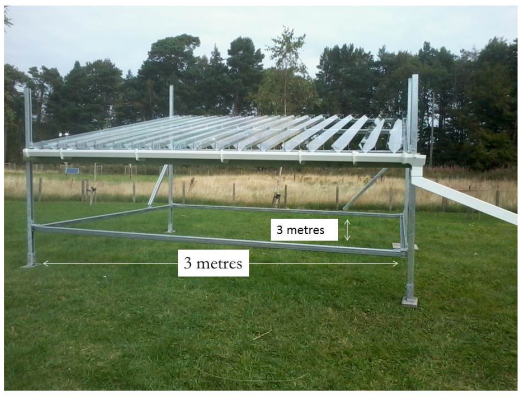
Geography Conference UWE Wed 10th June

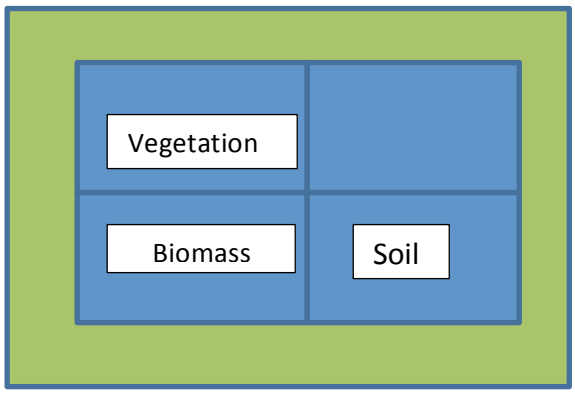
Visit to Simms Hill (Drought Risk and You Project)

Our climate is continually changing; climate change affects all living species. Drought is a normal part of all climates; current, computer based, climate models suggest that droughts are likely to become more frequent and more severe. Despite much research into the impacts of climate change many questions about ecosystem responses to climate change and interactions between climate and land management/human activities remain unanswered. If we want to minimize the negative impacts of drought we need a better understanding of how humans, plants and animals and water supplies behave as a drought develops.

We are studying seven river catchments: R.Fowey at Restormel, Ebbw at Rhiwderin, R Frome near Bristol, R Don near Sheffield, R Eden in Fife, R Pang at Pangbourn and the Great Fen project at Bevills Leam.

In three of the catchments (Frome, Don and Eden) we are looking at the effects of drought on grassland. In each catchment we have two field sites and on each site we have 15 3 m x 3 m plots (9 rainfall shelters plus 6 control plots). Six of the shelters will be used to impose an artificial drought. Three of the shelters will act as controls so that we can assess the influence of the shelter. The area within each 3 x 3 m plot is divided into 4 1 x 1 m subplots; one for vegetation monitoring, one for destructive sampling, one for soil measurements and one for access/additional experiments. We will monitor the species composition of the grassland, plant biomass, soil moisture, rainfall and temperature. We are very interested in the effects that drought might have on phenology of the vegetation and fauna.





Each field site is very different. In the Frome catchment we have a site close to UWE at Simms Hill that has had little management in recent years, and another near Yate that has been traditionally managed for hay and sheep grazing for at least thirty years.

The drought experiments will begin in 2015.

The rainfall shelters in this field were put up in April. In the next two weeks we will be installing instruments to measure soil moisture and automatic weather stations. At about the same time we will be making a preliminary assessment of the vegetation, so that we have a record of which species are present, their abundance and contribution to the biomass before the drought treatment is imposed.

Sarah Ayling June 2015 Sarah.Ayling@UWE.ac.uk

The information on differences in rainfall, temperature, soil moisture, biomass and species changes will be used to determine ecological mechanisms, drought resistance and resilience of plant communities, and will also contribute data to hydrological modelling of the catchments.

More information about the project can be found on the following web pages
http://www1.uwe.ac.uk/et/research/dry.aspx http://dryproject.co.uk/

Key Contacts: Sarah Ayling and Natasha Constant (University of West of England)

Jill Thompson (Centre for Ecology and Hydrology, Edinburgh)

An experiment about pollinating insects

We are interested in learning more about the interactions between pollinating insects and plants and how these are affected by drought. In some species, for example alfalfa, the content of soluble sugars is correlated with drought tolerance (Maghsddi and Razmjoo; 2015); this may alter the palatability of the herbage. Drought can also affect the production of nectar, in *Epilobium augustifolium* the volume of nectar produced and flower size are reduced in response to drought even though the sugar content of nectar is constant (Carroll et al 2001).

Carroll AB et al (2001) Drought stress, plant water status and floral trait expression in fireweed, Epilobium augustifolium. Amer J Botany 88(3) 438-446.

Maghsoodi M and Razmjoo J (2015) Identify markers for drought tolerance in alfalfa. Agronomy Journal 107(1) 149-157.

https://www.buglife.org.uk/sites/default/files/Pollinator%20identification%20chart.pdf

I would like you to help me by trialling the method that I am thinking of using to study pollinating insects. I welcome any feed-back (negative and positive) that will help me improve the way we try to monitor pollinators.

You should have in your pack: pollinator identification chart

blank recording form

There are 15 plots in this field, 9 have metal frames on them. The plots are labelled A-0. Plots F,G,H,K,L,M,N have a 1 x 1m square marked out in yellow string. You may work in pairs or as individuals. Please do not wander around the field, the control plots that do not have frames are difficult to see in the long grass.

1) Please write the letter of your plot, date, time and weather at the top of the sheet.

2) Count the number of flowers that you can see in the 1 x 1 m subplot.

Write down how many there are of each type. If you feel confident identify the flowers, otherwise describe them e.g. large yellow daisy, small mauve pea. (5 – 10 minutes, is this enough time?)

3) Count the number of pollinators that visit the flowers in 10 minutes. (is this enough time?)

Assign the pollinators to one of the six groups on your chart, record as other if it does not fit any of these groups.

Record the type of flower that the insect visits.

Please use 5-bar gates to tally the observations.

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Sample recording sheet.

Plot E Date Time

Flowers		Pollinators							
Type	No.	Bumblebees	Honey and solitary bees	Flies and hoverflies	beetles	Butterflies and moths	wasps	other	Total
Yellow daisy	5	III	I	IIII		I	I		10
Mauve pea	2	I	III	I	I			I	7
grass	25		II	IIII	IIII				10
Small white	3	III				II			5
Totals	35	7	6	9	5	3	1	1	32

Pollinators at Simms Hill Field

Plot Date Time

Flowers		Pollinators							
Type	No.	Bumblebees	Honey and solitary bees	Flies and hoverflies	Beetles	Butterflies and moths	wasps	other	Total
Totals									

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