Case Study 10.11
Somerford Mead[44], Oxfordshire – a long-term restoration site with post-restoration management trials. How long does it take?

Introduction

Somerford Mead (6.1 ha), had been Burnet floodplain meadow (MG4) in the 1950s at the University of Oxford's Field Station at Wytham, Oxfordshire. In the 1960s it became sheep pasture and in the 1970s the site was agriculturally improved. It was ploughed for the first time in 1981 and three crops of barley, grown with agro-chemicals were harvested. In 1985 a fourth barley crop was taken specifically to reduce soil fertility. No further chemicals were added prior to a restoration project. A seed-bank study in 1985/1986 looking at plants growing amongst the sown barley determined that no seeds of floodplain-meadow species remained in the soil.

Data collected in 1985 demonstrated that Somerford Mead was situated on circum-neutral (pH 7.5) alluvial soils over limestone gravel of varying thickness.

In 1986, seed from nearby Oxey Mead was harvested by Emorsgate Seeds and spread on Somerford Mead, which was then managed as a hay meadow with a late June/early July hay cut, and aftermath grazing with 12 heifers and 50 sheep. Similar management was undertaken in 1987 and 1988.

Great burnet at Somerford Mead. © Alison McDonald

Somerford Mead in June 1987. Yellow-rattle has germinated, but the sward is grass dominated and species poor. © Alison McDonald

In 1989, a replicated block experiment was set up to compare differences between aftermath-grazing treatments of sheep, cattle and no grazing (Figure 10.13). The hay cut and differential grazing continued throughout the experimental period. Monitoring was carried out in the centre of each plot throughout the experiment.

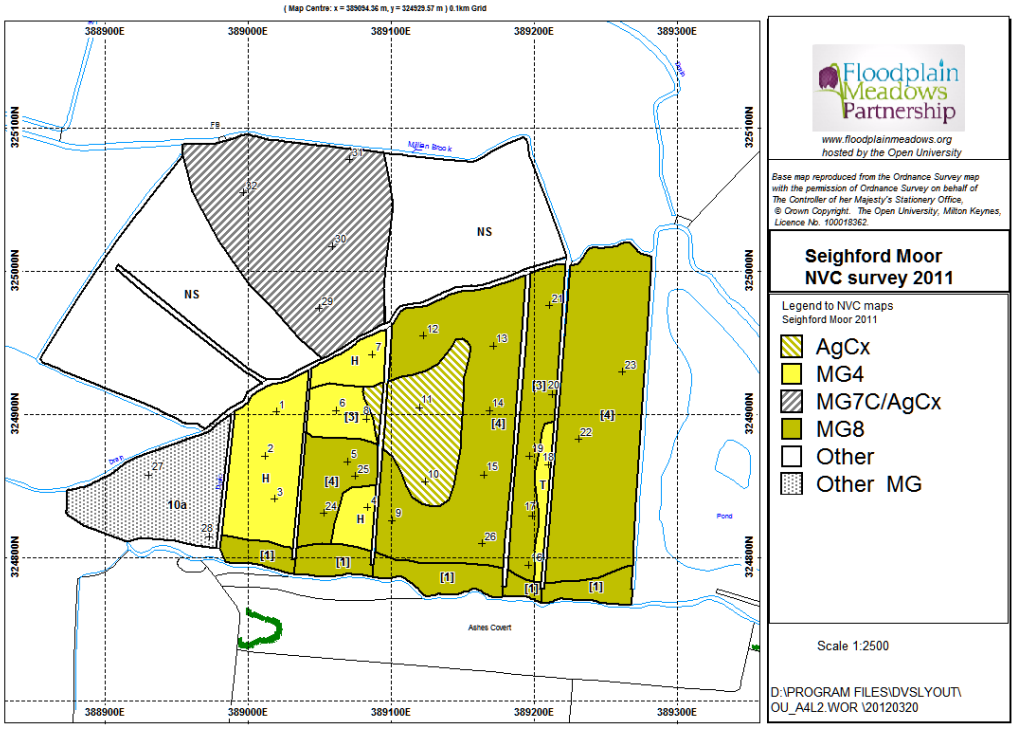

Figure 10.13 Position of different grazing plots with ten sheep (s) in each of three plots, two cows (c) in each of three plots and no grazing (u) in three plots.

Results

Botanical diversity

Germination of sown grasses such as meadow brome, Yorkshire fog, rough meadow-grass and perennial rye-grass was good in the first year (1987) but arable flowers in the seed-bank accompanied the sown grasses in almost equal numbers in the very open sward (Figure 10.14). In 1988, 18 of the unsown annuals recorded during the seed-bank study did not germinate or become established and sown species, such as red and white clover, and crested dog's-tail, increased in abundance. Red fescue, cock's-foot and meadow fescue appeared for the first time (McDonald 1993).

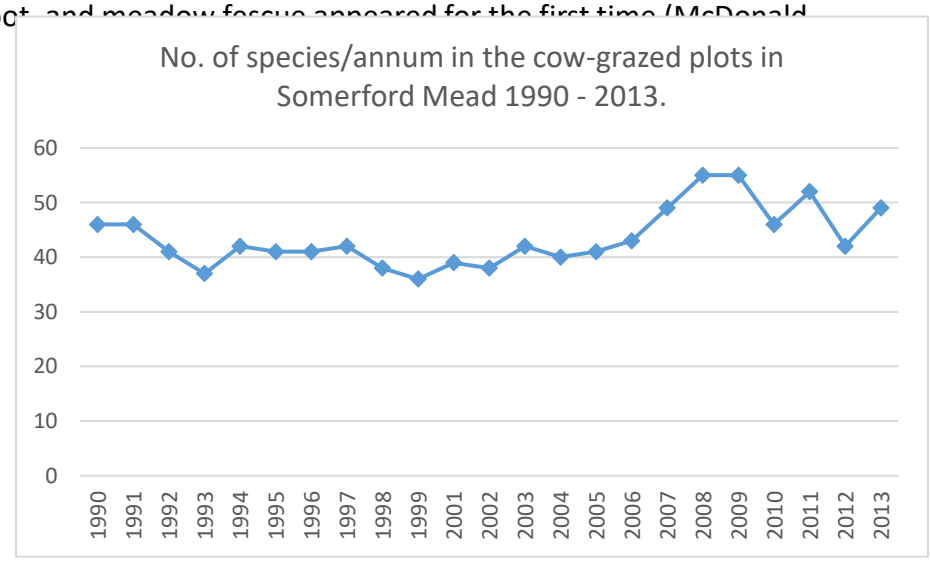

Figure 10.14 The total number of species recorded in the cow-grazed plots over the course of the experiment. The initially high records are due to the mix of arable and meadow species. The drop occurs as the arable species decline, and then the species numbers increase as meadow species develop. Fluctuations in the latter years are related to annual changes in weather conditions.

Phosphate

In 1987, the standing hay was lush and tall and the soil was described as 'requiring no additional nutrients'. By 1990, the soil was already regarded as being of 'low nutrient status'. At this time it was noted that the average pH had increased from 7.7 to 8.7.

Aftermath treatment

The traditional management of cutting for hay followed by cattle grazing has produced a sward which is a little more species-rich than the sheep-grazed treatments in some years but both of these treatments are richer than the ungrazed plots (Figure 10.15). In 2013, 44 species in total were recorded in both the ungrazed and sheep-grazed plots, and 49 species in the cow-grazed plots.

Invertebrates

As the sward architecture in Somerford Mead became more complex over time it was of increased importance to both the diversity and abundance of invertebrates (which need structures such as stems, leaves, flowers and seed heads for various periods in their life cycle). Since 1993 the cow-grazed plots have become the most suitable for invertebrates including plant-eating beetles (Woodcock and McDonald 2011).

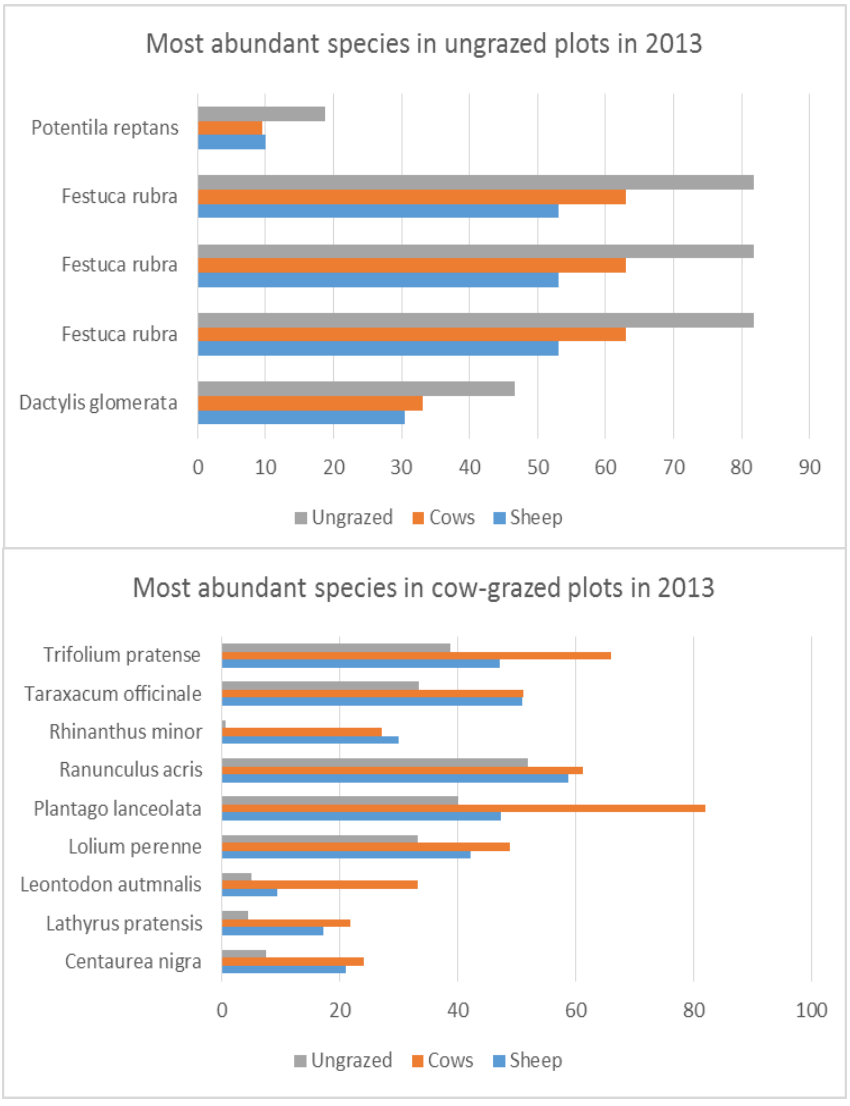

Figure 10.15 The cow-grazed plots have a flora more typical of a species-rich meadow, compared to the ungrazed plots, which are typically grass dominated.