Hay Time Highlights

The North Pennines AONB Partnership's Hay Time project focused on the conservation, enhancement and celebration of upland hay meadows. The project ran between May 2006 and October 2012.

A special habitat

Upland hay meadows are a rare habitat, rich in wildlife and cultural tradition. Once widespread, less than 900ha now survive in the UK, of which some 360ha are found in the North Pennines Area of Outstanding Natural Beauty (AONB). Hay meadows and the diverse array of plants and animals that they support rely on an annual cycle of traditional farm management. The gradual evolution of hay meadows from woodland glades and clearings is intimately linked to the cultural evolution of people, from those living in primitive settlements to present day society. Upland hay meadows are thus a living and vibrant link to the past. Their future conservation is important not only for the threatened wildlife communities that they support but as a testament to the labours and traditions of generations of farming communities.

Whilst upland hay meadows support some rare plants, such as globeflower and species of Lady's mantle, their real importance lies in their species composition. Their low fertility soils, coupled with the impact of grazing and cutting, means that individual species are unable to dominate, resulting in the very richest hay meadows containing over 30 species per square metre, with up to 120 species per field, including wood crane's-bill, great burnet, pignut, wood anemone, self heal, Lady's mantle, yellow rattle and eyebright. Hay meadows are also important as feeding areas for invertebrates and bats and provide valuable nesting and feeding sites for yellow wagtail, grey partridge, black grouse and curlew.

Hay making in upper Weardale

Species-rich meadow, Weardale

Farmers in the North Pennines have been able to claim financial incentives for managing their hay meadows non-intensively since the 1980s. However, at the turn of the 21st century, even where traditional management practices had been restored to meadows which had lost their special plants, there was little evidence of their return and many meadows continued to decline in quality. The limited potential for seeds to migrate naturally from neighbouring fields due to the rarity and highly fragmented nature of species-rich meadows was an important factor in this. However, the process of natural seed migration can be speeded up significantly by the direct addition of seed harvested from nearby species-rich meadows. This work lay at the heart of the AONB Partnership's Hay Time project.

The need for seed

Botanical surveys underpinned the work of the Hay Time project. During June and early July, Hay Time project officers surveyed as many meadows as possible using a standard survey technique. The information gathered during these surveys enabled us to identify which meadows would be suitable for harvesting seed from ('donor' sites) and which meadows would be suitable for having seed added as part of a restoration process ('receptor' sites). Following the survey season, a report was prepared for each farm surveyed which detailed the plant species found in each meadow with an assessment of their abundance and relative importance within the meadow flora. Management recommendations were also given for each meadow, with particular reference to how it could be enhanced in terms of species-richness.

Meadows surveyed	1,211
Reports for farmers	295

The Higher Level Scheme (HLS) of Environmental Stewardship administered by Natural England was fundamental to the operation of the Hay Time project. This scheme funded the purchase of seed in green hay from the 'donor' sites and paid for the contractors who harvested and spread the seed on the 'receptor' sites.

Two types of machine were used to harvest the seed from species-rich meadows. The first cut off the top few inches of the grass crop, including the seed heads. This 'hay concentrate' was then blown into a builder's bag on the back of the machine. At the meadow being restored, filled bags are tipped into a mini spreader from which spinning brushes sprayed out the hay concentrate. The second machine, an Amazon 'Green keeper' cut the whole grass crop and gathered it into a large bucket. This then tipped the cut material into the back of a conventional muck spreader. At the receptor site, the 'green hay' was flung out across the meadow and left to dry and drop its seed. Not only did these approaches enable the effective transfer of seeds, a process that would take decades to occur naturally, but they ensured that the unique genetic integrity of the meadows was maintained.

Harvesting 'hay concentrate'

Harvesting the whole crop

Spreading green hay

Number of meadows receiving seed in 'green hay'	93 meadows
Area of meadows receiving seed in 'green hay'	236ha

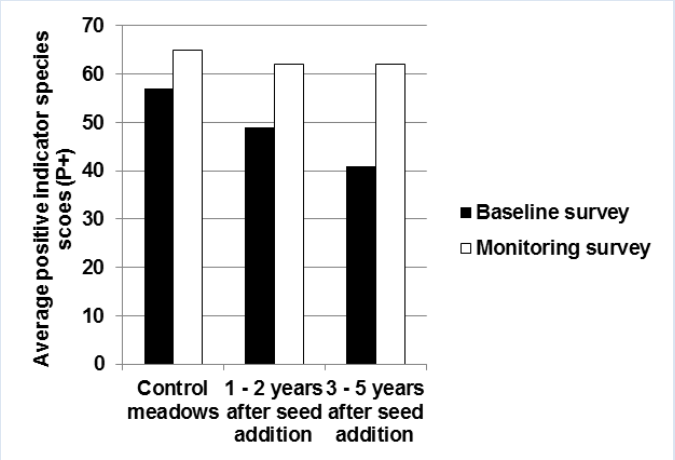
Signs of success

Between 2006 and 2012 Hay Time project officers undertook baseline botanical surveys prior to seed addition and later monitoring surveys after seed addition on 46 meadows (130ha). Eleven of the meadows were surveyed in more detail by volunteer botanists using 15 quadrats (1m x 1m squares) per meadow per year. A further 14 meadows had a baseline survey in 2008 and a follow-up survey in 2012; these meadows did not have green hay added (the controls).

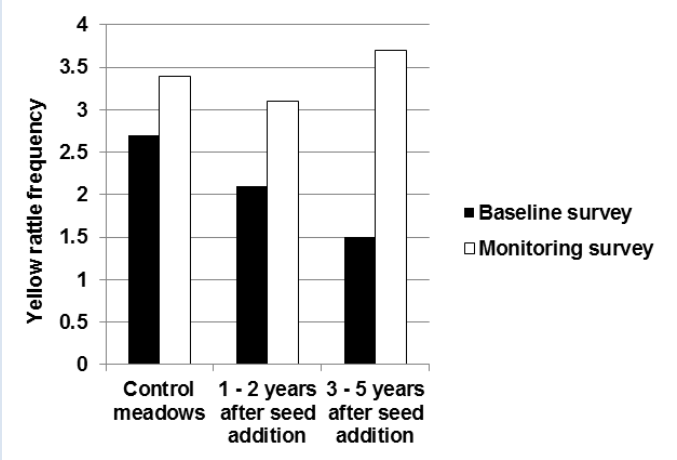
There are a number of species which are particularly characteristic of upland hay meadows which we hoped to see becoming established following seed addition. We refer to these as *positive indicator species*. During meadow surveys, these species were given a score between 1 & 4, the more special the species, the higher the score. Species scores were multiplied by frequency scores to derive a *total meadow score* for each meadow.

Comprehensive analysis of all the botanical data gathered revealed that the addition of seed has been successful in introducing new species into meadows and increasing botanical diversity. Furthermore, positive indicator species scores statistically significantly increased by an average of 18 in meadows that had seed added. The following species were found to statistically significantly increase in frequency after seed addition: common bent, sweet vernal-grass, crested dog's-tail, pignut, eyebright, red fescue, changing forget-me-not, ribwort plantain, meadow buttercup, yellow rattle, great burnet, lesser trefoil, red clover and yellow oat-grass. Quadrat surveys furthermore found significant increases in: meadow vetchling, autumn hawkbit and common sorrel. Evidence was also found that wood crane's-bill, bird's-foot trefoil, self-heal and rough hawkbit were beginning to establish in some quadrats.

It is encouraging that significant positive changes in sward composition have been shown during this large-scale but short-term meadow restoration programme. We hope that in association with appropriate traditional hay meadow management these positive trends will continue into the future.



Change in positive indicator species score between baseline and latest surveys



Change in frequency of yellow rattle between baseline and latest surveys

Skilled volunteer botanists	15
Meadows monitored	60

Plugging the gap

Survey work during the first year of the project in 2006 found a worrying scarcity of very species-rich meadows that could act as seed sources to enhance other meadows. However, many of the plants that are missing from our meadows, such as wood crane's-bill and great burnet, are still relatively frequent in road and track verges and in uncut banks. In 2007 we therefore set up a programme in which we asked volunteers to gather small quantities of seed from these places by hand and to then sow the seed and care for the seedlings and plants that they grew. Once sufficiently established, the resultant 'plug plants' were planted in suitable meadows

400 plug plants planted in 9 meadows

What's the buzz?

In 2010 we commissioned the Bumblebee Conservation Trust to undertake a bumblebee survey of hay meadows and other habitats in upper Teesdale. The survey found:

Sites which had the highest diversity of flowering plants tended to support the most diverse bumblebee communities for longer periods.

Gardens, species-rich verges and riverbanks were important foraging habitats for bumblebees particularly during the spring and autumn.

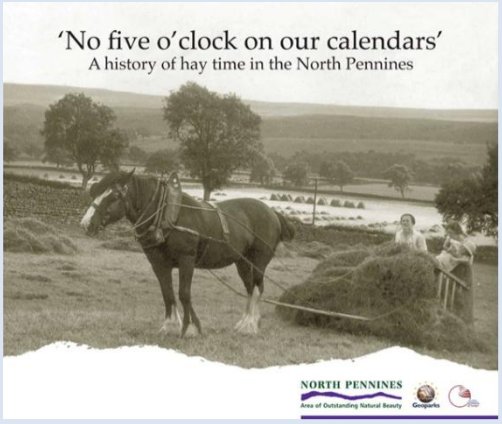
The rare UK Biodiversity Action Plan (BAP) species, the moss carder bee (*Bombus muscorum),* was found to be closely associated with species-rich meadows and hence their restoration and management is of key importance to this species.

Uncut banks and edges **wider than 1m** in hay meadows were found to provide an important foraging source for bees after hay cut.

Bumblebee identification workshops	3
Bumblebee survey & report	

Hay time history

Though still highly dependent on the weather, hay time in the 21st century is a relatively short-lived and solitary activity. Gone are the days when hay timing could last all summer and involve all the neighbours and friends. We wished to ensure that though these days have gone, the stories, anecdotes and language of them were recorded for posterity. Without the labour of countless generations of farmers and their families our meadows would not be what they are today: wildlife-rich jewels in the landscape.

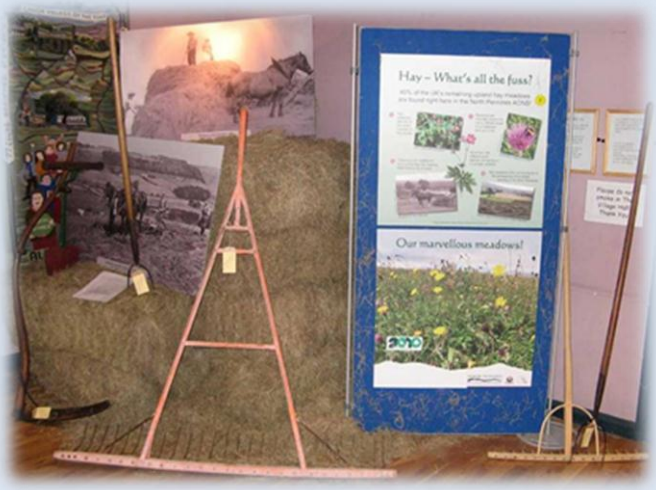


In 2011 we published a 40 page booklet 'No five o'clock on our calendars: a history of hay time in the North Pennines' which marked the culmination of four years of research into the history of hay meadow management in the North Pennines. The book principally comprises extracts from oral history interviews undertaken with retired farmers during 2007/8 and contains a wealth of old photos that have been generously contributed by many people.

Oral history interviews	20
History of hay time book	

Spreading the word

Workshops and training sessions on upland hay meadows were run throughout the project. Attendees included representatives from statutory agencies, conservation organisations, farmers, smallholders and volunteers. We also gave illustrated talks on hay meadows and our work to local community groups and enabled people to visit meadows for themselves during a series of guided walks. Between 2009 and 2011, we ran a series of Hay Time History Roadshows for community groups across the North Pennines. Using artefacts from hay times past and our 'History of Hay Time' DVD, we hoped to both increase people's understanding of the importance of modern-day hay meadows and stimulate recollections amongst those who managed them in the past.



Hay meadow exhibition weekends were held in 2008 (St John's Chapel) and 2010 (Allendale). These aimed to help visitors explore some of the characteristic flowers and wildlife of our meadows, invited them to listen to stories and memories of some of those alive today who recall hay time with hay rakes and horses and explained work being done to help farmers restore their meadows. Visitors could even become hay judges themselves by smelling different sacks of hay from a range of meadows across the Pennines. Hands-on hay timing activities were provided for children and colleagues from Beamish Museum displayed and demonstrated old hay timing tools and implements.

Training events	24
Illustrated talks	44
Guided walks	20
Hay Time history roadshows	20
Hay Time exhibition	2

Hands-on discovery for children

Taking children out of the classroom to experience for themselves the colour and life of a hay meadow in summer was a key aim of the project. Our 'three steps to hay time' programme for primary schools included classroom sessions, discovery tasks in local meadows, hay making activities, a bumblebee workshop, dressing up in period clothing, hay rope making and a hay time-themed trip to Beamish Museum.

Number of primary schools involved	19
Number of secondary schools involved	1
Number of children	589
Children's art competition	1

A legacy in print

A number of publications were produced during the project. These can either be downloaded or ordered through the AONB Partnership website (www.northpenninesaonb.org.uk).

'No five o'clock on our calendars' – a history of hay time in the North Pennines

An identification guide to flowers and grasses of upland hay meadows

Hay Time walks 1-3 (Allendale**,** Weardale, Baldersdale)

'Step-by-step' guide to upland hay meadow restoration in the North Pennines

The impact of green hay addition to upland hay meadows in the North Pennines through the Hay Time project (2006-2012)

Hay Time Annual Summary documents 1 – 5

Creating an upland hay meadow or wildflower plot

Managing your upland hay meadow for wildlife

A newly-established globeflower plant in an Upper Teesdale meadow

Thank you!
Hay meadows, along with other wildlife-rich natural habitats enrich people's lives and are more likely to survive within a society that understands and values them. Through the Hay Time project we have helped to raise the profile of the special nature of our meadows and have given many people an opportunity to contribute towards their conservation. However, the project was only possible thanks to the support of a great many organisations and individuals. We particularly wish to thank all the farmers and smallholders who allowed us access to their land and agreed to work with us, our devoted and hard-working team of volunteers, our partners at Natural England, the Bumblebee Conservation Trust and Beamish Museum, our fantastic agricultural contractors, all the schools and community groups who welcomed us so enthusiastically, members of our steering group and all our funding partners.

The AONB Partnership's Hay Time team (2006-2012)
Rebecca Barrett, John O'Reilly, Fiona Corby, Ian Craft, Neil Diment, Ruth Starr-Keddle

Hay Time was supported by:

heritage lottery fund LOTTERY FUNDED

COUNTDOWN 2010 SAVE BIODIVERSITY

COUNTY DURHAM Environmental Trust

THE tubney CHARITABLE TRUST

North Pennines AONB Partnership
The Old Co-op, 1 Martin Street, Stanhope, Bishop Auckland, Co. Durham. DL13 2UY
Tel: 01388 528801 Web: northpenninesaonb.org.uk

March 2013