

Creating a new meadow: Levenhall Links

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Levenhall Links is 120 ha of new land, claimed from the sea by the creation of a sea wall and the pumping of large volumes of pulverised fuel ash into various ash lagoons. Once full, lagoons were landscaped with a pond and wetland area, woodland strips and large areas of grassland.

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Amenity grassland dominated the site (denoted as yellow on Slide 2).

A review of site management revealed three main problems, listed below. To resolve these issues, grassland management across the whole site was changed. Creation of the meadow, therefore, was one part of wider grassland management.

- Some on-site activities conflicted with others. In particular informal golf practice, football, bird watching and ‘a walk in the country’ could each interfere with another.
- Amenity grassland has limited wildlife and landscape value.
- Maintaining amenity grassland over large swathes of the site, although relatively cheap, was still costing over £10,000 per year (excluding staff time) and the landscape was far from ideal.

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A hay meadow was proposed on 10 ha of Levenhall Links known as Lagoon 7.

Lagoon 7 had been landscaped as a large flat area of amenity grassland with four wooded areas. It was little used by the public and was ideal for managing as a hay meadow.

We aimed to:

- Enhance the wildlife and landscape value – especially enhancing botanical diversity.

Amenity grassland is notoriously species poor and plant diversity is a key to

enhancing the diversity of invertebrates and birds on the site. Sowing a wildflower seed mix should help.

- Learn more about the grassland on Lagoon 7. We conducted small-scale seed trials to determine whether sowing a seed mix would be beneficial. Larger areas of the meadow could be seeded thereafter.
- Develop a more sustainable management regime. Lagoon 7 cost over £5,000 to manage as amenity grassland.
- Develop a recognisable type of grassland, not just an area of long grass. National Vegetation Classification (NVC) was a reasonable system to monitor grassland development.

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However, Lagoon 7 had thin topsoil overlying ash. Although sufficient to sustain amenity grassland it may not have been sufficient to sustain a hay meadow. Because ash is prone to wind blow (causing problems in the nearby town) it was not possible to remove the existing vegetation. This would exert strong competition on any new seeds that were sown in the sward. There was also the possibility that the grassland would be burned or vandalised.

We had to arrange for a local farmer to harvest the hay and we had to be sure that he could get tractors and trailers onto the site. This issue was easily resolved.

Despite being of limited wildlife value, the amenity grassland did provide an important roost for waders at high tide. Since the meadow would be maintained as short grass through the autumn and winter the wader roost would not be lost entirely. The benefits of the meadow, and greater habitat diversity through the year were viewed as more beneficial than the wader roost on its own.

Finally, research revealed a lot of advice and opinion about meadow creation, much it conflicting. We decided to follow our own logical programme of work.

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Trial plots were marked on the grassland according to the scheme shown in this Slide.

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Having identified that the existing sward could not be removed we tried to reduce competition by spraying a growth hormone called 'Shortcut'. This restricts the growth of mature grasses, so giving time for new seedlings to develop and compete. Half the area was sprayed.

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Some seed was sown using a slot-seeder. This is an agricultural practice that cuts a groove in the turf and drops seed in at intervals. It causes minimal disturbance to the turf.

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The other seeded plots were scarified initially then sown as a top dressing. This is a mix of sand, soil and seed. Being in contact with soil at germination should improve seedling survival. This method is regularly used by local authorities to re-seed small areas such as goalmouths. Seed was mixed with dried barley tailings from a maltings plant to bulk up the seed volume. As controls, two of the plots did not receive seed, although one plot was sprayed.

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The seed mix contained 19 species of wild plant. 6 of the species were grasses, and grasses comprised 83% of the overall seed mix (by weight). This reflected proportions from a natural grassland where the bulk of the vegetation is grass. Seed was sown at 6 kg per ha (1 lb per acre). Had the seed been sown onto bare soil the rate would have been doubled. Seed was of a wild, local origin and the wildflowers were selected for their adaptation to grassland habitats, their competitiveness against grasses and their attraction to people. Most of the species were perennials but one or two annuals were chosen also.

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The grass has now been managed as a hay meadow for three years and it provides a better habitat and landscape for wildlife and people. Paths are mown through the hay

to encourage people into the area without trampling the crop. Most people do follow the path. Grey partridge, skylark and brown hare nest in the hay meadow and the wader roost is re-created in the autumn. Since a local farmer now manages the site the local authority saves management costs of around £5,000 per year.

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The meadow area as a whole now approximates to MG7 in the NVC. This is a relatively species poor sward (dominated by rye-grass *Lolium perenne*) and this is reflected in the number of species found throughout the meadow. Only 21 species grow in the meadow, although ironically species diversity has fallen over the three years since annuals that were present in year 1 have now been lost.

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Areas that were seeded with wildflowers approximate to MG6 in the NVC. This is a more species rich grassland (co-dominated by rye-grass *L. perenne* and crested dog-tail *Cynosurus cristatus*) with over 30 species found. Nine of the species in this sward originated from the seed mix.

Sweet vernal grass = *Anthoxanthum odoratum*; ox-eye daisy = *Lecantheum vulgare*; lady's bedstraw = *Galium verum*; bird's foot trefoil = *Lotus corniculatus*; kidney vetch = *Anthyllis vulneraria*.

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The seeding trials have proved reasonably successful after three years (although 10 of the original species have not yet been observed). Further seeding in the area would be beneficial and is practical, although with a few amendments. The seed mix should be modified to include up to a 30% composition of wildflowers. The existing sward is so dominated by rye grass *L. perenne* and white clover *Trifolium repens* that greater flower diversity requires a greater proportion of wildflowers. The seed mix should also be adjusted to reflect differences in seed size. *Chrysanthemum leucanthemum* (ox-eye daisy) for example, provides 2000 seeds per gram whereas *Geranium pratense* (meadow cranesbill) provides only 100 seeds per gram. Proportions of each species in the mix need to reflect these differences.

There was no difference in species composition between plots that were sprayed and un-sprayed. The aim was to stunt plant growth rather than kill the plants so a dilute weed killer solution may be more effective (e.g. 10% or 20% weed killer). Similarly there was no difference in plant composition between the slot-seeded plots and the top dressed plots. Slot-seeding would be the preferred option for larger areas, whereas top dressing would be more efficient on smaller plots.

Finally, it should be noted that these results have taken three years to achieve and the grassland is still relatively species poor. A wildflower meadow full of colour and diversity will take a long time to achieve on this site. More nutrient poor soils, or sowing seed into bare soil should help achieve a more diverse grassland. At Levenhall Links the hay meadow was created in one summer but the wildflower meadow will take much longer to develop.