

Radnorshire Wildlife Trust

Measuring water levels at Burfa Bog SSSI (aka Dipwell Project) 2014/15

The dipwell project ran from July 2014 – March 2015 and was funded by the Powys Environmental Partnership with 50% match funding in volunteer time. It was led by Darylle Hardy, Living Landscapes Development Officer at RWT.



Introduction

Burfa Bog SSSI is a 9.5ha (23.5 acres) Radnorshire Wildlife Trust nature reserve in countryside between Walton, Presteigne and Evenjobb (see <http://www.rwtwales.org/reserves/burfa-bog>). It lies between the improved farmland of the Walton Basin and the hills of Burfa Camp forestry plantations.

It is a low-lying wetland reserve bisected by streams and comprising a mosaic of wet woodland, extensive marsh and fen wetlands and semi-improved flower-rich meadow (BAP habitats) which support some locally uncommon plants and grassland fungi. The Knobbly Brook (which flows into the SSSI River Lugg) lies along one boundary. The reserve has a circular waymarked footpath and boardwalk around the site and the public are welcome to visit.

Probably the biggest threat to the wetland site is a change in the hydrology: particularly a lowering of the water table causing it to dry out. This would cause the vegetation communities for which it is designated to change drastically in their extent or disappear.

A lowering water table might be caused by different weather patterns from climate change or water-hungry farming practices in the Walton basin. Anecdotally it is believed that the

water table is dropping, but at the moment we have no evidence to show whether this is happening and therefore cannot implement or lobby for management changes within the water catchment.

This project had 3 aims:

- To pilot a hydrological survey on a shoe string, using a design from the Floodplain Meadow Partnership which we hope will provide some information to inform future management or demonstrate the need for more precise hydrological monitoring.
- To develop a hydrological baseline by putting in some dip-wells to enable a measurement of the water table on a regular basis.
- To involve and train a group of volunteers to monitor the dip-wells and other wildlife, take an increased interest in the reserve and perhaps become voluntary wardens there.

Planning and installing the dipwells



The project began with discussions on where to locate the dipwells with staff from the Floodplain Meadow Partnership and a site meeting with staff from Natural Resources Wales, including two hydrologists who made an initial site assessment and provided advice. From this advice, Darylle was able to create two dipwell transects at 90 degrees to the Knobbly Brook plus some extra dipwells on a part of the reserve which had a different, sandstone geology.

The next stage was to construct the dipwells from materials bought from local building suppliers. The design of dipwell was taken from the Floodplain Meadow Partnership website <http://www.floodplainmeadows.org.uk/content/how-set-cheap-and-easy-monitoring> and is one they advocate for groups to use across the country.

The dipwells consisted of plastic pipe cut into 1metre lengths and perforated with holes. It was then wrapped and secured in geotextile to prevent silt from entering the pipe and inserted into an auger hole in the ground, dug using a hired machine. This work was undertaken by conservation volunteers and two staff members. The dipwells were fenced off from the grazing cattle with a low post and rail fence. A sprayed food tin was placed over the top of the dipwell to stop rainwater entering. This was a deviation from the original design which called for flat metal plates to cover the dipwells: however because the fields are grazed rather than mowed, the flat plates were able to be replaced with the food tin. This, together with a different method of protective fencing than anticipated left spare money in the budget. The dipwells were numbered and mapped by GPS.

Monitoring water levels

The project was described in the RWT newsletter and a call made for volunteers to monitor the dipwells. In the meantime, a device known as a 'buzzer stick' was constructed by volunteers and staff out of materials gathered from various suppliers. One design was offered by the Floodplain Meadow Partnership but a more easily constructed design was used provided by Montgomeryshire Wildlife Trust, who monitor dipwells in peat as part of their Pumlumon Project.

The buzzer stick uses a battery-operated water sensor within a tube (in our case, a hollow mop handle). A wire runs from the water sensor to the battery pack in the top of the stick. The stick is inserted into the dipwell and buzzes when it hits water. The depth is measured at the top of the dipwell. This number is recorded on a spreadsheet that was constructed and updated by a volunteer.



The volunteers measured water levels in the dipwells every 2-4 weeks. Before the project started, it was anticipated that the buzzer sticks would be left on site for any volunteers who wished to help with the recording. However it was felt that the batteries would get damp and the buzzers would not then work and waste the volunteer's time. So eventually, four were constructed with the volunteers having one each and the other two being kept at the office. One of the volunteers upgraded the buzzer stick design, making them much easier to handle and measure with.

Benchmarking the dipwells

In order to have the absolute depth of the water table across the site, it was necessary to create a known benchmark height measurement and then measure the dipwells against that. A volunteer borrowed a theodolite and measuring stick and with difficulty (and three attempts) we managed to do this. The problem was the density of woodland on the site making it difficult to read the measuring stick at distance and therefore the need to take interim measurements in between. However we improved our accuracy on the second and third visits and are now happy with the baseline datum levels.



Extra dipwells at Abercamlo nature reserve

With spare money in the budget and on the basis of the success of the dipwell project at Burfa, PEP agreed that we could install dipwells at the Abercamlo nature reserve. This reserve is located between Llanyre and Crossgates and has recently been purchased by RWT (though managed informally for the previous 25 years). The key features are



a series of glacial kettle holes set amidst heathland and secondary woodland. The kettle holes support some uncommon bog plant communities and rare water beetles. However the hydrology the site is not well understood and it is hoped that the dipwells will help this.

The six dipwells were installed by a smaller team of staff and volunteers at various points around the reserve in February 2015. Subsequently the theodolite was borrowed again and we again set a benchmark and measured the dipwell heights against it (only taking one attempt this time!). Staff and volunteers will measure the water levels in the dipwells on a regular basis into the future.

Value of the dipwell project

We are very pleased to have achieved this. The concept of monitoring the water table at Burfa Bog had been on the table for some years, but it was, as the Floodplain Meadows Partnership suggests, “thought to be an expensive and mysterious process”. In fact none of it was as tricky as it seemed before starting out and we are now gathering useful data.

The volunteers have enjoyed taking part. The monitoring is being undertaken by new volunteers to RWT who have themselves met new people and learnt new skills as well as getting to know a nature reserve much better. They also act as voluntary wardens, reporting back any issues that they come across. The conservation volunteers also enjoyed the unusual task of installing the dipwells.

The success of the work at Burfa gave us the confidence and experience to install further dipwells at the Abercamlo nature reserve to monitor water levels in the kettle holes and give us a better understanding of water movement across the site.