

TROOPERS HILL, BRISTOL

ECOLOGICAL MONITORING 2002

INTRODUCTION

This report describes the results of vegetation and photographic monitoring carried out in 2002 as a repeat of surveys carried out in 1994, 1996, 1998 and 2000. The purpose of the monitoring is to identify any changes in the vegetation of Troopers Hill; to monitor the success of management; and to identify any further priorities for management required to conserve and enhance the site's ecological interest.

There are two habitat types of major interest at the site - acidic grassland, including partially bare areas that are of exceptional interest for invertebrates; and heath. Both habitat types are rare in both Bristol and the surrounding area. The monitoring has paid particular attention has been paid to the heathland vegetation since it appeared through the 1980s and in the early 1990s that this was threatened and might require particular management. Over the course of the monitoring programme the extent of heathland on the site has grown significantly.

METHODS AND RESULTS

The methodology followed that employed during 1994, 1996, 1998 and 2000. Photographs were taken from the locations mapped and described in the previous reports at the same time of year - in August, when the heather species are in flower.

The aim of the survey has been to record:

- 1) the extent of scrub encroachment onto areas of both grassland and heath; and
- 2) the size and health of the populations of the two heather species present - ling (*Calluna vulgaris*) and bell heather (*Erica cinerea*).

Patches of scrub and heath were mapped and identified with a letter and briefly described. The smaller patches of heath were measured, recording width and length of the patch at its widest and longest. The edges of each patch were defined as the furthestmost branch tips. The height measurement was taken at the tallest point of the patch, at its natural height - i.e. without pulling shoots upwards.

Photographs were taken from fixed points, showing as many of the features of interest as possible, including areas where scrub encroachment appeared to be a potential problem. Where possible photographs were framed so as to include a fixed reference point, such as a building. Features such as scrub encroachment referred to in the descriptions below are marked on the photographs.

Area Descriptions

The trend towards an increase in grass vigour noted in the previous two reports continued in 2002, presumably again as a result of wet weather in the early summer.

The hill was affected by a widespread fire in 1995, which killed areas of both heather and scrub. Before the 2002 survey there were several smaller burns, one of which affected an area of broom.

A: This is an area of mixed bramble and hawthorn scrub, with patches of bracken. Following the 1995 fire the area was very open but subsequently re-growth, especially of bramble, has been strong. The scrub vegetation has continued to thicken since 2000 and has also spread slightly. Photograph 1 shows some slight spread of bracken and bramble in both the upper centre-left and the centre-right of the photograph and this vegetation now covers a greater area than it did in 1994.

B: This area, a dense patch of bramble, was cut back in 2000. Photograph 2 shows the regrowth of the bramble here, to cover almost exactly the same area as it did before 2000.

C: The hedge here forms the edge of the site. It consists of a dense hedge of hawthorn, elder, goat willow and oak, with small amounts of bramble.

North of D: The Japanese knotweed and ornamental dogwood, shown on photographs 3 and 4, increased substantially between 1994 and 1998 but was then fairly stable between 1998 and 2000. There appears to have been a further small increase since 2000.

D: The large patch of ling seen in photograph 6 in 1994 had completely disappeared in 1996, presumably as a result of the fires of 1995. It had regenerated by 1998, although it was much smaller than it was in 1994. In 2000 it had recovered to its size in 1994 and it has remained at a similar size in 2002 (3.25m x 2.3m x 0.8m tall).

E: Previously this was a patch of ling plants in an otherwise grassy sward but strong growth of ling has been noted since 1996. This growth remains strong and small seedlings continue to appear around the edges of the patch. It is now too large and diffuse to measure with any accuracy. It is shown in photographs 7 and 8.

F: The broom scrub here was severely affected by the 1995 fire and had not attained its previous size by 2000. Photographs 9, 10 and 11 show that the patch of broom scrub is now as large and dense as it was in 1994, although there are fewer oak and silver birch saplings than there were then. Heath species are more numerous and vigorous in the surrounding area and bell heather is spreading in small patches up the hill towards the chimney, in an area where heath plants have previously been entirely absent.

G: In 1994 this was a patch of ling, with several seedlings. Bell heather has since colonised the area but since 1998 broom has regenerated strongly and although plants of both ling and bell heather remain under the broom they are much reduced in both size and vigour. A small patch of the broom here was burnt during the 2001/2002 winter. Photograph 11 shows the spread of broom and some of the effects of the fire.

H: In 1994 this was a patch of goat willow and silver birch with a small plant of bell heather. By 2002 a larger patch of bell heather 1.2m x 1.1m x 0.4m tall (0.78m x 0.8m x 0.35m tall in 2000, 0.5 x 0.25 x 0.3m tall in 1998) was present. There has been

strong growth of both heath species, and especially bell heather, across the slope to the west.

I: This is an area of tall grassland with scattered plants of bell heather. There has been a steady increase in the number and size of bell heather plants since 1994. On photograph 21 strong growth of grasses obscures heath plants here but there has been a marked increase in the number of bell heather seedlings. In 2002 goldenrod (*Solidago virgaurea*) was much more frequent in this and the next area than in previous years.

J: This is an area with scattered plants of bell heather and ling on a south-west facing slope; up until 1998 bell heather only was present. The extent of both bell heather and ling has increased steadily and consistently in this area. In 1994 photographs 13 and 14 show a grassy sward with scattered small plants of bell heather. The corresponding photographs in 2002 show heathland vegetation dominated by bell heather. There has been some spread of scrub and sapling trees around the edges of the area.

K: This is an area of broom scrub, which in 1994 had only small patches of bramble and saplings of oak. Since 1998 oak and bramble have grown up through the broom and are now shading out part of the area. This can be seen on photographs 13 and 14.

L: In previous years there was one plant of ling here, but the extent of heath here has increased, particularly since 1998. There are now many plants forming an extensive patch and the individual plant measured in previous years is now part of a much bigger patch of both ling and bell heather.

M: In 1994 this was an area of tall grassland with scattered small plants of ling. Bell heather has colonised the area since 1996 and bell heather has become much more abundant and vigorous. The spread of both bell heather and ling continued between 2000 and 2002.

N: This is a small valley, shown from various angles on photographs 16, 17 and 18. Throughout the monitoring scheme it has had good populations of both ling and bell heather growing around patches of bramble, oak and hawthorn. Japanese knotweed is present around some of the bramble patches. Both heather species have spread progressively since 1994, but there has also been growth of bramble patches and the oak trees and hawthorn bushes are becoming taller. Since 2000 there has been further spread of bramble at the edges of the area and this is shading out some of the heath.

O: At the start of the monitoring scheme this area consisted of a band of hawthorn scrub at the bottom of the hill and an area of tall grassland with patches of bramble and a considerable amount of broom on the slope above the hawthorn. The extent of hawthorn here has barely changed through the lifetime of the scheme but bramble has spread aggressively across the rest of the area, to the extent that tall grassland is now absent and broom is much less frequent than formerly. The spread of bramble, as seen on photograph 19, continued between 2000 and 2002.

P: This is a predominantly grassy slope with scattered plants of bell heather. The spread of bell heather in this area noted in previous reports has continued this year. This and surrounding slopes also have substantially smaller areas of bare ground

when compared with 1994 and 1996, and the grass sward is taller. Photograph 20 shows this area.

R: In 1994 this area had a cover of bell heather of approximately 75%, with some hawthorn, bracken, bramble and broom in the north-eastern part of the area. In the fire of 1995 the area of bracken and bramble was significantly reduced and the broom was destroyed. The cover of bell heather was significantly reduced. Since 1996 bell heather has spread and ling has colonised the area. The broom has regrown well. In recent years bramble and bracken have encroached into the area seen on the right of photograph 21.

S: In 1994 this area of heathland had a cover of bell heather varying from 30% at the south-eastern end to 90% at the north-western end. The area was burnt in the 1995 fire and, although patches of bell heather remained, its cover was much reduced. Since then the cover of bell heather has recovered throughout the area and now varies from 70% to 95% and this recovery continued between 2000 and 2002. The area is shown in photograph 22.

T: In 1994 there was one small plant of ling in this area. There has since been a significant increase in heath vegetation and in 2002 there was a large patch of ling and 21 plants of bell heather (12 in 1998). Some of these plants can be seen in photograph 23. Bramble has spread across the rock face visible on the left of photograph 23, but this has not had any discernible adverse impact on the ecology of the site.

U: In 1994 there were three clumps of ling here. By 2002 this population had grown to 12 clumps (5 in 1998). The area was colonised by bell heather between 1998 and 2000, now 1 large plant is present within the main area and 3 on the north-west facing slope (1 small plant on each slope in 2000). Part of the area can be seen on photograph 24.

V: This is a small bowl in the south-facing slope of the gully, shown on photographs 25 and 26. In 1994 there were substantial patches of ling with one clump of bell heather. Both ling and bell heather increased here between 1994 and 2000 and this increase continued between 2000 and 2002. The bramble at the bottom of the slope, visible in the bottom left of photograph 25 and the bottom right of photograph 26, has also spread.

W: This area is on the north-facing slope of the gully, opposite area V. In 1994 there were 3 moderate-sized patches and 1 very small patch of ling. The cover of ling increased significantly between 1994 and 1996 but then decreased between 1996 and 1998. Since then it has increased again and this increase continued between 2000 and 2002.

X: There is scattered ling in a grassy sward on the slope of the gully here, with one patch of bell heather at the top of the gully slope. The vegetation of the area has remained largely unchanged since 1994, although there has been some increase in the size of the heather plants.

Y: In 1994 ling made up approximately 75% of the cover in this area. This proportion remained roughly the same in 1996 but it has since increased to 100%. Photograph 27

now shows a slope dominated by ling, as opposed to a grassy slope with scattered ling in 1996. However, there has been some increase in bramble, visible in the bottom left corner of photograph 27 and spread of bracken, visible to the left of photograph 28. This spread largely occurred between 1996 and 1998, but it has continued at a slower rate since then.

Z: There are scattered clumps of ling on the south and south-east facing slopes of the gully here. The ling has become more abundant and vigorous and bell heather has colonised the area but at the bottom of the slope there has been some increase in bramble. The top of the slope can be seen in photograph 29, which illustrates the improvement in heath cover.

AA: This is a small gully that has supported dense ling throughout the life of the monitoring scheme. The vigour of the plants has increased progressively and there are several seedling plants around the edge of the main patch. The spread is most obvious at the tops of the slope, and can be seen in photographs 30 and 31. The scrub at the bottom of the slope does not appear to be spreading.

BB: In 1994 ling was scattered across this slope and formed a dense patch only around the patch of bramble (visible in the bottom left of photograph 33). The area was affected by the fire of 1995 and since then the ling has spread quickly, and is now much more vigorous than it was in 1994. Bell heather colonised the area after 1996. The bramble has also spread and several plants of broom are now present.

CC: This area, part of which is shown on photograph 32, has patches of ling around beds of bramble and other scrub and a small oak tree. Bramble has spread across the area, but at the expense of rank false oat-grass dominated grassland, rather than of the ling.

DD: There has consistently been a patch of ling and bell heather, in approximately equal quantities, here. The heath species continue to do well in this area but small scale bramble encroachment has continued and is threatening their survival. See photograph 34.

EE: This area is located directly above number 89 Troopers Hill Road. In 1994 it supported 2 clumps of ling and 1 clump of bell heather on the main slope and a clump of bell heather at the bottom of the slope. No heath species were found here in 1996 or 1998 following the fire in 1995, although the broom did re-grow. In 2000 3 plants of bell heather and 1 plant of ling were found. In 2002 many young plants of both species were present. See photograph 35.

Summary

There has been a marked increase in the abundance of both ling and bell heather in recent years, to such an extent that areas that previously consisted of grassland with scattered plants of heather species now support true heathland. There has also been marked colonisation of the north-western slopes of the hill (between areas D and E and the chimney) by bell heather. These changes in the site's vegetation are presumably due to a succession of relatively wet summers, which has encouraged both the growth of heath species and the development of a lusher (compared to earlier

years) grassland sward. The damper weather has also reduced the frequency of fires, which reduced the cover and distribution of heath species on the site.

The only area where heath has declined significantly since 2000 is in areas D and E. This has been due to an increase in broom growth. Broom scrub is also an uncommon habitat in Bristol and in view of the increase in heath species elsewhere on the hill the growth of broom in this area is probably to be welcomed. Elsewhere on the site, as at areas K and O, broom has been overgrown by more common scrub species such as bramble, hawthorn and oak.

Bare ground habitat on the site is extremely important for invertebrates. Photograph 20 shows that the main area of erosion, used by large numbers of *Andrena* solitary bees and their predators and parasites, has remained at the same extent. This valuable habitat feature should continue to be monitored in future years.

It was obvious in several areas on the western side of the hill that goldenrod was having a very good year in 2002 - this is an uncommon plant locally and supports several moth species. This increase might be a temporary phenomenon caused by weather conditions.

MANAGEMENT

There are four key habitat types on the site, as follows:

- i) heathland;
- ii) acidic grassland;
- iii) bare slopes; and
- iv) broom scrub

The diversity of habitat on the site is particularly important to the site's invertebrates and rock faces, tall grassland (generally dominated by false oat-grass), tall herb vegetation (such as areas dominated by rosebay willowherb, tansy or thistle species), bramble and hawthorn scrub and secondary woodland are all important in contributing to this diversity. These habitat types are all much more widespread than the four listed above and they should not be allowed to spread at the expense of these habitats.

Site management should aim to produce an approximately 60:40 mix of acidic grassland to heath. The proportion of heath is currently lower than this but it has been increasing in recent years. The area of bare or partially bare ground on slopes should remain at the 2002 level as a minimum. The proportion of bare soil fluctuates with rainfall and was higher in the drier years of the mid-1990s. There is no need at present to attempt to increase the availability of bare ground, and this would be difficult, but if bare patches shrink further then appropriate measures such as small-scale turf removal should be considered. No measures should be undertaken to reduce the extent of bare ground. In places broom scrub is being lost to encroachment by other scrub species and this should be reduced, with the aim of approximately doubling the extent of broom scrub on the site.

The site has relatively few management needs and a combination of trampling and very poor soils prevents large scale scrub encroachment.

Litter removal and path maintenance require ongoing management effort.

Locally there is a small problem caused by encroachment of scrub, especially bramble, onto the edges of interesting areas of vegetation. The following areas have been identified as being in need of management:

A: control bramble at edges of area and along path;

J: control bramble and other scrub at edge of area;

K: control oak and bramble;

N: remove hawthorns and oak and cut back bramble;

O: control bramble and hawthorn;

R: (and elsewhere along this lower path): cut back bramble from path, to maintain access as well as to retain habitat;

V: cut back bramble at bottom of slope; cut back scrub;

BB: control bramble; and

DD: cut back scrub.

Invertebrate Records

Casual records of invertebrates have been made during the surveys. The following table provides the data from the three year's monitoring visits. P = recorded as present but not counted, the number is given if the species was counted and a dash indicates that the species was not recorded in that year. A indicates that the species was noted as being abundant.

	94	96	98	00	02
Butterflies					
Grayling	P	6	-	-	-
Small heath	P	-	-	-	30+
Meadow brown	-	-	-	10+	15+
Gatekeeper	-	-	-	5+	-
Common blue	-	-	-	4	10+
Small copper	P	-	-	4	1
Brown argus	-	-	-	3	-
Clouded yellow	-	P	-	-	-
Speckled wood	-	-	-	1	4
Painted lady	-	P	-	-	-
Large white	-	-	-	-	1
Moths					
Silver y	-	P	-	10+	-
Square spot rustic	-	-	-	-	1
Knotgrass (larva)	-	-	-	-	1
Vapourer	-	-	-	2	-
Rush veneer	-	P	-	100+	1
Agriphila tristella	-	P	-	10+	10+
Agriphila straminella	-	P	-	10+	10+
Agriphila inquinatella	-	P	-	-	-
Orthoptera					
Mottled grasshopper	A	-	P	P	P
Field grasshopper	P	-	P	P	P
Meadow grasshopper	P	-	P	P	P
Common green grasshopper	-	-	-	-	P
Dark bush cricket	P	-	P	P	P
Long-winged conehead	-	-	-	-	2+

Grayling appears to have disappeared from the site but the sighting of small heath, in good numbers, for the first time during this survey since 1994 is welcome; this species is known to be in decline elsewhere. Long-winged conehead was recorded for the first time on the site in 2002. This was until recently a very rare insect nationally, but it has spread rapidly in recent years. It was recorded at several sites locally in 2002 but its appearance at Troopers Hill is surprising given the rarity of its preferred tall grassland habitat here.