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Welcome to the Floodplain Meadows Partnership Winter 2011/12 newsletter. In this edition find out about the Splodge plots (page 3), help out with a new bumblebee survey in floodplain meadows, and Lisa Lane from BBOWT tells us how they have finally turned a profit at Chimney Meadows NNR following the disastrous summer floods (page 7). Page 8 has a too-good-to-resist offer for our 2012 workshop, so don't delay...book today!

The Flight of the Fritillary...



Albert Corporaal

We have counted the fritillary populations in 200 quadrats (1 m x 1 m) at North Meadow since 1998 and Natural England have counted a separate set of 8 quadrats over an even longer timescale. We are starting to see trends that show a big expansion in the numbers of seedlings the year after a summer flood. This may be due to the creation of bare patches as a result of grass kill, allowing the small seedlings to become established.

However, we don't know if this trend is the same on other sites. Further, it is likely that bumblebees are the main pollinator of this species, and as they decline in the wider countryside, we should establish if this is going to become an issue for fritillary populations, as the species relies solely on pollination and seed dispersal for survival.

Therefore, we are planning to expand our fritillary counting exercise to two new sites in 2012 and are working with the Bumblebee Conservation Trust to establish bumblebee monitoring at all these sites. This will give us important information on what bumblebees are doing in floodplain meadows throughout the spring and summer and which species of flowers they are primarily using.

Our two new sites will be Clattinger Farm (Wiltshire) and the Lugg Meadows in



a million voices for nature



The Light
Owler Trust



The 29th May 1961
Charitable Trust



Herefordshire. Neither site currently has counts, but both have important populations of fritillary. The Lugg population is unusually predominantly white!

All our fritillary counting to date has been done with the help of volunteers, and we hope this will continue. Volunteer groups will be established at the two new sites, and we are asking volunteers to come forward to contribute towards both the flower counts and the important bumblebee surveying exercise. No previous experience is necessary and training will be given. Spending a spring day in a lovely meadow counting flowers is a fantastic experience, and becoming familiar with the different bumblebee species over a spring and summer will not only provide important and new information, you never know, this could become a new hobby!!

Dates for 2012:	Lugg Meadow	(Herefordshire)	14th April
	Clattinger Farm	(Wiltshire)	23rd April
	North Meadow	(Wiltshire)	24th April

We will be inviting volunteers from each site back in the autumn to talk about the results once the data have been processed and to discuss the next years counting events (there will be cake!).

If you would like to get involved in a volunteer group, please contact us on Floodplain-Meadows-Project@open.ac.uk

If you are involved in a floodplain meadow and would like to take part in the bumblebee survey, then please contact us, as it would be really excellent to have counts from floodplain meadows across the country regardless of whether there are fritillaries present.

Refining the classification of the kingcup meadow (*Caltha palustris*-*Cynosurus cristatus* MG8) plant community

One of the priorities that our Steering Group highlighted for us for the next phase of our project, was to investigate this wetter floodplain meadow community. Formally it is known as the marsh marigold-crested dogstail (*Caltha palustris* – *Cynosurus cristatus*) community. It is not currently well defined in the National Vegetation Classification (NVC), and there is no up-to-date assessment of its distribution. It is thought to be quite rare, and it can certainly be very species rich and therefore probably deserves greater recognition. Over the next two years, we hope to consult local conservation managers and botanists, refine our dataset, visit a range of sites throughout the UK, and come up with an inventory and possibly a new description of the community. This project should help in refining management advice. If you have sites in your areas that you think might qualify, or would like to know more, please let us know.

There is more information about this on our website, please follow this link to find out more.



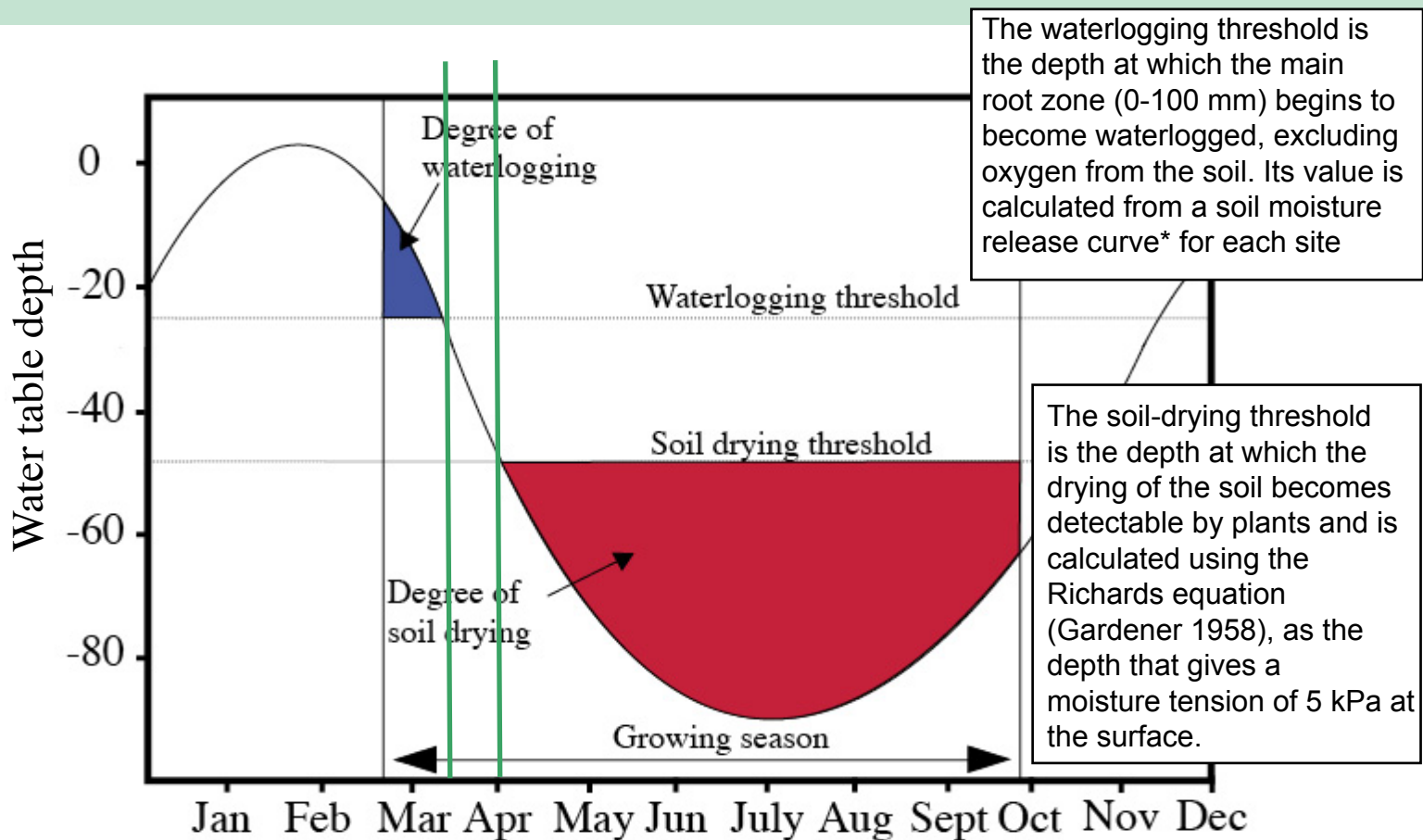
MG8 meadows on the Shannon Callows, Ireland

'THE SPLODGE PLOTS': what are they, how are they derived and what relevance are they to me?

Much of our understanding of how different plant species (and plant communities) respond to hydrological regimes comes from two DEFRA funded research projects. These projects enabled a number of floodplain meadow sites to be studied in great detail. Botanical data were collected, soil nutrient availability measured and sites undergoing hydrological alteration were monitored to assess changes in plant community composition. The results form the core of the dataset held by the Floodplain Meadows Partnership and if you can get to grips with its interpretation, it will help you understand hydrological changes on your site.

Hydrological models were used to simulate water table behaviour at 3750 separate locations across 18 different sites, each of which had been recorded in terms of its plant community composition. Water-table depths were measured fortnightly on the ground such that field-scale hydrological models could be validated, and then these models were used to estimate the water-table depths at all 3750 locations each week for the ten years preceding the survey date. A massive amount of hydrological data was thereby amassed. In order to understand what it all meant in relation to plant communities, Sum Exceedence Values (SEV) were calculated.

The graph below represents a typical hydrograph for a floodplain meadow, showing how the water-table changes throughout the year. It is overlain with two pre-defined threshold depths (one for waterlogging and one for soil drying). The values of the threshold depths vary from site to site depending on soil porosity.



So during March in this example, the site demonstrates water-logging. The SEV is calculated from the area shaded blue.

During April, the soil is neither water-logged or dry

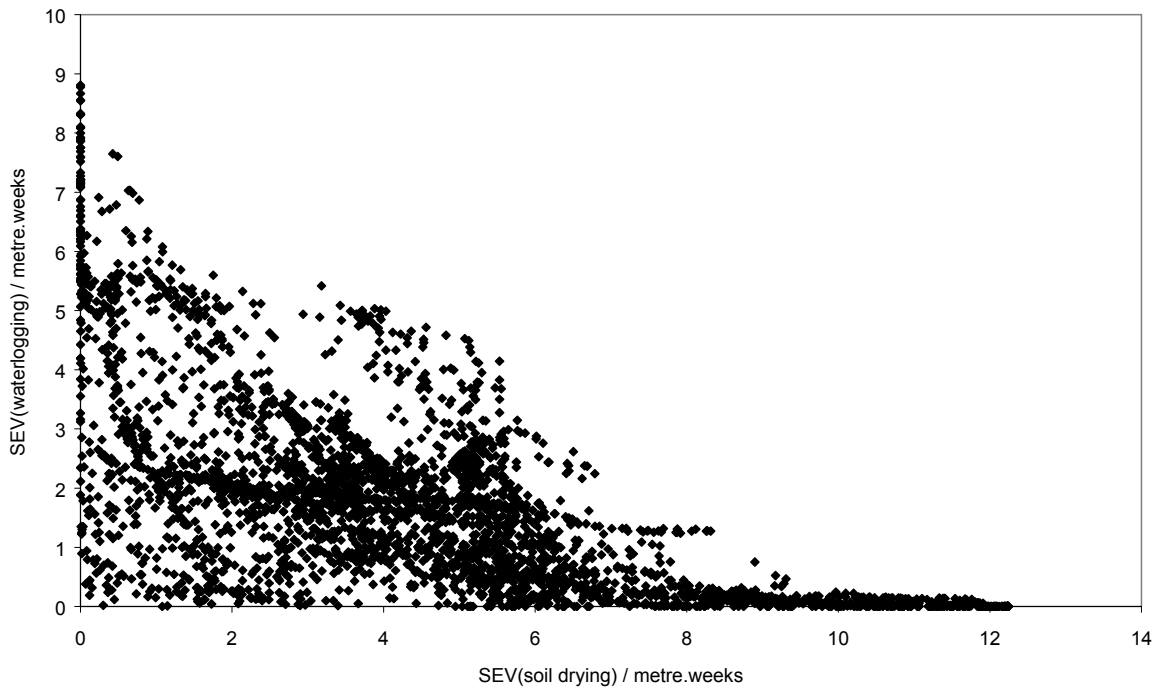
From beginning May to Sept, the soil is detectably dry. The SEV in this case is calculated from the area shaded red.

*A soil moisture release curve can be plotted by taking soil cores from the site, saturating them, then gradually draining them on a sand table in a lab.

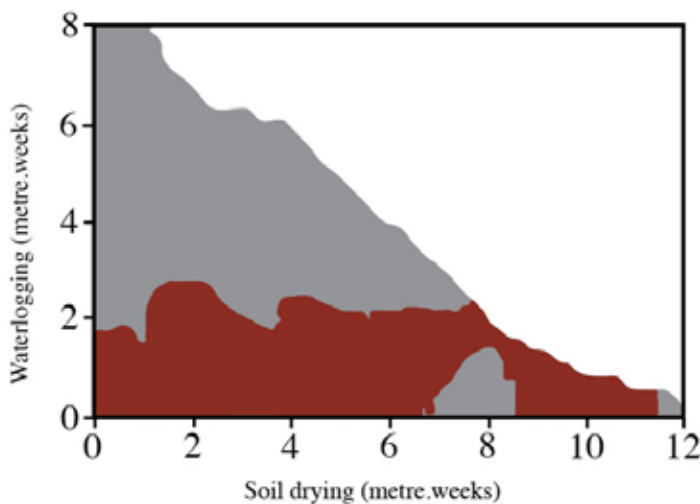
For each of the 3750 recorded locations, an SEV soil drying and SEV soil waterlogging was calculated. A graph showing all 3750 SEV calculations recorded during the study is shown below and demonstrates the spread of hydrological regimes on floodplain meadows in the UK.

The bottom right shows soils that are well drained and dry for much of the year, whilst in the top left are soils that are almost permanently waterlogged. Bottom left are those sites that have stable shallow water tables. In the centre are regimes that fluctuate during the year. No water regimes that would fall in the top right corner have been encountered in our surveys (because such soils would not be suitable for species-rich grasslands.)

For each of the points on the graph, botanical data are available and plots can be drawn by filtering out just the points where a particular plant species has been recorded in order to determine the preferred hydrological regime for that species.



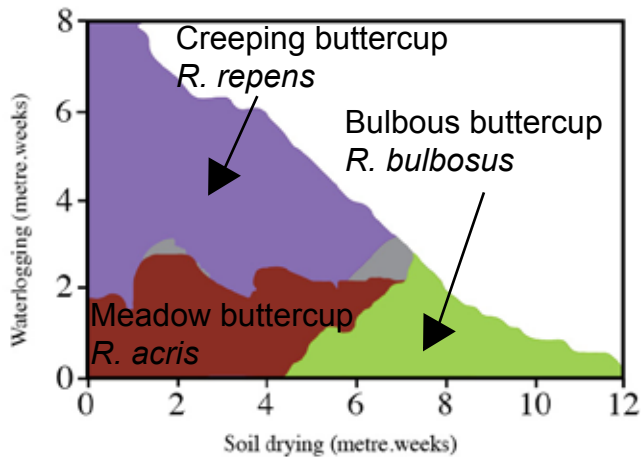
Meadow buttercup *Ranunculus acris* Splodge Plot



The graph adjacent shows the 'splodge plot' for meadow buttercup *Ranunculus acris*. The area shaded brown shows the range of hydrological regimes in which this species is more likely to be found than you would expect by chance. Ecologists would call this range its hydrological niche.

In this case, you can see the species tolerates a broad range of soil drying, but does not tend to be found in waterlogged areas.

Splodge plots for three species of buttercup



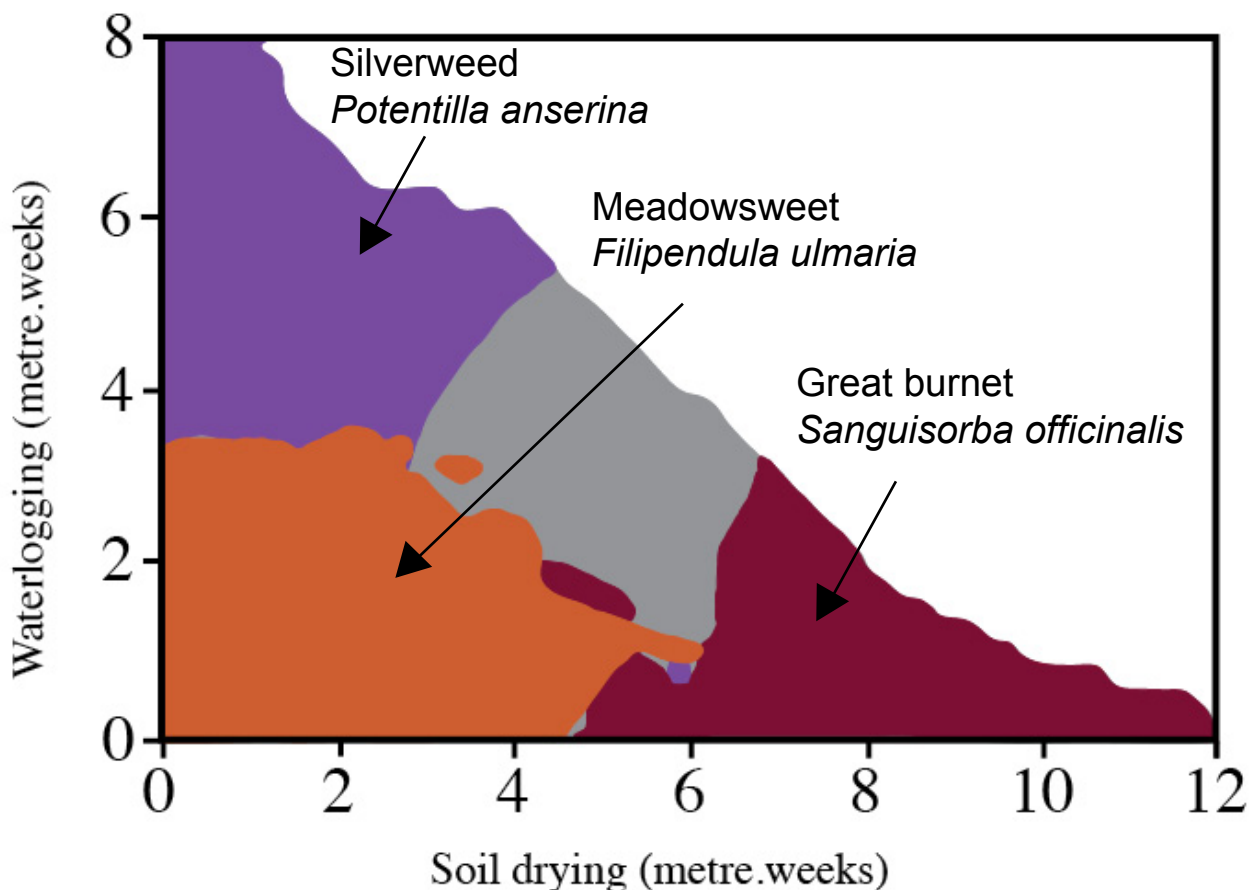
Comparison of the three ranges shows us that each occupies a different hydrological niche.

Bulbous buttercup, *Ranunculus bulbosus* (green), prefers drier conditions and is rarely found on waterlogged soils (top left) or those kept constantly moist (bottom left). Whereas creeping buttercup, *R. repens* (purple), prefers waterlogged soils and is largely absent from those which are dry for much of the year. *Ranunculus acris* occupies a more general position between the two.

An understanding of the range of 'splodge' plots produced will enable you to understand what is happening to your site hydrologically, by knowing the favoured hydrological regimes of the different plant species.

Some of the Rose family

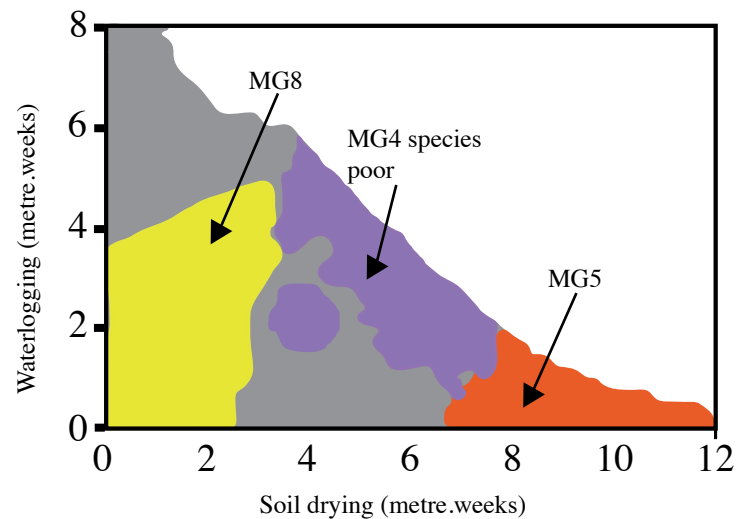
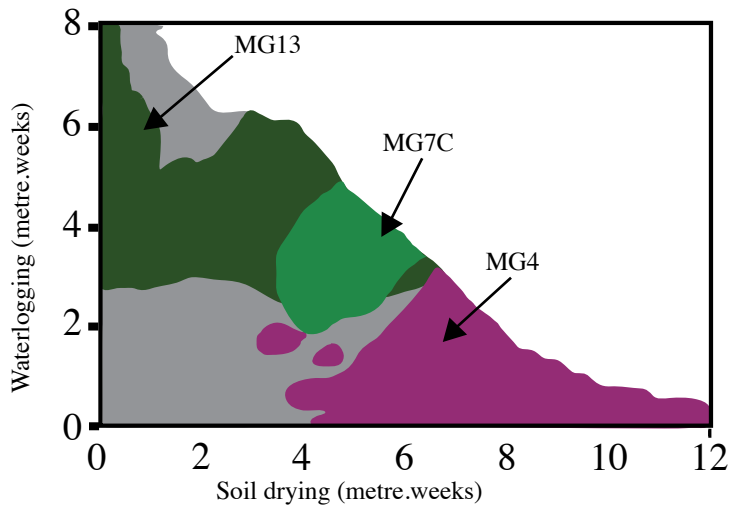
The graph below shows some representatives of the rose family (*Rosaceae*) found on floodplain meadows. Meadowsweet, *Filipendula ulmaria*, will tolerate wetter conditions than great burnet, *Sanguisorba officinalis*, but silverweed *Potentilla anserina* is far more tolerant of waterlogged



conditions than either of them. It often seems to be the case that closely related species "divide up the available hydrological space between them (probably as a result of divergent evolution).

Splodge plots have been published for a total of 99 different species, so you can see how they compare in terms of tolerance to waterlogging and soil drying. This information is published in the research report available here and forms the basis for the tables in the Floodplain Meadows Partnership FSC guide, which tabulates different species tolerance of hydrological conditions, as well as soil fertility. The FSC guide is available through the FMP, please **contact us for a copy**.

NVC Plant community plots



Using the same principles and from the same research project, assessments were made for whole plant communities. These community splodge plots have also been published and enable you to see at a glance where each of the main NVC community types sits within the hydrological space of floodplain meadows.

This method of using SEVs is being used elsewhere (including Spanish mountains and South African heaths) and Dr Carly Stevens (Lancaster University) is currently employing a similar method to understand Orchid communities on the Somerset Moors

So, what does this mean for you and your site?

1. If you become familiar with the main plants and their preferred hydrological niches, you should be able to interpret what is happening to your site's hydrology.
2. We are developing a tool that enables you to interpret your soil-water/dipwell data in the context of this research. If you enter your dipwell data into the tool relevant to your soil type (generic values for several different soil types are being estimated), then you can establish whether your soil will support one of the typical plant communities above. This will help you to decide whether it is worth considering a restoration project, and perhaps help to identify the seed source to suit your water regime. It will also enable you to see what your soil water levels are doing on existing sites and therefore pick up why there might be community changes occurring.
3. If you construct a soil-moisture-release curve for your site, you can interpret its hydrology more exactly and therefore get a better picture of your plant community and how it functions.

Chimney Meadows –The Importance of Making Hay While the Sun Shines! Lisa Lane, Upper Thames Living Landscape Manager, BBOWT

The story begins in 2003, when the Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust (BBOWT) purchased 200 ha of mixed farmland adjacent to Chimney Meadows National Nature Reserve (NNR), in West Oxfordshire.

The NNR, already managed by BBOWT, had been designated in recognition of the botanical importance of its plant communities (MG4/5). We wanted to extend the area of species-rich grassland and provide a buffer for a nationally important site.

To this end, we took green hay taken from the NNR and used it to successfully revert 70 ha of arable land back to species-rich grassland, similar in composition to the NNR. Most of these fields are managed as hay meadows, cut in the summer and aftermath grazed.

Whilst for some people the summer floods of 2007/2008 is a fading memory, for others it will always be the stuff of stories. Our graziers remember running around helping each other to get their sheep and

cows off the land, as the River Thames broke its banks and flooded much of the surrounding land.

The impact of the floods can still be seen on the NNR today, where for several years in succession we could not cut the hay. In addition, poor contractor availability meant the fields at Chimney were being cut quite late anyway and some fields were becoming more rank, resulting in poor quality hay that was difficult to sell. So in 2011, we were determined to change the system and get on early, to ensure that we could take a restorative hay cut and produce a quality product which we could sell.

So what did we do to make 2011 the most successful hay cut at Chimney Meadows ever? Firstly we got a derogation from Natural England to start the hay cut on June 15th, giving us the widest window of opportunity. Ironically, the dry spring meant there wasn't enough growth to make it worth cutting early. We wanted to demonstrate both ecological and financial benefit in order to sustain this operation in the long term and persuade other landowners to manage their landholdings in a similar way.



Arable reversion fields at Chimney Meadows. For more info about the reversion project follow the link here to the [July 2009 newsletter](#)

Further, in 2011 curlew had started to breed at Chimney Meadows once more. Up until the summer floods, they had regularly bred on the NNR and hay cutting was delayed until mid July (as per the ESA agreement), to ensure the chicks had fledged. However, following the flooding, the soil invertebrate populations crashed and the curlew had stopped breeding at Chimney Meadows until this year.

Whilst delighted that the curlew decided to breed again, it did push back our hay cut start date. We monitored the site and once we were happy that any chicks had fledged we had a look at the fields to check the grass growth. Finally, we had a little rain, enough to thicken out the hay crop and started cutting on 29th June. Following variable weather in August we completed the final field on 4th September. In total we made hay on 111 ha (275 acres).

In previous years, large areas of grass had been cut at one time, then turned and baled. The historical later cut meant it took longer to dry, (shorter days/dew forming on fields next to the river, cooler weather). Consequently, there was more chance that the weather would turn before the cut hay was dried and baled and even before the summer floods therefore, we were not always able to get it off. Even once baled we had issues with storage resulting in poor quality hay with little financial value.

So this year, not only did we start earlier, we divided the labour between 2 contractors and ourselves. One contractor cut, turned and baled the hay on the NNR plus 2 other fields (57 ha). He made it into small bales, some of which he took in payment, some were sold to local horse owners and the remainder we took to feed our own livestock and is all stored inside. A second contractor cut and baled (large quadrant bales) the remaining 54 ha, and we did the turning and stacking having purchased a

haybob and hired in a second tractor, flat 8 grab and hay trailer. That contractor then bought most of the hay off the field and one of our graziers bought the remaining bales.

By doing the hay cut a few fields at a time, cutting no more than we could turn, bale and stack under tarpaulin within a 3-5 day window of good weather, we were able to make quality hay. By having control over the turning we could do it during the good weather and were not reliant on waiting for a contractor. Selling the hay off the field meant that we weren't left with a large amount of hay of deteriorating quality and as a result we were able to make a profit to be put back into the organisation.

It took 2 months to complete the hay cut and an unexpected benefit was that early cut fields were flowering again by the end of summer. It has been very satisfying to hear everyone's comments about how good the hay smells as they enter the barn at Chimney Meadows.

The early hay cut has made a visible difference to the structure of the ranker meadows. There is far less coarse vegetation and flowers and grasses are visible amongst some of the more sedgey areas. We are now working with CEH (Centre for Ecology and Hydrology) to understand how the site hydrology works in order to better control these areas. We are currently exploring whether we should re-instate some foot drains that have become blocked.

We are also considering spreading green hay from the arable reversion fields back onto the NNR (where the seed came in the first place) to restore diversity in the damaged areas. However, we are planning to wait and see how the fields recover over this next year before taking more drastic action. The impact of the summer floods made us realize how vulnerable floodplain meadows can be to changing climatic conditions and the need to extend the area of this habitat.

Now that we have a better way forward with the hay cut, and are gaining better knowledge about the hydrology of the site, we just need to work out what to do about cowslips that are flowering in October!



Volunteer using the haybob to turn the hay during periods of good weather during summer 2011

2012 Workshop - LAST CHANCE

This year we will again be running our popular annual workshop, and have expanded the agenda even further to include a speaker on historical aspects of floodplain meadows, the Bumblebee Conservation Trust and more in depth invertebrate discussions. This course is aimed at floodplain meadow managers and advisors, and will cover the latest research on floodplain meadows as well as very practical sessions on botanical and hydrological monitoring. A day is spent in the field practising ID skills, downloading dipwells and looking at the invertebrates of floodplain meadows. It will provide an excellent opportunity to talk to other meadow managers from across the country. There are generous discounts for staff from organisations represented on our Steering Group (two for the price of one) and we are not planning to run this course in 2013...so don't delay, click here to book today!

Does anyone have any advice for.....

Cutting small sites. Has anyone got a cheap method for cutting very small sites that will not cause compaction, but also does not require bespoke machinery? Could you let us know if you have come across such a thing?