

Make hay when the sun shines (but what if the sun don't shine?)...

With the wettest June since records began under our belts, and early July continuing in the same vein (groan), what happens to our floodplain meadows when the sun doesn't shine for long enough to make hay? We wrote a short article about this in the Winter 2008 newsletter, but four years down the line and another wet summer under way, we thought it would be a good idea to update this article with latest data, and provide some tips on how to deal with the resultant problems.

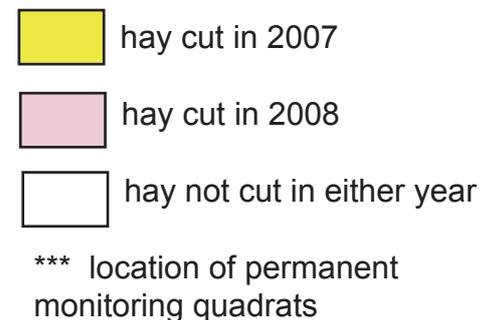
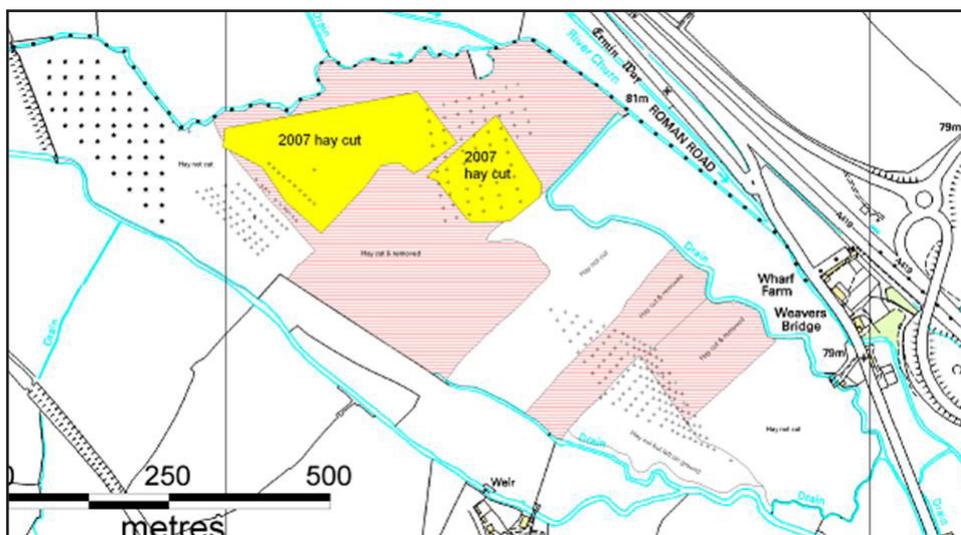
Meadows exist because of the hay cut followed by grazing, both of which remove tree seedlings and stop woody vegetation developing on the floodplains. The diversity of the sward has been created by the annual hay cut which prevents domination by a few coarse species.

Meadow plants, especially grasses and sedges produce a lot of litter by the middle/end of summer if they have not been cut. The litter prevents germination of the seeds and development of the seedlings of many species and also has an effect on soil temperature and moisture. Similarly, hay left on the meadow after it has been cut has a very similar effect as litter on uncut areas. Species diversity declines sharply on both. Further spring/summer floods bring additional nutrients causing production of bigger vegetation biomass and more litter if hay can not be cut.

You should not cut hay when the soil is too soggy to support the agricultural machinery as the risks of soil

compaction to species richness are too great, plus hay cut onto wet ground rarely makes well. Therefore in the summers of 2007 and 2008, a lot of sites did not have their hay cut at all, were cut very late, or were cut, but the hay was not removed. These are common problems faced in these conditions by many hay meadow managers. Our advice would be: if your soil is too wet to make hay, then leave it until it dries out; if it doesn't dry out (such as in 2008,) then just let the animals (preferably cattle) into the field as normal in August/September and let them eat the hay crop.

We have been monitoring North Meadow, Cricklade for many years now, and the summer floods in both 2007 and 2008 presented us with an ideal opportunity to monitor what happens in different cutting scenarios following a summer flood.



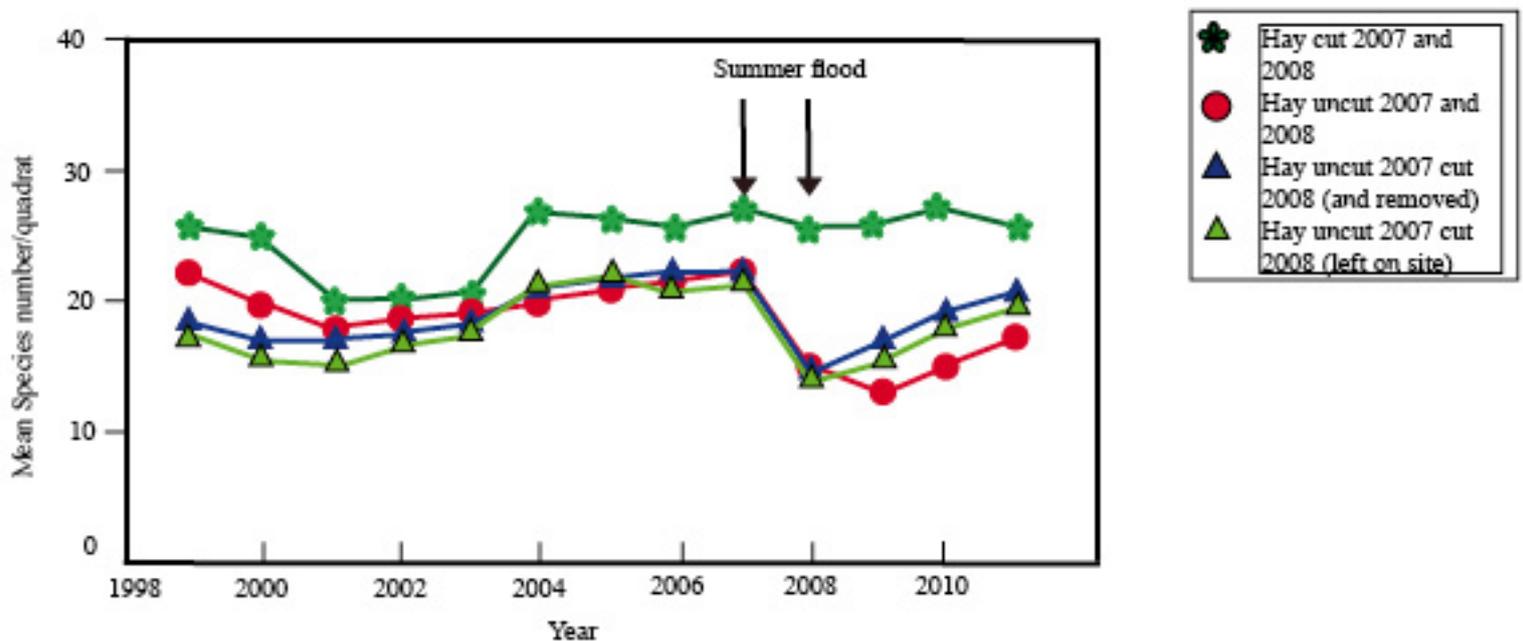
This analysis is particularly interesting as Natural England keep very detailed management records on this site, enabling us to overlay their management data with our botanical, hydrological and soils data.

Management data from North Meadow

The summer flood events of 2007 and 2008 prevented much of the hay crop from being cut and removed from site. The map (page 1) describes the different cutting patterns that happened across our 4 blocks of quadrats (320 quadrats in total).

So you can see from the management map that we have botanical data over several years following several different cutting patterns.

Graph 1. Plant species richness in relation to hay cutting pattern at North Meadow NNR, Cricklde highlighting the 2007-08 summer floods



The rate of decline and subsequent recovery in species richness appears to be closely linked to hay management in 2007 and 2008. Where a normal hay cut was taken in both years, the species richness only showed a small decline in 2008 and started to recover in 2009 (green flowers). Areas that were uncut in 2007, but cut in 2008 showed a greater decline in richness in 2008 (blue triangles), whilst those areas that were left uncut in both years continued to decline into 2009 (red dots).

Species richness is still lowest in the plots that were uncut two years in a row. The data are currently being analysed to see whether the main drivers for this continued slower recovery in areas uncut for two years are to do with nutrient increase as a result of hay not being removed from site, or the effects of shade cast by the dominant species when left uncut on the more diminutive members of the community.

East Cottingwith Ings (Yorkshire) in June; the meadows are wet and cannot drain as the river levels are too high



Big Sedges

One of the things that was noted following the 2007 floods was the expansion of large waterlogging-tolerant sedges, most notably lesser pond sedge *Carex acutiformis* and slender tufted sedge *Carex acuta*. These species tend to become dominant to the exclusion of other meadow species, are not easily digested by animals and are therefore not desirable in hay. Whilst a range of the smaller sedges form part of the typical flora of a floodplain meadow, these larger sedges do not.

Sonia Newman has been studying mechanical methods for control of these sedges for her PhD and she is due to finish early 2013. It looks like two cuts a year are reducing the vigour of the sedges in her experimental plots (either in May and late June or late June and July). Watch this space for more info when she starts to publish papers on her findings.



So, what should you do in a wet summer (like this one)?

- Stating the obvious, cut as soon as you can if the weather, soil conditions, machinery availability and time allow.
- Cutting later in the year and removing the arisings is better than not cutting at all especially if combined with a prompt hay cut the following year.
- Cutting and leaving the hay, or just topping is little better than not cutting at all, so always try and remove the arisings if you can, even if it can't be used as feed for stock (a local biodigester company may be interested in cutting the material and using it).
- If there really is no option to cut the hay at all, then turn stock out as normal in August/September and let them graze off the hay crop.
- Manage the nutrient balance by taking a prompt hay cut the following year (mid/late June) and possibly a second cut if the weather works in your favour, in August.
- Look carefully at the drainage infrastructure. You need to be able to get flood water off the site as soon as possible after a flood recedes. If the site can dry out quickly, you are more likely to be able to take a hay cut. Water sitting around for long periods in the summer, making the soil anoxic, killing flood intolerant species and encouraging unwanted species will neither help maintain the species richness nor the value of the hay crop.
- Think about floodplain meadow restoration nearby. As the article about Chimney Meadows in the Winter 2011/12 newsletter showed, their restoration site will prove vital if they are to use it to spread green hay back onto the National Nature Reserve, so damaged in the 2007 floods.