The use of ground disturbance techniques to manage perennial knawel *Scleranthus perennis prostratus* 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 1992, at a locality where perennial knawel had been recorded in 1985, the ground was disturbed using a vibrating sub-soiler. As a result of this soil disturbance, in 1994 two plants appeared. From seeds of these plants, seedlings were propagated and transplanted. After initial success the population dwindled and none were observed in 2005, additional mature plants were therefore planted. It is believed that the basic soil pH (7.5) and herbicide drift from neighbouring fields has been deleterious to the site and reduced habitat suitability for perennial knawel.

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 a small woody herb flowering between June and September. It is a biennial or short-lived perennial of semi-open, very short grassy heaths, compacted tracks and abandoned arable land, and is generally found on well-drained acidic (pH 4.9-6.8) sandy soil. It is a poor competitor, and requires open soil for seedling establishment.

Perennial knawel is classified as 'endangered' and is given special protection under the Wildlife and Countryside Act 1981. It 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 north Suffolk, and has been extirpated from Norfolk (except for one site where reintroduced – Leonard 2006).

This case describes the use of mechanical ground disturbance to maintain perennial knawel habitat at an undisclosed 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 describes management at one of these extant sites, an undisclosed locality in north Suffolk.

Study site: At this locality, perennial knawel had been last recorded in 1985. The site was a well-vegetated track with a pH of 7.5 which is slightly higher than the optimal pH range of 4.9-6.8 known to be preferred by the species. The site is also subject to herbicide spray drift from the neighbouring cultivated field, contaminating the site and causing damage to the plants.

Table 1. Management and decline of perennial knawel at an undisclosed site in north Suffolk between 1995 and 2005.

Year	No. of plants	Date of count	Management activity	Date of managemet
1995	99	27 Nov		
1996	35 9	4 May 3 Nov		
1997	45	August	63 individuals planted; 60 individuals planted	June October
1998	101	Summer (exact date not known)	Ground disturbed using forage harvester and vehicles; Swiping of vegetation	Summer (exact date not known)
1999	47	26 July		
2000			Track scarified; Seeds scattered	8 October
2001	25	6 August		
2002	38	14 July		
2003	24	2 July		
2004	0	Summer (exact date not known)	17 flowering individuals planted	
2005	240	August 2005	14 flowering individuals planted	

Ground disturbance and introduction of perennial knawel: In 1992, the ground was disturbed along a 67 m length of the track, using a shakerator (a vibrating sub-soiler). As a result of this soil disturbance, in 1994, two perennial knawel plants appeared in the exact place where perennial knawel was last recorded in 1985. From these two plants, 99 seedlings were propagated and replanted on 27 November 1995. Seedlings were well-watered in their pots (in which they had been cultivated locally) prior to the transplanting.

Management at this site is undertaken annually, disturbing the ground using a forage harvester and 4WD vehicles to create bare patches suitable for seed set and seedling growth, and also hand-swiping of encroaching taller vegetation. Additional seeds and seedlings were added on occasions.

CONSEQUENCES

In spring 2005, no perennial knawel was found at the site (Figure 1 & Table 1 for details of the timing of management and population decline data) and the track was once again lush with other vegetation. However, 14 further mature flowering individuals were planted during the spring of 2005. By the end of the season (August/September), the original 14 flowering individuals were still present and there were additionally three vegetative individuals, and 123 minute seedlings (all under one single parent plant). Active management of the site is continuing in an attempt to establish a self-sustaining population.

Conclusions: Various techniques have been used to manage habitat for perennial knawel at this site in north Suffolk, including initially using a shakerator to prepare the site seven years after perennial knawel appeared to have been lost, subsequent use of a forage harvester and 4WD vehicles to occasionally disturb the soil, and also swiping of other encroaching vegetation .

Although it is understood that ensuring that the ground is disturbed and that there is suitably sufficient bare ground (30-50%) to facilitate successful germination and seedling growth, it is unclear whether it has been ground disturbance or the replanting of additonal individuals that maintained the population until 2003. Since the initial planting in 1995, this site has suffered a gradual perennial knawel population decline up until 2005, when additonal plants were added. It is believed that the basic pH (7.5) of the soil and the herbicide spray drift from the neighbouring field has been deleterious to the site and has reduced the habitat suitability for perennial knawel.

REFERENCES

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

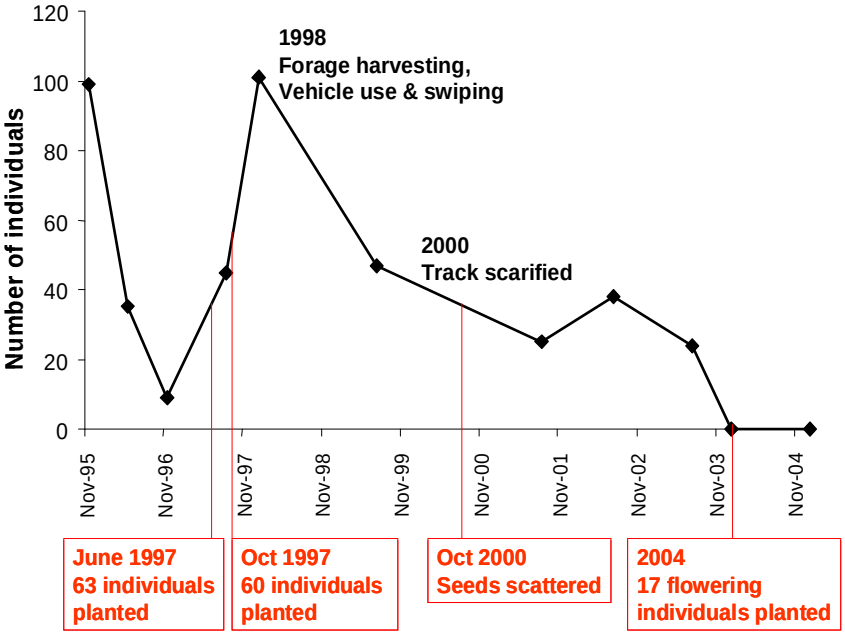

Figure 1. Management and decline of perennial knawel at an undisclosed site in north Suffolk, between 1995 and 2005.