Furrow ploughing and grazing to manage perennial knawel *Scleranthus perennis prostratus* habitat in the Brecklands of north Suffolk, England

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SUMMARY

The endemic subspecies of perennial knawel *Scleranthus perennis prostratus* is a declining plant found only in the Breckland area of eastern England. In 1978, a population of 1,670 individuals was recorded in a small 6.8 ha patch of heathland. In 1994, a survey found only 32 mature plants. In an attempt to enhance habitat conditions, old furrows were re-ploughed and sheep-grazing introduced to break up the ground and reinstate patches of bare ground suitable for germination and seedling growth. As a consequence of management, and also rabbit *Oryctolagus cuniculus* grazing, the perennial knawel population had increased by the year 2000 to several thousand plants. An experimental exclosure showed that in the absence of sheep and rabbit grazing, and period disturbance management, perennial knawel died out.

BACKGROUND

In the UK the endemic subspecies of perennial knawel *Scleranthus perennis* ssp. *prostratus* is found only in the Breckland area of East Anglia, eastern England. The Brecklands, one of the driest regions of Britain, cover 940 sq. km within the counties of Norfolk and Suffolk.

Perennial knawel is classified as 'endangered' and is given special protection under the Wildlife and Countryside Act 1981. It is a small woody herb flowering between June and September. It is a biennial or short-lived perennial of very short grassy heaths, compacted tracks and abandoned arable land, and is generally found on well-drained acidic (pH 4.9-6.8) and sandy soil. It is a poor competitor, and requires open soil for seedling establishment.

Perennial knawel has never been a widespread and within its restricted range it has suffered a marked decline over the last 50 years for several reasons including: the increased use of herbicides and fertilisers; the destruction of field-margin refuges; the abandonment of marginal arable land and heathland; afforestation of former sites and potential sites for colonisation; deterioration of former and potential sites due to inappropriate grazing; and loss of sites to building developments. It is now restricted to the southern part of Breckland in Suffolk, and has been extirpated from Norfolk (where recently reintroduced – Leonard 2006).

This case study describes the habitat mangement undertaken at an extant perennial knawel site in north Suffolk.

ACTION

Species Recovery Programme: All previous records and management work for perennial knawel *Scleranthus perennis prostratus* were collated in 1992 for the 1993 English Nature Species Recovery Programme. This included extinction records, past introduction sites and site pH data. All previously known sites, throughout Norfolk and Suffolk were identified and assessed. Of these sites, three were found to still support populations of perennial knawel. This case study describes management at one of these sites (see Cases 336 and 338 for mangement work at the other two sites).

Study site: This undisclosed locality in north Suffolk, comprises of a small patch of heathland, approximately 6.8 hectares in extent. Historically (up until the 1970s), the site had been used for farming and furrows had been ploughed annually each spring. In 1978, the site was surveyed and 1,670 individual

plants were present. This has been the highest number of perennial knawel plants recorded at this site.

Furrow ploughing and introduction of grazing: In 1994 the site was re-surveyed and only 32 mature perennial knawel plants were recorded. In the same year, all furrows were re-ploughed and sheep grazing was introduced in order to break up the soil surface and recreate suitable habitat conditions for perennial knawel seed germination and growth.

In addition to furrow re-ploughing, ground disturbance using a cultivator every six years has been undertaken. Sheep grazing has varied from low to medium intensity since 1994, depending on the number of sheep on the farm at the time. There has also been ground disturbance caused by rabbits *Oryctolagus cuniculus*. No additional perennial knawel plants have been planted.

Experimental exclosure: Within the site, a wire mesh control exclosure (5 m x 5 m) was erected in 1994 to exclude sheep and rabbits in order to investigate the effect of grazing and associated soil disturbance on perennial knawel. No additional individuals were planted inside the exclosure.

CONSEQUENCES

In summer 1995 (the year following the initial management activity), 26 perennial knawel plants were recorded. In summer 1996, this had risen to 165 individuals. Vegetation had a suitably short sward length and sufficient ground disturbance by rabbits and sheep was observed. By 1997, the population of perennial knawel had risen to 221 individuals and by 2005, several thousand plants were recorded.

Experimental exclosure: Within the exclosure, perennial knawel gradually diminished over the years as other more competitive plant species became established. By 2005 there were no perennial knawel plants left within the exclosure.

Conclusions: To date, the management of perennial knawel at this site in north Suffolk has been successful. Ensuring that the ground is sufficiently disturbed and suitably bare is essential for the viability of this species. Using a combination of furrow re-ploughing and a cultivator alongside sheep and rabbit grazing have proven successful techniques to sufficiently disturb the ground and encourage seed germination and seedling growth. The experimental exclosure showed that without grazing by sheep and rabbits and periodic ground disturbance, perennial knawel died out.

REFERENCES

Leonard Y. (2006) Reintroduction of perennial knawel *Scleranthus perennis prostratus* to Thetford National Nature Reserve, Norfolk, England. *Conservation Evidence*, 3, 9-10.