Dŵr Cymru
Welsh Water

Draft Drought Plan 2020: Annex 1i – Dyffryn Conwy WRZ

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1. Dyffryn Conwy – WRZ Reference no. 8035

1.1. Dyffryn Conwy Water Resources Overview

This WRZ stretches from the coastal region of Llandudno, inland to the Snowdonia National Park close to Blaenau Ffestiniog (see Figure 1).

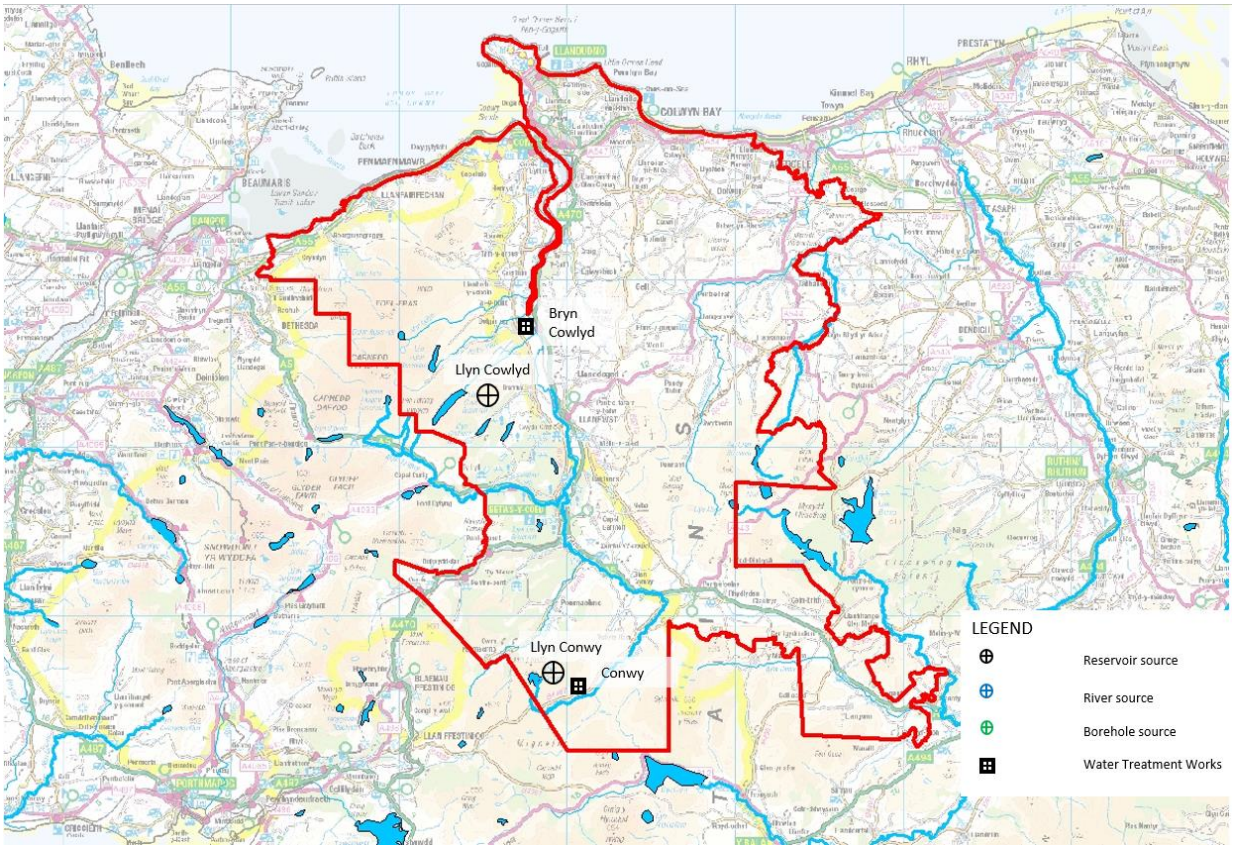

Figure 1 - Map of the Dyffryn Conwy WRZ

The water resources within the zone consist of two reservoirs (Llyn Cowlyd and Llyn Conwy), see Table 1.

Site Name	Licence No.	Source Type	Status
Llyn Cowlyd	23/66/10/0007	Impounding Reservoir	Operational
Llyn Conwy	23/66/1/0004v1	Non-Impounding Reservoir	Operational

Table 1 - Licensed sources in the Dyffryn Conwy WRZ

The principal water source in the zone is Llyn Cowlyd which feeds Bryn Cowlyd water treatment works with a maximum capacity of ~45 Ml/d. The storage in Llyn Cowlyd is managed between ourselves and RWE Innogy, who operate a Hydro Electric Power scheme. The top 47% of the storage is shared but, to ensure we have enough water in a dry year, the bottom 53% is for our use only. Our ability to supply water in this zone is constrained by the Cowlyd annual volume on the abstraction licence.

Llyn Conwy treatment works is much smaller but, when storage allows, Llyn Conwy can help supply more of the zone under gravity rather than pumping water up from Bryn Cowlyd which reduces our operating costs.

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

1.2.Drought Management

The drought status of the zone is assessed by the reservoir storage position at any time in relation to the Drought Action Zones (DAZs), defined for both Llyn Cowlyd and Llyn Conwy, see Figure 2 and 3. For Llyn Cowlyd the DAZ only includes the bottom 53% of storage as we share the resource with RWE Innogy. The use of the DAZs are described in more detail in Section 2 of the main report.

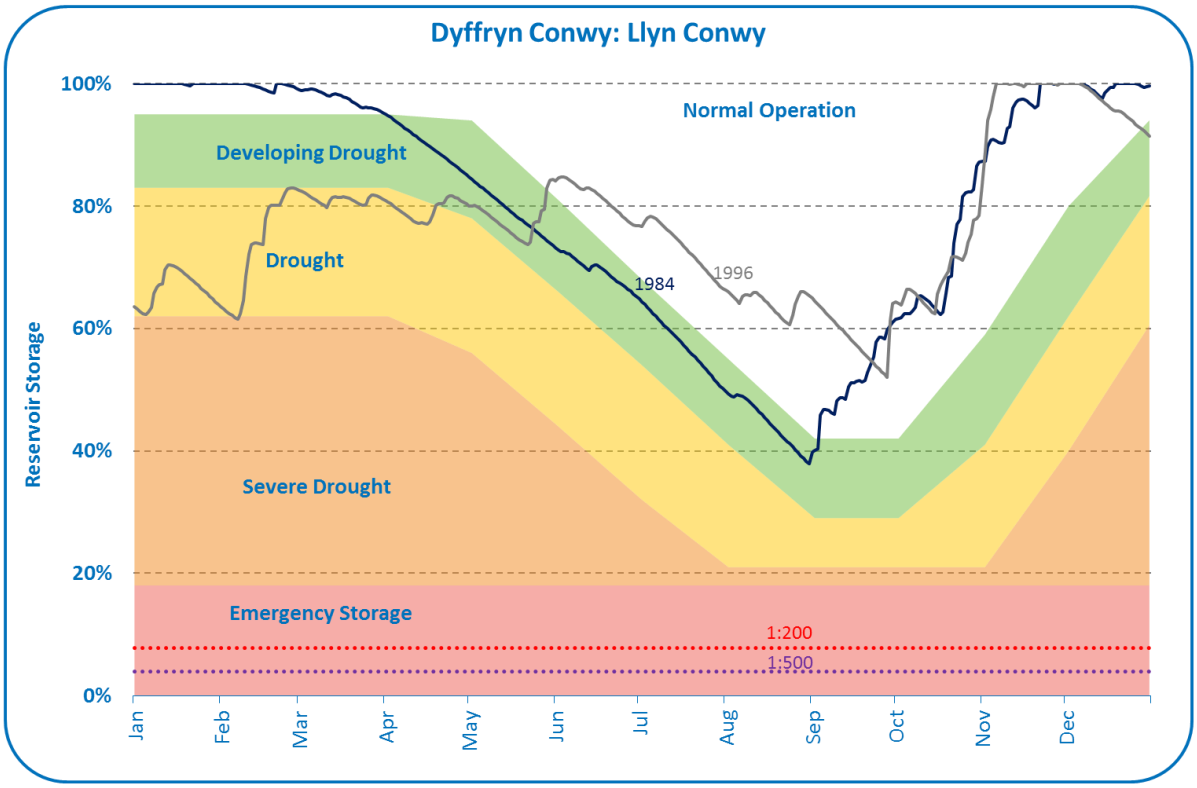

Figure 2 - Llyn Conwy Drought Action Zones showing the results of scenario testing

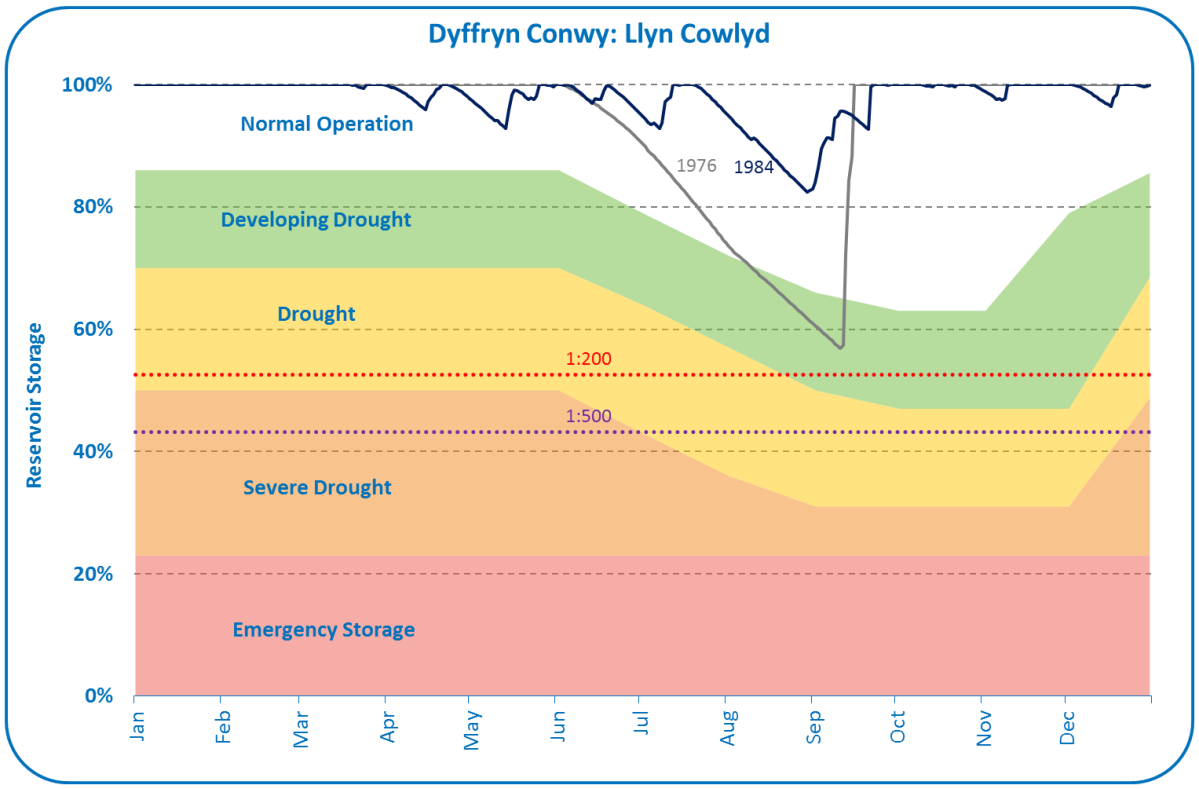

Figure 3 - Llyn Cowlyd Drought Action Zones showing the results of scenario testing

1.3.Assessment of Drought Risk

For our 2019 Water Resource Management Plan we tested our ability to maintain supplies of water to our customers in the Dyffryn Conwy zone using the period 1958 – 2015, which encompasses the known drought events of 1959, 1976, 1984, 1989 and 1995. The reported supply demand balance at WRMP19 shows the zone to be in a healthy position with a forecast 4.2 Ml/d surplus at 2024/25, increasing to 10.6 Ml/d by 2049/50. The WRZ was therefore classified as low risk of significant drought impact.

Figure 2 and Figure 3 show 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 Developing Drought 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 both Llyn Conwy and Llyn Cowlyd, under both a 1:200 and 1:500 year drought return period scenario, as represented on the chart by the red and purple lines respectively.

Our analysis indicates that under a 1:200 year drought, reservoir levels at Llyn Conwy could fall below the Emergency Storage provision zone but at Llyn Cowlyd the level would not fall further than the Drought Action zone (depending on the timing of the drought). As the WRZ is operated conjunctively, and Llyn Cowlyd has approximately nine times the volume of storage that Llyn Conwy has, then taken together, the analysis indicates that the risk of needing to implement extreme supply side measures (e.g. widespread pressure management or water rationing) in the WRZ is low.

Although the identified drought risk in the zone is low, reservoir levels at Llyn Conwy and Llyn Cowlyd may fall lower than they have in the past. As a result it is important we operate in line with our control curves and take all necessary actions in good time, the principle being to reduce supplies from Llyn Conwy and make more use of Llyn Cowlyd. By doing this we will maintain a high level of drought resilience in this zone.

1.4.Drought Management of the WRZ

1.4.1. Normal Action Zone

During normal weather conditions we optimise our sources to minimise the cost of operations. In the Dyffryn Conwy zone this means that we make maximum use of the Llyn Conwy water treatment works as it can gravitate supplies to our customers thus reducing our energy costs.

1.4.2. Developing Drought/ Drought/ Severe Drought Action Zone

As reservoir storages move into the developing drought action zone, we are more likely to have to carry out operations which are not usually undertaken and as a result increase the risk of impacting our customers. To authorise these activities, the 'Gold' command centre may convene.

As reservoir levels fall we will carefully make changes to our supply networks so that the areas normally supplied from Llyn Conwy are reduced and Betws y Coed and Dolwyddelan will receive their water from our Bryn Cowlyd treatment works. The abstraction from Llyn Cowlyd is relatively small given the size of the reservoir, therefore it is extremely unlikely that the WRZ will be constrained by lack of resource availability during a drought.

To supplement these changes we will increase our leakage efforts to minimise losses in the network.

1.5.Supply-side drought management action

Given the high drought resilience of the zone, it is not considered necessary to develop supply-side options. Therefore for the Dyffryn Conwy 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).