

Scrub clearance enhances floristic species richness on a green lane with restricted motorised vehicular access in Stanford Rivers, Essex, England

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SUMMARY

An experimental early-spring scrub clearance regime was introduced in 2008 to Coleman's Lane, a 'green lane' site (i.e. a double hedged, unsurfaced track) in Essex, southeast England, with the aim of increasing floristic species richness. A year after scrub clearance, floristic species richness was higher on both grassy verges either side (average 5.6 species/quadrat) and central track (4.3 species) of the green lane, compared with that recorded a year prior to clearance (4.2 and 2.8 species respectively). Plant species that especially benefited from scrub clearance included cow parsley *Anthriscus sylvestris* and red dead nettle *Lamium purpureum*. New species recorded in 2009 included bush vetch *Vicia sepium*, sweet violet *Viola odorata* and wood anemone *Anemone nemorosa*. There were substantial reductions in bramble *Rubus fruticosus* and cleavers *Galium aparine* achieved. Further clearance is planned for winter 2009-10, and subsequently on a 2-3 year rotation.

BACKGROUND

The byways (public rights of way open to all traffic; walkers, horse riders, cyclists, motorised vehicles and carriage drivers) of Essex were surveyed in 2002 and 2003 in an effort to describe their value for conservation, archaeology and amenity. This survey led to the publication of a report of the findings (Plumb 2004) with the eventual aim being to compile a list of byways that could be subjected to permanent or seasonal Traffic Regulation Orders based on their ecological value and importance for nature conservation. This desire to regulate vehicular usage of byways stemmed from Section 66 of the Countryside and Rights of Way Act (CROW) (2000), which incorporated a new section (22A) into the Road Traffic Regulation Act (1984). The new section of the CROW Act enables highway authorities to make orders to control vehicular traffic on unclassified roads and byways throughout England and Wales for the purposes of conserving or enhancing the natural beauty of the area. It is made explicit that "conservation of natural beauty"

includes the conservation of flora, fauna and physical features of the landscape. Motorised access can lead to low floristic species richness where vehicular usage is high, often eradicating plant cover on the central track due to excessive wear and tear by vehicle wheels (Gardiner 2008).

Coleman's Lane in Stanford Rivers, Essex (southeast England) is threatened by scrub encroachment due to a permanent prohibition of driving order (a form of Traffic Regulation Order) and an absence of management. This paper documents the response of the flora of this green lane to a scrub clearance regime introduced by Epping Forest Countrycare in spring 2008.

ACTION

Coleman's Lane: This green lane is classified as a public byway open to all traffic (excluding motorised vehicles) and is approximately 640 m in length. The byway has a Traffic Regulation Order (TRO) that prevents

motorised vehicles using the lane. Signage and bollards are situated at the entrances to the byway to enforce the order. The byway (Byway 55 Stanford Rivers; Ordnance Survey grid ref. TL 530015) is situated in the parish of Stanford Rivers (west Essex), has a hedgerow on both sides for most of its length, and is approximately 5 m wide, although scrub (mainly bramble *Rubus fruticosus* agg.) has encroached onto the verges, narrowing its width to < 2 m in places. The unsurfaced central track (approximately 1-2 m wide) has significant patches of bare earth (due to the trampling by horses and walkers) with some low vegetation cover. The soil type is chalky boulder clay and the lane is quite steep in places, leading to water logging at the lower southern end due to runoff from the highest point at Coleman's Farm to the north and flooding where it crosses Stanford Hall Brook.

The lane has a relatively species rich hedgerow (five woody species per 30 m), the southern section is bordered by ancient woodland which contains localised plant species such as yellow archangel *Lamiastrum galeobdolon*. Coleman's Lane is a Local Wildlife Site due to the mixture of green lane and woodland habitats. Local Wildlife Sites are defined as "a discrete area of land which is considered to be of significance for its wildlife features in at least a District/Borough/Unitary Authority context"; although not protected by legislation, their importance is recognised by local authorities when considering any relevant planning applications (Epping Forest District Council 2009).

Scrub clearance of the verge and track: On the lane, grass and scrub was cut using a self propelled flail mower along the entire length of the byway on 11 March 2008 by Epping Forest Countrycare and volunteers. An early-spring clearance was undertaken prior to the onset of the main bird nesting season (undisturbed scrub and hedgerow habitat was still available along the lane in which birds could nest). All cut material was collected by raking and burnt on an area of bare earth at the southern end of the lane.

Monitoring: Ten quadrats (50 x 50 cm) were placed randomly on both the grassy verges and central track (20 quadrats in total in each

year, 10 on verge, 10 on track) to monitor the response of the ground flora to management. Monitoring took place on 12 April 2007 (11 months before scrub clearance) and 10 April 2009 (13 months after scrub clearance) in the same area of the lane (although exact locations of quadrats varied due to the random positioning within the area). The frame quadrat used had 100 divisions (5 x 5 cm) to assist percentage vegetation cover estimates. In each quadrat, the number of squares that each plant species (vascular herbs and shrubs) was present in was recorded as a measure of frequency of occurrence (e.g. if a species appeared in 100 squares it was recorded as having 100% occurrence in the quadrat). Grasses were not recorded due to difficulty in identification early in the growing season. The method allowed an objective determination of the abundance/species richness of plants that could be repeated on each survey date.

CONSEQUENCES

The floristic species richness of the grassy verges and central track appeared to increase in response to scrub clearance (Table 1). A year after clearance, floristic species richness was higher on both the verges (average 5.6 species/quadrat) and track (4.3 species), compared with that recorded a year prior to clearance (4.2 and 2.8 species respectively). On the verges there was a substantial increase in the ground cover of cow parsley *Anthriscus sylvestris* (10.5 to 39.2%). New species recorded in 2009 included bush vetch *Vicia sepium*, sweet violet *Viola odorata* and wood anemone *Anemone nemorosa*. The scrub clearance was successful in reducing the cover of woody species encroaching on the verges such as *R. fruticosus* agg., and rank grassland plants such as cleavers *Galium aparine*.

On the central track, scrub clearance seemed to increase the ground cover of vegetation, as there was a reduction in bare earth in the quadrats (Table 1). Plant species that increased included *A. sylvestris* and creeping buttercup *Ranunculus repens*. New species recorded in 2009 included greater stitchwort *Stellaria holostea* and lesser celandine *Ranunculus ficaria*.

Table 1. Mean percentage ground cover (\pm standard error) and mean number of vascular plant species (excluding grasses) per quadrat on the verges and track on 12 April 2007 (before scrub clearance) and 10 April 2009 (after scrub clearance).

Plant species/bare earth	Verge		Track	
	2007	2009	2007	2009
Bare earth	4.4 \pm 3.0	3.1 \pm 1.8	81.9 \pm 4.8	67.9 \pm 4.0
Bramble <i>Rubus fruticosus</i> agg.	23.0 \pm 9.9	13.7 \pm 6.7	2.1 \pm 1.0	1.9 \pm 0.5
Broad-leaved dock <i>Rumex obtusifolius</i>	0.0 \pm 0.0	0.0 \pm 0.0	0.7 \pm 0.5	1.5 \pm 0.7
Bush vetch <i>Vicia sepium</i>	0.0 \pm 0.0	1.0 \pm 1.0	0.0 \pm 0.0	0.0 \pm 0.0
Cleavers <i>Galium aparine</i>	12.3 \pm 6.2	2.7 \pm 0.6	1.5 \pm 0.8	1.0 \pm 0.8
Cow parsley <i>Anthriscus sylvestris</i>	10.5 \pm 5.1	39.2 \pm 9.9	2.9 \pm 1.2	12.7 \pm 3.7
Creeping buttercup <i>Ranunculus repens</i>	0.7 \pm 0.7	0.0 \pm 0.0	2.7 \pm 1.6	5.1 \pm 2.9
Creeping thistle <i>Cirsium arvense</i>	0.0 \pm 0.0	0.0 \pm 0.0	0.0 \pm 0.0	0.2 \pm 0.2
Dandelion <i>Taraxacum officinale</i> agg.	0.0 \pm 0.0	0.0 \pm 0.0	0.0 \pm 0.0	3.0 \pm 2.1
Dog rose <i>Rosa canina</i> agg.	2.0 \pm 2.0	0.0 \pm 0.0	1.0 \pm 1.0	0.0 \pm 0.0
Dog's mercury <i>Mercurialis perennis</i>	23.2 \pm 9.3	19.7 \pm 8.2	1.1 \pm 1.1	0.3 \pm 0.3
Garlic mustard <i>Alliaria petiolata</i>	0.0 \pm 0.0	1.9 \pm 1.4	0.5 \pm 0.5	1.0 \pm 0.7
Greater plantain <i>Plantago major</i>	0.0 \pm 0.0	0.0 \pm 0.0	0.0 \pm 0.0	1.8 \pm 1.3
Greater stitchwort <i>Stellaria holostea</i>	1.0 \pm 1.0	0.0 \pm 0.0	0.0 \pm 0.0	2.1 \pm 2.1
Ground ivy <i>Glechoma hederacea</i>	2.0 \pm 1.1	0.5 \pm 0.3	0.4 \pm 0.4	0.1 \pm 0.1
Hogweed <i>Heracleum sphondylium</i>	0.4 \pm 0.4	0.8 \pm 0.6	1.3 \pm 1.3	0.8 \pm 0.8
Ivy <i>Hedera helix</i>	1.8 \pm 1.5	4.5 \pm 4.5	0.0 \pm 0.0	0.0 \pm 0.0
Lesser celandine <i>Ranunculus ficaria</i>	8.5 \pm 8.5	3.0 \pm 3.0	0.0 \pm 0.0	1.4 \pm 1.2
Lords and ladies <i>Arum maculatum</i>	0.0 \pm 0.0	2.1 \pm 2.1	0.0 \pm 0.0	0.0 \pm 0.0
Nettle <i>Urtica dioica</i>	7.1 \pm 4.4	7.1 \pm 2.9	0.0 \pm 0.0	2.0 \pm 1.4
Prickly lettuce <i>Lactuca serriola</i>	0.0 \pm 0.0	0.5 \pm 0.5	0.0 \pm 0.0	0.0 \pm 0.0
Red campion <i>Silene dioica</i>	0.5 \pm 0.5	0.3 \pm 0.3	0.5 \pm 0.5	0.6 \pm 0.6
Red dead nettle <i>Lamium purpureum</i>	0.0 \pm 0.0	2.4 \pm 1.4	0.0 \pm 0.0	0.0 \pm 0.0
Sweet violet <i>Viola odorata</i>	0.0 \pm 0.0	0.2 \pm 0.2	0.0 \pm 0.0	0.0 \pm 0.0
Wood anemone <i>Anemone nemorosa</i>	0.0 \pm 0.0	0.5 \pm 0.5	0.0 \pm 0.0	0.0 \pm 0.0
Wood avens <i>Geum urbanum</i>	0.4 \pm 0.4	0.9 \pm 0.6	1.9 \pm 1.0	0.2 \pm 0.2
Mean no. of species/quadrat \pm SE	4.2 \pm 0.3	5.6 \pm 0.5	2.8 \pm 0.5	4.3 \pm 0.5

Discussion: It would seem that scrub clearance increased the floristic species richness of the grassy verges and central track of Coleman's Lane. Management was particularly effective at reducing the ground cover of *R.fruticosus* agg. and *G.aparine*, species that had smothered the grassland flora. Higher than average rainfall in the 2008 growing season may have led to enhanced growth of plant species such as *A. sylvestris*, this indicator of fertile grassland will need to be kept in check to prevent it dominating the verges of the lane. The quadrat survey indicated the short-term impact of scrub clearance on the flora of the lane, longer-term data is needed to gain a more detailed insight into the response of plant communities to management.

Townhall clock *Adoxa moschatellina* and cowslip *Primula veris* used to occur along the lane (Paul Hewitt pers.comm.) but appear to have disappeared due to scrub encroachment.

However, a small patch of *A.nemorosa* was recorded; this localised plant of ancient woodlands and hedgerows (Jermyn 1974) may likewise be lost if too densely smothered by invading scrub.

This study indicates the importance of scrub clearance in increasing the floristic diversity of public byways where motorised vehicular access has been restricted by a TRO. Without management, these green lanes, which do not receive the disturbance they did whilst vehicles drove over the sward (thus helping to restrict the development of scrub), can quickly become overgrown by woody vegetation (Gardiner 2008). Therefore, it is necessary that scrub clearance is undertaken regularly to prevent the loss of vascular plants. A scrub clearance regime will be maintained on Coleman's Lane, with a cut taking place every 2-3 years.

ACKNOWLEDGEMENTS

We would like to thank volunteers from Epping Forest Countrycare who helped with the scrub clearance.

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