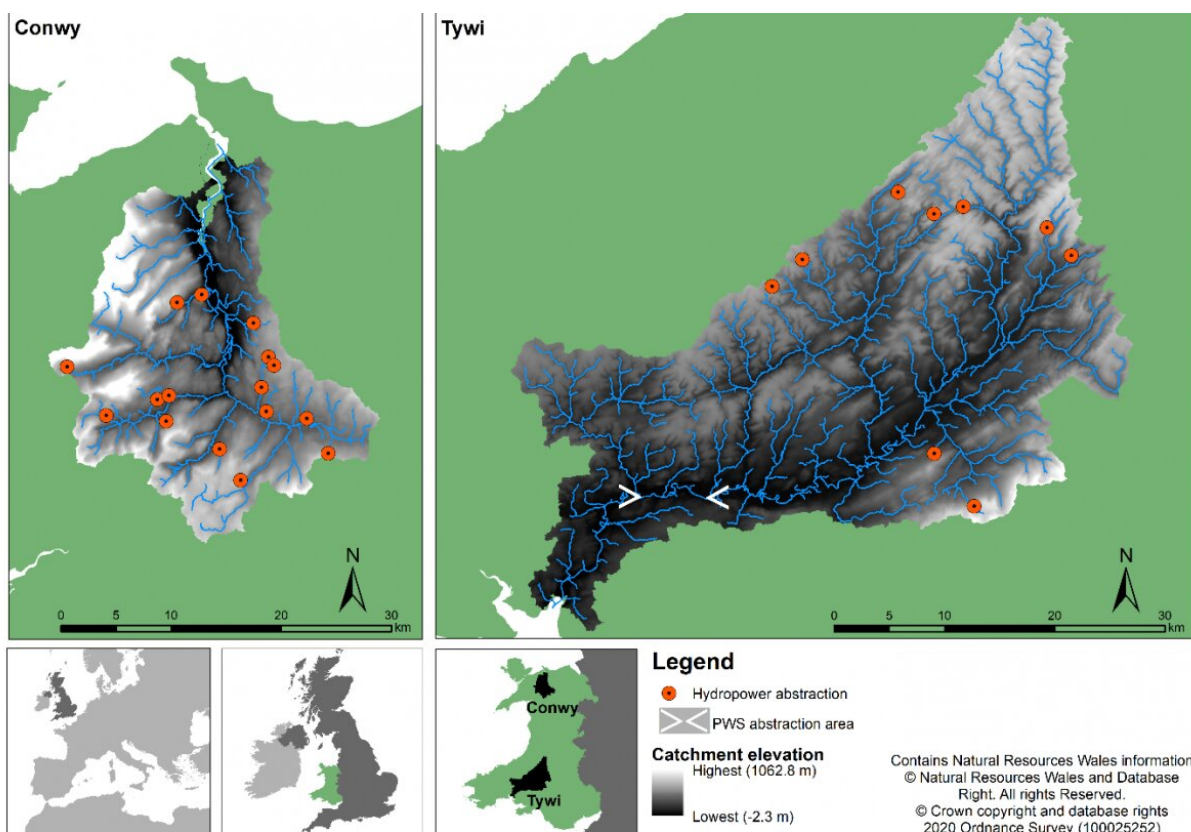


Climate change will impact future water availability for hydropower and public water supply in Wales

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Credit: Bangor University

Wales could face public water supply challenges and lower hydro power generation potential in the future according to new research. The

findings of a recently published study conducted by Bangor University researchers, as part of the ERDF funded Dŵr Uisce project, shows that water availability in Wales will become more seasonal under future climate change.

Published in the *Journal of Hydrology: Regional Studies*, the paper assessed the impact of a worst case scenario of future climate change on the hydrology of two river catchments in Wales: Conwy and Tywi.

Using UKCP18 data, the latest climate projections for the UK from the Met Office's Hadley Centre, the researchers simulated future daily streamflow at Conwy and Tywi for the 2021 to 2079 period with the Soil and Water Assessment Tool. These future flows were then used to calculate the amount of [water](#) available each day for abstraction at 25 run-of-river hydropower sites across the two catchments, and a single public water supply abstraction location in the Tywi. For public water supply, three future water demand scenarios were analyzed using the Water Evaluation And Planning system: increasing demand (based on historical relationships between daily temperature and water demand), static demand, and decreasing demand (based on Dŵr Cymru Welsh Water's demand projections).

The study found that under all future demand scenarios, there is an increase in the number of days per year when the river streamflow is too low to satisfy [public water supply](#) demand and will require additional releases from upstream reservoir to compensate. For hydropower, there was a reduction in the number of days per year when power generation is possible, as well as a decrease in the annual available water for abstraction, leading to a loss of power generation potential. Changes in water availability were most pronounced in the medium-term (2021–2054), and the rate of change slowed after 2060. In addition, future water availability increased in the winter and spring seasons compared to the present day, but these increases were outweighed by the

larger decreases in available water for the summer and autumn seasons.

Dr. Richard Dallison, lead author of the paper and Dŵr Uisce Postdoctoral Researcher at Bangor University, explains: "Given the reliance on surface waters for many sectors in Wales, it is highly important to characterize the nature of climate change induced streamflow alterations as far as possible. Getting a good understanding of how the frequency and magnitude of extreme high and low streamflows will be affected, for example, is crucial for understanding how hydropower operations will be impacted, with these flows playing an important role in when and how much power can be generated. Our results indicate faster rates of change in [water availability](#) in the medium-term, to the 2050s, with the rate of change slowing after this, suggesting that action may need to be taken soon to mitigate against projected changes."

Dr. Sopan Patil, Lecturer in Catchment Modeling and co-author of the paper, adds: "Climate change projections indicate an altered flow for rivers across the UK, not just in Wales. However, the implications of these regional changes at a local level, where all the water abstraction happens, are still not fully understood. Our study's methodology provides a great template for analyzing climate change impacts at specific abstraction locations. Moreover, it is flexible enough to account for variations in the demand projections and water abstraction needs of different water users."

Dr. Prysor Williams, Dŵr Uisce Principal Investigator at Bangor University, senior lecturer in [environmental management](#), and co-author of the paper also adds: "We are pleased to see this paper published as it has relevance for so many topics of real concern. Wales is often considered a country plentiful in water supply. However, our work has shown that this may change in the future, with obvious important social, economic and environmental impacts."

More information: Richard J.H. Dallison et al, Impacts of climate change on future water availability for hydropower and public water supply in Wales, UK, *Journal of Hydrology: Regional Studies* (2021). DOI: [10.1016/j.ejrh.2021.100866](https://doi.org/10.1016/j.ejrh.2021.100866)

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