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Partnership between Fforest Fawr Geopark and Cardiff University benefits a local business

The Welsh Whisky Company's Penderyn Distillery, the only distillery in Wales, is situated in Fforest Fawr Geopark within the picturesque Brecon Beacons National Park. The distillery provides employment and, through its Exhibition Centre with more than 20,000 visitors annually, it contributes significantly to tourism activities in Fforest Fawr Geopark.

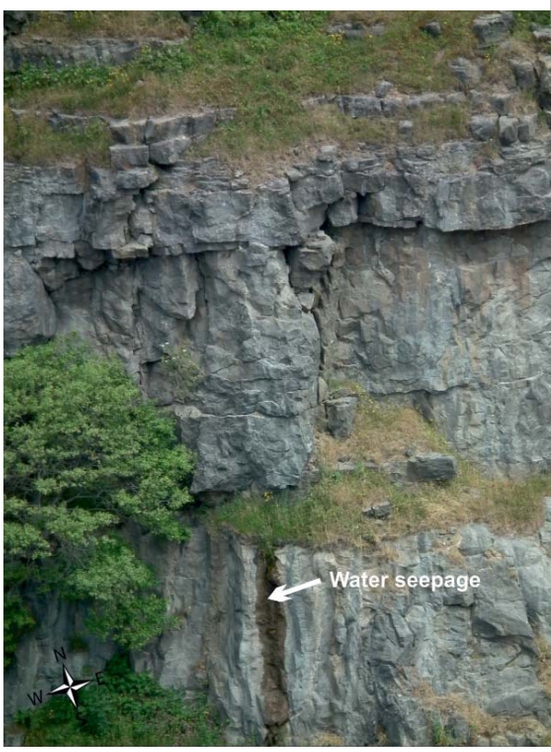
In July 2013 the distillery doubled its use of water by adding a second still. To ensure that the increased extraction of water is sustainable, the distillery requested a geo-environmental investigation of the surrounding area which was undertaken as a research project by Cardiff University with support and participation by Fforest Fawr Geopark.

The distillery is sited on a narrow, alluvium filled, approximately 40m deep steep-sided channel incised into the Carboniferous Limestone floor of a glacial valley. The distillery draws groundwater from a 39m deep well drilled into the alluvium to create is blends of world class whisky and spirits.

The steep-sided alluvial channel was probably eroded by a sub-glacial stream flowing at the base of a glacier during the last Ice Age. The channel sediments consist of soil and gravel (3m), gravel and clay with water (6m), sand gravel and silt (19m) clay and gravel (7m) and limestone fragments and sand with water which line the base (1m) and walls of the channel. Groundwater is pumped from sediments below the water table at a depth of approximately 15m below surface. The 19m thick sand gravel and silt layer, probably the main component of the aquifer, stores and transmits water fast enough to supply the pumping well.

The groundwater at Penderyn Distillery has two potential renewable sources of recharge. These are primary water flow to the alluvial channel through bedding planes, joint planes and karst features in the Carboniferous Limestone bedrock. Further study is required to assess the groundwater contribution of a karstic component. Primary flow through the bedrock occurs through vertical fractures and along inclined bedding planes. Field observations suggest that recharge through the bedrock to the alluvium aquifer is minimal. It has been established that the groundwater is recharged primarily through surface waters percolating into the groundwater along the length of the alluvium channel associated with the Nant Cadlan stream. Rainfall in the 12km^2 catchment area provides localised recharge to the ground and surface waters. The results of the research project show that, based on calculations from a well pumping test, the groundwater flow rate of 166,400m^3/day, 60, 745,000 m^3/year through the alluvium channel aquifer is sufficient to sustain the distillery's increased use of water through expanding production.

Penderyn Distillery has an informative exhibition centre which, with at least 20,000 visitors annually, contributes significantly to tourism activities in Fforest Fawr Geopark. Through its Icons of Wales Series consisting of individual malt whiskys each one celebrating a person, milestone or event from Welsh history with international significance the Distillery promotes Wales through its world class products.



Water seepage through a vertical joint in the Carboniferous Limestone

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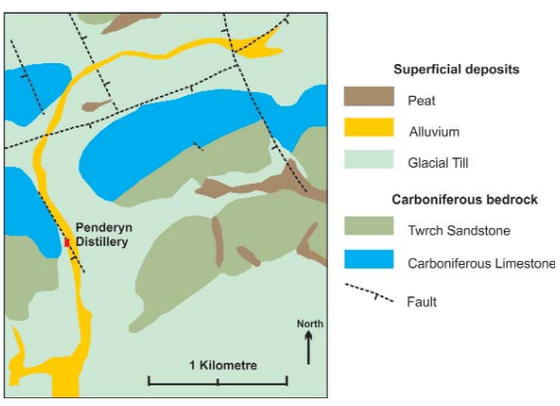
Geology of the Penderyn area and the alluvium aquifer



The sediment sequence in Penderyn Distillery borehole