

RESTORING AND RE-CREATING SPECIES-RICH GRASSLAND: RAWCLIFFE MEADOWS, YORK

27th MAY 2015

Hay meadow restoration

Background: Rawcliffe Meadows was apparently managed as hay meadow as part of the Clifton Hospital Farm from the 1860s onwards. From ca. 1970 to 1989, it was let to a farmer who grazed the area with livestock throughout the year. When surveyed in 1990, the vegetation was species-poor Yorkshire Fog – Tufted Hair-grass pasture with very extensive stands of Creeping Thistle (>20% cover). Very small amounts of meadow herbs such as Great Burnet and Meadowsweet were found occasionally, surviving in vegetative form within thistle beds.

Initially (summer 1991) a commercial contractor was employed to weed-wipe large areas dominated by Creeping Thistle. Another contractor abandoned the initial hay cut as the material was worthless and the half-rotten hay was eventually carted off site at considerable cost. A small profit on the hay crop was achieved after five years (in 1995). Hay cropping takes place annually: this is planned for early to mid July but is sometimes delayed by weather.

Aftermath grazing was reintroduced in 1994. Several different graziers have been involved. Suckler cattle (nursing cows with calves) proved difficult to manage on a site with high levels of recreational use and not very stock-proof boundaries. For about 15 years we have worked in partnership with a local farmer who takes the hay and grazes bullocks. We also benefit from a volunteer who is on site most days and monitors the livestock. Brief periods of spring grazing have been undertaken on an ad hoc basis, including in 2014 and 2015.



Meadow Foxtail – Great Burnet grassland, coded MG4 in the National Vegetation Classification

Results: There was an immediate reduction in cover of Tufted Hair-grass following the first hay cut and species such as Great Burnet and Pepper Saxifrage which were barely detectable in vegetative form in 1990 flowered freely. The condition of the sward varies considerably from year to year but overall there has been a shift in the plant community from Yorkshire Fog – Tufted Hair-grass (MG9) to Meadow Foxtail – Great Burnet (MG4) grassland. This was confirmed in a survey by specialists from the Floodplain Meadows Partnership in 2009 and the site is now recognised as nationally-important for its MG4 grassland as part of the Clifton Ings & Rawcliffe Meadows SSSI.

While restoration of the traditional cycle of hay meadow management has transformed the grassland, it is worth pointing out that land use history continues to have a profound effect. The best areas of MG4 grassland are in the south of the site and have been permanent grassland, predominantly managed as hay meadow, since the 17th century. Parts of the site to the north were under arable cultivation into the 19th century and are much poorer in indicator plants, though these have increased and spread over the past 20 years.

Wildflower seed mixture

Background: a large spoil mound left over from pond construction in May 1991 was graded into the adjacent flood bank and left fallow during the summer months. The material was fertile loam of neutral pH. After removal of Creeping Thistle regeneration, the bank was sown in autumn 1991. A rotovator powered by a mini-tractor PTO was used to produce a tilth, seed was hand broadcast and the plot was repeatedly rolled.

The seed used was a customised mixture bought from Emorsgate Seeds. Following advice circulating at the time, this was oversown with Westerwolds annual rye-grass as a nurse crop.



The seeded area in 2013, 22 years after sowing

Results: Growth of the nurse crop was so prodigious that it had to be cut (with a brush-cutter) ten times during the 1992 growing season, with the arisings manually raked up and removed. At the time this felt like an enormous mistake but the massive removal of biomass during the establishment phase can now be seen as key to long-term success.

Weekly cutting during the first summer appeared to have no detrimental effect on the sown mixture, which flowered during the second year. Following an initial phase in which Oxeye Daisy dominated, the plot became progressively 'naturalised' as sown species reduced in abundance and non-sown species such as Great Burnet colonised from the adjoining meadows. Quaking Grass was planted in autumn 1991 and is frequent within the plot but has not spread outside it. 24 years later, the plot supports a short, open sward of species-rich Crested Dogstail – Common Knapweed (MG5) grassland.

Copse Meadow: using hay bales as a seed source (1)



Copse Meadow in May 2014

Background: This 0.5 hectare plot was formerly agriculturally-improved but run-down pasture with few wildflowers other than Creeping Thistle and Stinging Nettle. It was stripped of ca. 30 cm depth of topsoil in March – June 2008 to provide material for repairing a nearby riverbank. During a brief fallow period, Creeping Thistle regeneration was spot-sprayed with glyphosate. After cultivation with a chain harrow to create a rough tilth, eight large hay bales from Clifton Ings were spread in early August. The spread hay was rolled with a tractor-drawn Cambridge roller. Some hand collected seed was also sprinkled and over the next two years around 1,000 plugs and pot-grown plants were added: these included Meadowsweet, Great Burnet, Pepper Saxifrage, Ragged Robin, Meadow Barley and Quaking Grass, all grown from local seed.

The field was cut and raked three times during 2009. From 2010 it has been managed by hay cutting and aftermath grazing along with the adjacent meadows.

Results: A very flower-rich sward has established. Although this remains dominated by Red Clover, a wide range of characteristic floodplain meadow plants includes Meadowsweet,

Great Burnet, Meadow Vetchling, Meadow Barley and Meadow Brome. Small sedges are abundant in a slightly flushed area alongside the cycle path. Some 59 plant species were recorded in 2013.

Overall, survival of plugs has been poor although Pepper Saxifrage has survived well. Establishment of pot-grown plants has been mixed and most have not yet spread, perhaps due to competition. Bistort disappeared almost entirely. Post-planting weather conditions have probably been the major influence on survival of plugs and pot-grown plants. Meadow Barley established readily from seed so use of plugs was superfluous. Use of hand-collected seed had a clear effect despite the relatively small quantities involved, introducing plants such as Glaucous Sedge and the early-flowering, hay meadow ecotype of Common Knapweed.

Pitfall trapping in 2013 revealed an interesting beetle assemblage including the rare and declining Necklace Ground-beetle.

New Meadow: using hay bales as a seed source (2)

Background: In 1991, this small (0.25 ha.) field supported tall weed vegetation (e.g. Hemlock, Hogweed, Stinging Nettle, Welled Thistle). It was stripped of ca. 30 cm topsoil and seeded using a hay bale in 1992. In 2012, a burst sewage pipe killed almost all the vegetation. After removal of contaminated sediment, an initial attempt at resowing failed due to prolonged flooding. In summer 2013, a new seedbed was prepared by ploughing then power harrowing to give a firm tilth. A single large hay bale from Clifton Ings was spread in August with some addition of hand-collected seed. Around 400 pot-grown plants of local origin were planted the following winter.

The plot was cut, raked and checked for invasive weeds four times during 2014, when cattle were excluded. It will be managed by hay cropping and aftermath grazing along with the rest of the meadow land in 2015.



Spreading hay on the seedbed

Enhancing wet grassland for insects

Background: A 2 hectare flood basin is not mown for hay but is grazed in late summer/autumn along with the rest of the site. An entomological survey in 1995 identified a lack of late-flowering nectar plants as probably restricting insect diversity. As the basin is isolated from the river flood plain, the potential for natural colonisation by wetland plants was considered to be limited. Attempts have been made to increase botanical diversity by rotovating small plots and strewing these with seed-heads of suitable plants collected from local fens.



Cattle grazing in the flood basin

Results: The substrate is heavy laminated clay which makes it very difficult to create a seed-bed, even using a tractor PTO. Results have been variable with some plots faring better than others. Seedlings have perished when the substrate has cracked during dry weather with flooding and grazing pressure also affecting establishment. Overall this technique has been successful for establishing a few species such as Fleabane, Purple Loosestrife and Devilsbit Scabious. Others such as Wild Angelica and Marsh Thistle have failed to establish. Hand collection of seedheads is a simple way to obtain reasonable quantities of seed of late-flowering wetland plants.

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