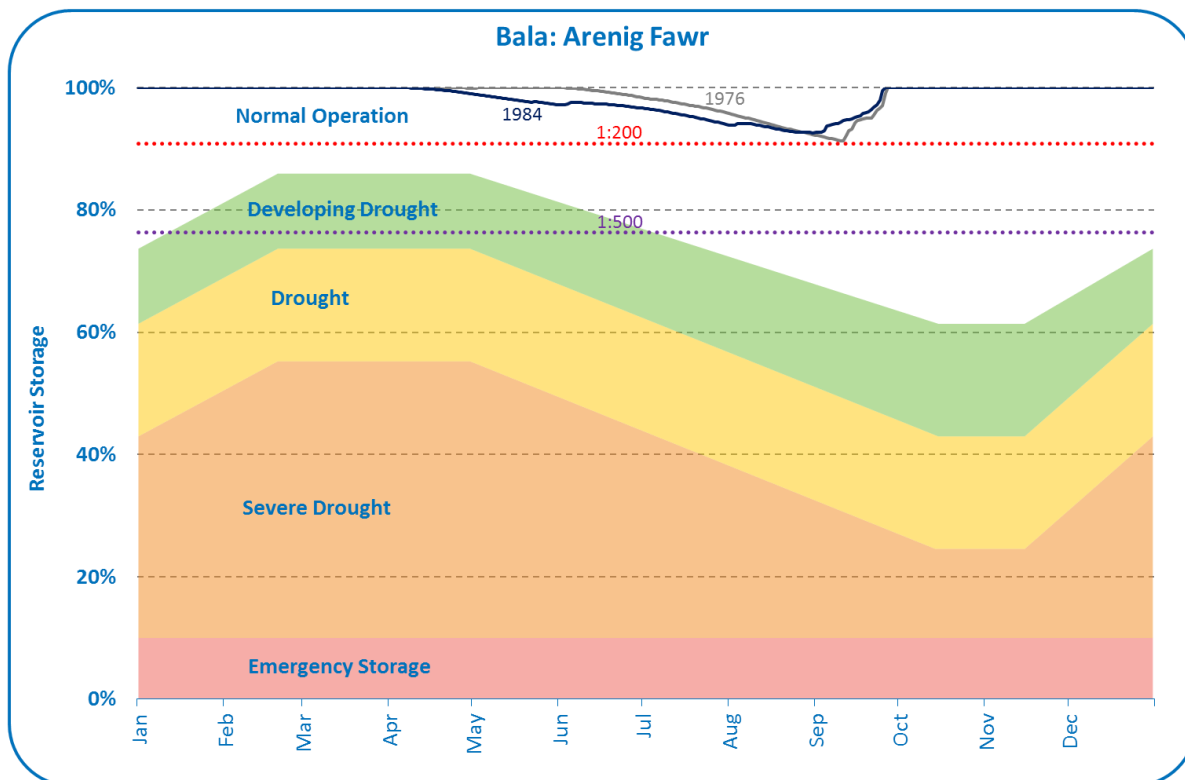


Figure 2 - Llyn Arenig Fawr Drought Action Zone

1.3.Assessment of Drought Risk

For our 2019 Water Resource Management Plan (WRMP19) we tested our ability to maintain supplies of water to our customers in the Bala zone during the period 1920 – 2015, which encompasses the known drought events of 1933/34, 1976, 1984, 1989 and 1995. The reported supply demand balance at WRMP19 shows the zone to be in a healthy position with a forecast 0.32 Ml/d surplus at 2024/25, increasing to 0.57 Ml/d by 2049/50. The WRZ was therefore classified as being at low risk of significant drought impact.

Figure 2 shows the results of our scenario testing. The worst historic droughts, when simulated in our water resource models, do not cause reservoir storage to fall lower than our Normal Operation action zone. However, as the historic drought events were less severe than those of a return period of 1:200, for WRMP19 we used Extreme Value Analysis to provide an estimation of the level of drawdown we could see at Llyn Arenig Fawr under a 1:200 and 1:500 year drought return period scenarios as represented on the chart by the red and purple dashed lines respectively.

Our analysis indicates that even under these more extreme drought events, reservoir levels would not fall lower than our Developing Drought action zone. We can therefore conclude that the Bala WRZ is at

a very low risk of us having to implement extreme supply side measures e.g. widespread pressure management or water rationing.

1.4. Drought Management of the WRZ

As the identified drought risk in the zone is low then our management philosophy is to ensure we operate our water resources in line with our control curves and take all necessary actions in good time, in order to maintain this high level of drought resilience.

The following sections describe the operation of the zone as we move into a drought period and the actions that we will take to ensure that we minimise the impact on our customers.

1.4.1. Normal Action Zone

During normal weather conditions we abstract from Llyn Arenig Fawr and treat the water at Bala Water Treatment Works.

1.4.2. Developing Drought/ Drought/ Severe Drought Action Zone

The abstraction from Arenig Fawr is small relative to the size of the reservoir and so even under drought conditions, it is extremely unlikely that the WRZ will be constrained by a lack of water resource. Although storage levels in our reservoir will be in a good position, the effects of tourism can cause high fluctuations in demand and at times we may approach the daily limit on our abstraction licence. When this happens we are unable to abstract sufficient water to meet customer demand without breaking these legal limits and so under instruction from the 'Gold' command centre, there are three ways in which we can respond.

The first is to increase our leakage effort to reduce the demand for water below our abstraction permitted levels. If this is still insufficient then we are able to carefully make changes to our supply networks in this zone and the neighbouring Alwen Dee zone, to allow additional water to be imported in from Alwen works. We would expect these actions to be more than sufficient in enabling us to meet customer demands using our existing resources but if not, then we will tanker in extra water from outside the zone to supplement the supplies available to us at Bala treatment works.

1.5. Supply-side drought management action

Given the high drought resilience of the zone, it is not considered necessary to develop further supply-side options. Therefore for the Bala zone we have not produced any Environment Assessment Reports (EARs) nor populated Appendix G of NRW's Water Company Drought Plan Technical Guideline (Dec 2017).