



**TROOPERS HILL LOCAL NATURE RESERVE
MANAGEMENT PLAN**

**PRODUCED BY WESSEX ECOLOGICAL CONSULTANCY
WORKING IN PARTNERSHIP WITH**

FRIENDS OF TROOPERS HILL

&

BRISTOL CITY COUNCIL

www.troopers-hill.org.uk

www.bristol.gov.uk/parks



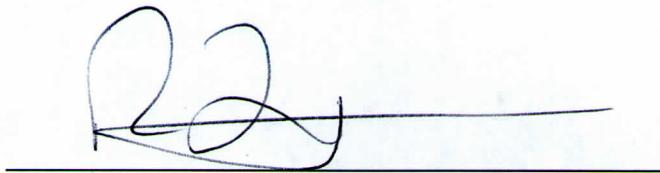
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**WE, THE UNDERSIGNED,
SUPPORT THESE MANAGEMENT
AND WORK PLANS AND WILL
WORK TOWARDS ACHIEVING
THEIR AIMS AND OBJECTIVES**

SIGNED

A handwritten signature in black ink, appearing to read 'S. Acton-Campbell', written over a horizontal line.

Susan Acton-Campbell, Chair
on behalf of Friends of Troopers Hill

A handwritten signature in black ink, appearing to read 'R. Fletcher', written over a horizontal line.

Richard Fletcher, Parks Services Manager
on behalf of Bristol City Council

Saturday, 25th January 2020

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1.0 INTRODUCTION

1.1 The Reason for Producing a Management Plan

Troopers Hill has had a management plan since 1992 and it has been revised periodically to remain current and to take account of latest guidance; since 2007 this has included the Green Flag criteria. The previous version of the management plan was produced in January 2012.

1.2 The Purpose of the Plan

Troopers Hill forms part of a network of Local Nature Reserves owned by Bristol City Council and it is important to ensure that its management complies with the criteria that Natural England set out as being necessary for such a designation.

Therefore the plan will:

Assist Bristol City Council in looking at the long term management of the site by setting policies and management priorities.

Provide continuity when staff, management and committee members retire or move on.

Enable Bristol City Council and Friends of Troopers Hill to identify projects that are beyond their financial resources so that additional funding can be sought.

Enable the Council and the Friends to agree ongoing maintenance works to be carried out by the Council, volunteers, contractors and others.

Inform all interested user groups and individuals of the long-term future of Troopers Hill; the daily maintenance regime; and the reasons behind any major changes.

Ensure that all stakeholders can work together towards the same ends and to allow these groups and individuals input to the management plan.

Explain the rationale and evidence that has been used to guide management decisions.

Identify future investment needs.

1.3 The Process used to Produce the Plan

March 1992	The first Troopers Hill Management Plan was produced for Bristol Development Corporation by Landmark Environmental Consultants.
August 1994	A photographic monitoring programme was established in 1994 with the aim of assessing ecological changes at Troopers Hill. Photographs are taken from 35 fixed points on the site every five years in August, and report on findings is produced.
June 1995	Bristol City Council declared Troopers Hill as a Local Nature Reserve.
March 1999	A new management plan was produced for Bristol City Council by Wessex Ecological Consultancy
April 2004	A Management and Action Plan for Troopers Hill was produced by the newly formed Friends of Troopers Hill, in partnership with Bristol City Council.
April 2005-2006	Updates and reports produced by the Friends of Troopers Hill.
Summer 2006	The council adopted a format for parks and green spaces based on guidance from the Commission for Architecture, Buildings and Environment. It was also agreed to apply for a Green Flag for Troopers Hill.
November 2006 to January 2007	The management plan for Troopers Hill was revised in line with other parks site management plans. The Friends of Troopers Hill worked closely with the council during the process and provided much of the background research and information.
November 2011 to January 2012	A further review and update of the management plan was carried out. In 2014 Bristol City Council no longer had sufficient officer resource to support Green Flag applications but continued to support the site to achieve a Green Flag standard.
August 2018 to November 2019	The current review and update of the management plan was carried out.

1.4 The Life of the Plan

The plan is to inform policy making with a view of over 50 years. It contains a ten-year work plan that will be reviewed annually as part of the process of producing an annual action plan, allowing revisions to be made as financial resources are identified and in response to changes. The whole document will be reviewed in ten years time.

1.5 Vision and Aims

Troopers Hill is a popular and well used open space, highly valued by the residents of East Bristol. It has the largest area of heathland in the city and is recognised as one of the most important sites in Bristol for invertebrates, fungi and lichens by experts in all three fields. It is used as a survey site by university students and postgraduates, visited by natural history, local history and school groups and used to contribute data for national studies.

1.5.1 The Vision for Troopers Hill

The vision for Troopers Hill is to enhance the use of the site for recreation by the local community while protecting and enhancing its natural beauty, rich biodiversity, history and geology.

1.5.2 The Aims for Troopers Hill

Overall Aim

1.5.2.1 To ensure that Troopers Hill is maintained as a Local Nature Reserve, to benefit both wildlife and people.

Site Aims

1.5.2.2 To conserve and where possible enhance the extent and quality of acidic grassland and heath habitat, including associated bare earth, for the benefit of biodiversity.

1.5.2.3 To ensure that Troopers Hill's landscape retains its strong character and remains in good condition.

1.5.2.4 To conserve and where possible enhance the geological features of the site, where this does not conflict with important biological interest.

1.5.2.5 To conserve the industrial heritage features.

Community Aims

1.5.2.6 To provide suitable facilities and opportunities for public enjoyment of the site, for present and future generations of Bristolians and visitors to the city, providing that these do not conflict with nature conservation requirements.

1.5.2.7 To provide maximum opportunities for interpretation and to encourage educational use.

1.5.2.8 To encourage community involvement in the site, and to encourage active involvement in its care and management.

1.5.2.9 To assist organisations or individuals with any scientific research.

1.5.2.10 To ensure that Troopers Hill is safe and is accessible to all within the natural constraints of the site.

1.5.2.11 To ensure that antisocial behaviour is controlled and its impacts reduced.

1.5.2.12 To ensure that Troopers Hill is well managed and well resourced, balancing all the various public uses with the wildlife and heritage value of the site.

2.0 POLICY CONTEXT

Bristol City Council is guided by a Corporate Plan, The Bristol Partnership Community Strategy and other strategic documents. National and local strategies provide guidance and help to steer and formulate objectives. This conservation management plan complements these strategies and the corporate plan.

2.1 The Corporate Strategy

The Corporate Strategy sets out what, within available resources, Bristol City Council plan to achieve over the next five years towards the delivery of the long term vision for the city. The Corporate Strategy can be viewed at www.bristol.gov.uk/policies-plans-strategies/corporate-strategy.

2.1.1 Parks and Green Spaces Strategy (2008)

The Parks and Green Spaces Strategy (P&GSS) outlines a twenty year investment programme for the future provision of green space and the facilities and services that should be provided, its core vision is to create a city with good quality, attractive, enjoyable and accessible green spaces that meet the diverse needs of all Bristol citizens and visitors. The P&GSS can be viewed at: www.bristol.gov.uk/policies-plans-strategies/bristol-parks-and-green-space-strategy.

The P&GSS has eight objectives:

1. Raise the quality of parks and green spaces.
2. Encourage greater use and enjoyment of Bristol's parks and green spaces by all sectors of the community.
3. Contribute to the wider planning of the urban fabric of the city by providing a range of good quality parks and green spaces, which play a significant role in meeting the needs of balanced and sustainable communities and enhancing the urban landscape, to help make Bristol a green and sustainable city.
4. Protect needed green space from development.
5. Rectify shortage in particular types of green space across the city to ensure that all residents have access to formal, informal, natural, sports, and children and young people's spaces.
6. Provide a clear basis for beneficial investment on green spaces – identifying those areas of Bristol where investment and improvements in green spaces are most needed – helping the council spend better.
7. Encourage active and healthy life styles and promote social inclusion.
8. Encourage community participation in the improvement and management of green spaces.

The following table shows how the policies in the P&GSS relate to the Troopers Hill Management Plan:

Ref	Policy Detail	The Troopers Hill Management Plan Response
NG	Natural Green Space	
NG2	Improve maintenance and management regimes ensuring optimum conditions for wildlife alongside attractive, welcoming and easily accessible places for people to enjoy.	Key members of parks staff have been made aware of the value of the site for both ecological and geological conservation. Developing a skilled workforce means that they are more able to manage this sensitive site through the lead of the management plan and the Nature Conservation Officer (NCO).

NG5	Create new habitats for wildlife to remedy shortfalls in natural green space.	Explore potential to create new wildlife habitats where scrub and woodland edges have been cleared.
LM	Land Management Policies	
LM6	Develop the role of on-site parks staff and dog wardens to tackle problems of dogs' mess and uncontrolled dogs through education, encouragement and enforcement.	Key members of park staff will receive training to enable them to educate, encourage and as necessary issue fixed penalty notices for fouling and uncontrolled dogs.
LM9	Adopt sustainability targets in the management of Bristol's parks and green spaces.	The management plan seeks to undertake a range of sustainability measures, which form part of the Parks and Estates Environmental Management Audit Scheme commitment.
D	Delivery Policy	
D1	Support participation and involvement in parks and green spaces through consultation, participation in active management of spaces, volunteering, education and outreach activities.	Bristol City Council support and work in partnership with the Friends of Troopers Hill to increase consultation and community participation in a variety of events and activities.
D2	Increase use and enjoyment of spaces through a range of activities providing health and exercise related opportunities, events, festivals and improved information provision.	The need to increase the use and enjoyment of Troopers Hill has been carefully balanced with the protection of its natural assets. Small scale events are held throughout the year on Troopers Hill.

In addition Troopers Hill is protected by Bristol Development Core Strategy's Green Infrastructure Policy BCS9 due to its designation as a Local Nature Reserve, Site of Nature Conservation Interest (SNCI) and as one of Bristol's Regionally Important Geological and Geomorphological Sites (RIGS). The Policy states that:

"The integrity and connectivity of the strategic green infrastructure network will be maintain, protected and enhanced. Opportunities to extend the coverage and connectivity of the existing strategic green infrastructure network should be taken...Open spaces which are important recreation, leisure and community use, townscape and landscape quality and visual amenity will be protected...National and local sites of biological and geological conservation importance will be protected having regard to the hierarchy of designations and the potential for appropriate mitigation..."

There is more information on www.bristol.gov.uk/localplan

2.2 Bristol Strategic Context

2.2.1 Local Nature Reserves (LNRs)

Bristol City Council officially declared Troopers Hill as a Local Nature Reserve (LNR) on 22nd June 1995, under the 1949 National Parks and Access to the Countryside Act. The site was one of three sites declared as Bristol's first LNRs, all selected with the guidance and approval of English Nature (now Natural England). They were selected on the basis of their high nature conservation value, and the fact the sites

support a contrasting range of habitats and species. The importance of public enjoyment of nature and education were also crucial factors in their designation. The cultural and historical importance of Troopers Hill was highlighted at the time of the site's designation as an LNR.

Bristol's Parks and Green Space Strategy outlines Bristol City Council's aim to declare a network of up to 16 LNRs in order to meet Natural England's recommended national standard. The Strategy also details the policy to maintain LNRs to a high standard and to ensure that these key wildlife sites achieve their potential in terms of community involvement and environmental education. There are currently 12 LNRs in Bristol.

2.2.2 Designations

Troopers Hill, in total or in part, is covered by the following designations:

- Local Nature Reserve (LNR)
- Site of Nature Conservation Interest (SNCI)
- Public Rights of Way (PROW)
- Conservation Area
- Listed buildings / structures (two)
- Regionally Important Geological and Geomorphological Sites (RIGS)

2.2.3 Parks Byelaws Byelaws for Bristol's parks and green spaces were introduced on 28th April 2017. These are details on www.bristol.gov.uk/parksbyelaws . Troopers Hill is currently unique among Bristol's council-owned green spaces in having a ban on barbecues across the entire site. This is due to the history of uncontrolled fires on the site.

2.3 The Green Flag Award

The Green Flag Award scheme is a national measure of the quality of the provision and management of parks and green spaces, it is an annual award. Applications are made in January when the management plan for a site is submitted for evaluation. If the management plan gains sufficient marks an assessment of the site is made by (usually) two independent judges who evaluate the site using the following criteria:

- A welcoming place;
- Healthy, safe and secure;
- Well-maintained and clean;
- Sustainability;
- Conservation and heritage;
- Community involvement;
- Marketing; and
- Management.

The prestigious Green Flag Award was bestowed on Troopers Hill in 2007 and each subsequent year for 7 years.

In 2014 Bristol City Council could no longer afford officer time to support applications for the award but the Council committed to maintaining the site to Green Flag standard.

2.4 Pride in Parks Award

To ensure Troopers Hill continues to be assessed by an external, independent body, the Friends of Troopers Hill enter the site for an RHS South West in Bloom “Pride in Parks” award annually. The site has gained the highest level award each year from when it was first entered.

3.0 SITE DESCRIPTION

3.1 Name of Site

Troopers Hill Local Nature Reserve

3.2 Location and Area

Central grid reference: ST628 731

Area: 8.4 hectares (21 acres)

3.3 Ownership

The whole of the site is owned by Bristol City Council.

3.4 Site Description

3.4.1 Troopers Hill Local Nature Reserve

Troopers Hill occupies a hillside facing south and west, providing spectacular views across the city and towards The Mendips. The top is an uneven plateau bounded to the north by an allotment site. The LNR is roughly triangular in shape and is bounded to the south-east by a mixture of fencing, gates and dense scrub along Troopers Hill Road. To the south-west it is bounded by Crews Hole Road and to the west it is contiguous with Crews Hole woodland, which is also owned by Bristol City Council. To the north-east part of the boundary runs along the small cul-de-sac of Greendown and part is with The Farm allotment site, which is managed by Bristol East Allotments Association. The site has been extensively mined for coal and fire clay and has been quarried for pennant sandstone. It is uneven and very steep in places, with mainly very poor soils. There is bare rock and a little erosion and spoil in places. Access to the northern most entrance is via Troopers Hill Field, which is an adjacent recreation area also owned and managed by Bristol City Council.

The flora of the site is very interesting, and the reserve has the best examples in Bristol of several habitat types. The top of the ridges and the tops of the spoil heaps are clothed with fine grasses with small patches of ling and bell heather. The tops of the slopes generally have heath, with broom, gorse and other shrub species in places. The lower slopes are dominated by taller vegetation, usually grading through patches of bramble or bracken to taller scrub and finally to birch and oak dominated woodland. There are six pedestrian entrances into the area, and two gates for working vehicles, one on Greendown and the other on Malvern Road, providing access via a track over Troopers Hill Field. There is an extensive network of paths on the site, some maintained and some desire lines. There are two listed structures, both redundant chimney stacks from previous industrial works. There are no facilities on the site other than the paths and steps, interpretation boards, benches and dog waste bins.

3.4.2 Adjacent Sites

Neither of the adjacent Bristol City Council owned sites (Crews Hole Woodland and Troopers Hill Field) are within the scope of this plan. However, both provide complementary facilities and experiences to visitors. In particular children's play equipment and five-a-side goalposts are provided in The Field. These would not be appropriate on the nature reserve. Likewise The Field has three litter bins. The woodland provides footpaths that have a very different feel to the open grassland and heathland of the hill. It also provides a complementary wildlife habitat.

Both these adjacent sites were part of Malvern Rd tip where mainly building rubble was deposited until the 1970s. Both are important access routes to Troopers Hill, the Field in particular offering the only point of access, via its Malvern Rd entrance, for visitors with mobility issues to reach Troopers Hill

The woodland extends into the western edge of the area officially designated as the Local Nature Reserve but is not shown on the compartment plan (section 7.2) as it is managed as part of the woodland and not the Local Nature Reserve.

Management of the woodland includes:

- maintaining existing paths and steps, connecting Crews Hole, Lamb Hill, the Field and the Local Nature Reserve
- monitoring for Japanese Knotweed and appropriate treatment by Bristol City Council

Management of the Field includes:

Grass cutting and controlling the encroachment of the woodland so there is a 4 metre of grass between the edge of the woodland and the track that connects the Malvern Rd entrance to Troopers Hill Local Nature Reserve.

3.5 A Short History of the Site

This is an abbreviated version taken from a much more detailed account written by Rob Acton-Campbell of the Friends of Troopers Hill. The full version is available at www.troopers-hill.org.uk.

3.5.1 Troopers Hill in the Seventeenth Century

Harris Hill

The area that is now known as Troopers Hill was on the edge of Kingswood Forest or Chase overlooking the River Avon. A map dated 1610 shows the hill as Harris Hill and a later map of 1672 shows Harris Hill Lands.

Civil War

Local tradition has it that the Parliamentary army, under the command of Sir Thomas Fairfax, camped in Troopers Hill prior to the siege of Bristol in 1645. It has also been suggested that the ditch between the hill and the allotments was dug at this time as a defensive earthwork.

Baptists

A reference to the area in the seventeenth century is made in *The Records of a Church of Christ in Bristol 1640 to 1687*. This is the story of the struggles of the baptists in Bristol against persecution. In the record for August and September 1682 it refers to preaching on the woodland slope in the area of Troopers Hill. While it is not known exactly where this gallery was, this account does indicate the slopes on the side of the Avon Valley were woodland at that time.

3.5.2 Eighteenth Century

Copper Smelting

In the eighteenth century copper smelting was established in the area. Copper ore was brought by boat, mainly from Cornwall and north Devon, and coal was sourced locally. The copper produced was used mainly with calamine (zinc ore) from the Mendips in the manufacture of brass at Baptist Mills and other sites in Bristol.

Troopers Hill Chimney

Although it is not known exactly when the chimney was built there is evidence to suggest that it originates from the 1790s and that it was built for a copper works. It is certain that the chimney was built before 1826, since it is shown in a drawing from this date of the view from Arnos Court commissioned by G.W. Braikenridge.

The smelting of copper and lead in the Avon Valley throughout the eighteenth century may have had an effect on the natural environment of the hill. Both produce smoke laden with sulphur, which may have increased the acidity of the soil in the surrounding area. The chimney is now a Grade II listed structure.

3.5.3 Early Nineteenth Century (1800-1840)

Coal Mining

Copper and lead smelting continued in Crews Hole during the early years of the nineteenth century on a much smaller scale than it did in the eighteenth century. On Troopers Hill itself there was some quarrying of pennant sandstone during this period, but the most significant development was the opening of Troopers Hill Pit.

The chimney, or stack, that still stands at the junction of Troopers Hill Road and Crews Hole Road is all that remains of this colliery. Originally the chimney was at the corner of the engine house and parts of the walls of that building can still be seen. The corners of the stack are formed with black copper slag blocks. This structure is also Grade II listed. The colliery, which was also known as Crews Hole Pit, was mining coal from the early 1800s and closed before 1845.

Scenes in our Parish, by a Country Parson's Daughter

A unique record of the Crews Hole Road area in the early nineteenth century has been provided by Elizabeth Emra, the Country Parson's Daughter. 'Little Elizabeth' was the author of '*Scenes in our Parish*', the first part of which was published in 1830.

“the barren and quarried hill, with its yellow spots of gorse and broom, and its purple shade of heath, raising itself above the dark heaps of dross on our own side; and then the river, the beautiful soft flowing river that we have loved so well, laving as kindly our rough and barren banks, and holding its pure mirror to us, as truly as the the embellished and fertile scenery on the other side; and how clearly we saw every reversed image of the trees in the little copse-wood beyond...” [dross: ‘The scum thrown off from metals in smelting’].

This actually refers to the hill at the top of what is now Strawberry Lane, however, the same landscape will undoubtedly have extended all the way along the valley to Troopers Hill at that time.

Troopers Hill – the Origin of the Name

1830 marks the first recorded use of the name ‘Troopers Hill’ – first edition of the Ordnance Survey map of the Bristol area. Prior to this date the hill had been referred to as ‘Harris Hill’ or ‘Truebody’s Hill’. ‘Truebody’s Hill’ continued to be used on legal documents until the end of the century. One document has ‘The Bodies Hill’; this must have been a transcription error, and demonstrates how easily names can be changed.

Troopers Hill and Truebody’s Hill were therefore both used through much of the nineteenth century, with Troopers Hill becoming the accepted name by the end of the century, possibly because of its use on the Ordnance Survey map. It remains in doubt as to whether the name came from the use of the hill by troopers in the civil war or at some other time; or whether it was simply a corruption of Truebody’s Hill.

3.5.14 Late Nineteenth Century (1840-1900)

Tar Works

1843 saw the start of a new industry adjacent to Troopers Hill that dominated the area until 1981. The Great Western Railway line from Bristol to Paddington was under construction in 1838 when John Bethell patented creosote as a preservative for the wooden sleepers and Brunel realised that its use would be a benefit to his new railway. William Butler & Co (Bristol) Ltd gradually took over all the land between Troopers Hill and the river.

Chemical Works

It is not known who purchased the copper works site and Troopers Hill in 1828 when the Brass Company sold them, but by 1886 all the land, except that owned by Butlers, was owned by the Somers family of Clevedon.

In the area where the new copper works were shown on the 1803 map, the 1886 lease shows Stone & Tinson’s Chemical Works. Given the requirement to maintain the chimney and flue mentioned in the lease it seems likely that this works was using the Troopers Hill chimney at that time.

Fireclay Mine and Works

Fireclay is often found alongside coal seams and fireclay mines were often operated in areas where the coal had previously been extracted. The first recorded fireclay

mine in Crews Hole was owned and worked in the 1850s. The exact location is unknown but the 1886 lease points to it being at Troopers Hill. The Fireclay Company abandoned the mine in 1908.

Pennant Sandstone Quarrying

The industry that had most effect on the shape of Troopers Hill as we see it today was the quarrying of pennant sandstone for use in building. Quarrying probably started on a small scale very early in the history of the area and Elizabeth Emra referred to a large quarry in her book of 1830.

The 1890 Ordnance Survey map shows a quarry in what is now known as 'the gully'. Comparison of this map with the second edition Ordnance Survey map of 1904 clearly shows that a lot of rock was removed between the dates of the surveys for these two editions. The shape of the hill in 1904 was much as it is now so quarrying must have ceased soon afterwards. The humps between the gully and Troopers Hill Road are tipped waste from this quarry. A quarry is also shown on the south-west of the hill on the 1890 map that has become an 'old quarry' by 1904. The 1890 map shows an 'old quarry' adjacent to the colliery engine house at Crews Hole end of Troopers Hill Road.

The exposed sandstone faces in the gully with their great range of colours from red to grey that were left when the quarry closed are now one of the hill's most striking features.

Expansion of Bristol

In 1897 the boundaries of the City and County of Bristol were extended to include St George and therefore Troopers Hill, which had previously been in the County of Gloucestershire.

Fortunately Troopers Hill and the fields of Troopers Hill Farm to the north both escaped development. The farm was to become allotments on the outbreak of war in 1914. Part of it remains as Bristol East Allotments Association's 'Farm' allotments site. While the area now known as Troopers Hill Field was converted from allotments to public open space some time after its purchase by Bristol City Council in 1932.

3.5.5 Early Twentieth Century (1900-1956)

White's Bristol Flora

An indication of the range of plants present on Troopers Hill at the beginning of the twentieth century is given in *The Bristol Flora* by J.W. White, published in 1912. Troopers Hill is mentioned in this book as one of "*minor eminences on the Gloucester side of Bristol*". In the chapter on soils Mr White refers to the change in vegetation to the east of Bristol due to the pennant sandstone and says "*the trees are low in stature, as of stunted by fumes and smoke from collieries and chemical works; and the few remaining untilled portions of old Kingswood Chase are sprinkled with heather, broom, needle-whin, and uncommon forms of bramble.*"

Troopers Hill For Sale !

With the closure of the fireclay mine, the quarries and finally the chemical works of Stone and Tinson the industrial history of Troopers Hill came to an end.

In 1920 and again in June 1924 Troopers Hill was offered for sale by auction. It was said to have 'over 2,000 feet of frontage to public roads and comprises some useful building sites'. The chimney stack and flue are mentioned as well as 'valuable Quarries of Stone and seams of Fireclay'. Potential buyers were obviously not convinced by this sales pitch and no sale was completed until September 1924 when it was purchased by John Ballard of Holly Lodge, St George for £515.

Coal Digging in the General Strike

Outcrops of coal were dug during the 1926 General Strike while the coal mines themselves were closed. It is believed that one of coal diggers lost his life on the hill at this time. The photograph of coal digging on Troopers Hill in Dave Stephenson, Andy Jones and Dave Cheesley's book on Crews Hole may date from this time.

Purchase by Bristol City Council as Public Open Space

In papers held at Bristol Records Office is a report from a local paper under the headline of 'Troopers Hill' stating:

"After visiting the area, the visiting sub-committee of Bristol Planning and Public Works Committee decided yesterday that negotiations should take place with the owner of 21 acres of land at Troopers Hill, St George, with a view to acquiring it for public open space purposes."

The sale was completed in the fourteenth of September 1956 for the sum of £600. There is on the website www.troopers-hill.org.uk a series of photographs taken in 1953 from Butlers Tar Works that shows what the hill looked like at the time of its purchase. The hill appeared dramatically different then from the way it does now, with significantly less woodland and more grassland. The quarry is clearly visible and there are only isolated hawthorn bushes.

There was open ground all the way along the side of the Avon Valley from Troopers Hill to Blackswarth Road. The land between Troopers Hill and Lamb Hill was also purchased by Bristol City Council in 1956; the area is now known as Crews Hole Woodland.

3.5.6 Later Twentieth Century and Beyond (1956-present)

New Fences and Paths

An information leaflet was produced by Bristol Development Corporation (BDC) and Bristol City Council's Parks Department entitled 'Troopers Hill...is wearing out!', reflection of a mistaken belief that erosion on the hill was increasing. The leaflet invited the public to a meeting on Thursday 28th February 1991. The leaflet set out a plan of action for the hill, which included building new fences around the perimeter to prevent access by motorcycles and repairing the footpaths. The fences and paths were constructed during the spring of 1991. The BDC also had a management plan drawn up for the site and subsequent to this two interpretation boards were installed.

Troopers Hill Local Nature Reserve

Photographic monitoring of the site, undertaken by Wessex Ecological Consultancy, was introduced in 1994 in order to track changes in the vegetation. Photographs of the site have been taken from 35 fixed locations at intervals since 1994.

In March 1999 Wessex Ecological Consultancy produced a management plan for the site. The plan did not propose any changes to the site's management but did recommend the formation of a Community Action Group.

1995 Fire

In its second summer as an LNR Troopers Hill suffered from a serious grass fire that swept across the hill. Although the short term effects did not look attractive the medium term effects were probably beneficial in controlling scrub. Fires on Troopers Hill were regular occurrences in the past; there have been no large fires on the site since 1995.

2003 Friends of Troopers Hill

In late 2003 the volunteer community group Friends of Troopers Hill was founded. This led to the raising and investment of more than £300,000 into the LNR and adjacent sites, events and guided walks throughout the year, twice monthly volunteer conservation work parties, awards, raising the local profile of the site and increased contributions of time and investment from Bristol City Council.

3.6 Vegetation

3.6.1 Heath and Acid Grassland

Troopers Hill LNR supports the only significant areas of Lowland Heathland and Lowland Acidic Grassland in the Bristol area, and amongst the best examples of these habitat types in the surrounding area. Both are identified under the UK Biodiversity Action Plan as UK Priority Habitats.

Many of the lower slopes of the Hill, particularly those facing the River Avon, have areas of heath dominated by ling (*Calluna vulgaris*) and bell heather (*Erica cinerea*), with associated species including golden-rod (*Solidago virgaurea*) and wavy hair-grass (*Deschampsia flexuosa*). Most of the areas of heath include small rock outcrops, which support sparser vegetation with frequent mouse-ear hawkweed (*Pilosella officinarum*) and sheep's sorrel (*Rumex acetosella*) and mosses such as *Polytrichum commune*. Some areas are being extensively invaded by scrub, especially bramble (*Rubus fruticosus* agg) and broom (*Cytisus scoparius*), and by tree saplings.

Acidic grassland dominates the upper parts of the Hill. The most frequent species here are the grasses common bent (*Agrostis capillaris*) and red fescue (*Festuca rubra*), with associated herb species including common catsear (*Hypochaeris radicata*), heath bedstraw (*Galium saxatile*) and common bird's-foot trefoil (*Lotus corniculatus*). The most diverse areas of grassland are those around small rock outcrops and on steep banks, where the more open sward allows mostly small

annual species to thrive. Additional species here include early hair-grass (*Aira praecox*), silvery hair-grass (*Aira praecox*), small mouse-ear (*Cerastium semidecandrum*) and birdsfoot (*Ornithopus perpusillus*). Patches of bare ground, some of them large, are scattered across the grassland areas. They make a vital contribution to the reserve's biodiversity, in particular supporting large populations of burrowing bees and other invertebrates.

Trends

The health of these habitats, which are the most important on the site, has been a prime focus of the photographic monitoring. This has shown that since the 1990s there have been several trends:

- Ling and bell heather have become much more frequent across much of the site. Areas where both species were previously present in small quantity, such as the slopes above the day nursery, are now dominated by heath rather than having grassland with scattered patches of heath species. Smaller patches of both species are now present across several parts of the upper slopes, where previously they were absent.
- Several herb species associated with the heath, including golden-rod and hawkweed (*Hieracium spp*), have become more frequent.
- There has been a huge increase in the quantity of broom on the reserve. At times, particularly following the 1995 fire, it appeared that this species might disappear from the hill. It now dominates significant area.
- Several areas that previously had open habitats, particularly on the lower slopes of the hill, have been colonised by scrub and secondary woodland. A succession through bramble and broom to woodland is evident and appears to have accelerated in recent years. This has led to a significant decline in biodiversity in places, and if unchecked threatens the biodiversity of the reserve as a whole.

It seems that these trends have been caused largely by the reduction in the frequency and extent of fires on the hill. These frequently occurred every few years and played a major part on keeping open grassland as the dominant habitat, and suppressing heath and scrub species. The impact on biodiversity has been mixed: the increase in heath and associated species such as golden-rod has been a positive change, but the subsequent spread of scrub and tree saplings is a major threat to the reserve's ecological importance.

The photographic monitoring also shows that some features remain very constant. For example, the main area of bare soil on the south-western slopes increases slightly in dry summers and shrinks slightly in wet years, but has remained remarkably constant since the 1990s and, as shown in photographs from the 1950s, over a longer period.

Current Management

The grassland has received little management, and in most places the poor soils and trampling by visitors seem sufficient to maintain its quality and extent. There has been more effort to conserve areas of heath, with tree and shrub removal employed to maintain several areas. The impacts have varied: removal of trees in the gully has

been very effective, but areas of scrub removed from areas such as the slopes to the east of the upper chimney have rapidly regrown.

3.6.2 Neutral Grassland

There is a small area of taller and more dense grassland in the north-eastern corner of the reserve. This has developed on soils that are deeper and more nutrient-rich soils than those elsewhere on the site. It is dominated by tall grasses such as false oat-grass (*Arrhenatherum elatius*), with herb species including black knapweed (*Centaurea nigra*) and meadow vetchling (*Lathyrus pratensis*).

Current Management

Most of this area is mown once a year, with the arisings being removed. Bramble and other scrub is periodically removed from the western part of the area. The hedge boundary with Greendown is flail cut annually.

3.6.3 Tall Herb Vegetation

Tall herb vegetation occupies a small proportion of the land area of the LNR, but is a very distinctive habitat type. Small patches are scattered on the edges of scrub patches around the fringes of the hill. The most frequent species is rosebay willowherb (*Chamerion angustifolium*), with associated plants including hemp agrimony (*Agrimonia eupatoria*), tansy (*Tanacetum vulgare*), wood sage (*Teucrium scorodonium*) and soapwort (*Saponaria officinalis*).

Some of the plant species found in this vegetation, such as tansy and soapwort, are locally uncommon. The tall herbs are of value for invertebrates, largely as a nectar source, but also as larval foodplants for several locally rare species.

3.6.4 Scrub and Woodland

Woody vegetation is concentrated around the edge of the hill. Both the appearance of the vegetation and the historical evidence suggest that it has become established relatively recently, but there are some sizeable trees of pedunculate oak (*Quercus robur*) along the northern and eastern boundaries of the reserve. These more established areas of woody vegetation typically also contain hawthorn (*Crataegus monogyna*) and ash (*Fraxinus excelsior*), with a fringe of sallow (*Salix x reichardtii*), silver birch (*Betula pendula*) and rowan (*Sorbus aucuparia*) in places. More recently established areas of scrub have frequent hawthorn and bramble, with associated species including buddleia (*Buddleja davidii*) and several species of cotoneaster (*Cotoneaster spp*). Where the soil is thinner broom and gorse (*Ulex europaeus*) are dominant. Most areas of scrub have saplings of trees including silver birch, pedunculate oak and holm oak (*Quercus ilex*). The ground flora under the trees and shrubs is largely species-poor and dominated by ivy (*Hedera helix*).

The woody vegetation defines site boundaries and provides a habitat for a variety of bird, fungus and insect species; although most of these are widespread there are several locally uncommon species associated with silver birch in particular. It also provides shelter for more open habitats, which is important for the reserve's insects. Sallow and hawthorn in particular are important as nectar sources.

Current Management

This habitat has received little management input, apart from clearance of encroaching trees and shrubs from areas of heath.

3.6.5 Assessment

The acidic soils of Troopers Hill support habitats that are unusual in the Bristol region and the reserve is therefore rich in locally rare and uncommon plant species. Some of these species are more widespread in other parts of the country, but even there habitat loss is causing declines in several once common species. The Vascular Plant Red List for England (2014), for instance, lists ling, bell heather and goldenrod as being near threatened in England; the last-named has disappeared from several lowland British counties.

The Flora of the Bristol Region lists the following 26 species found on Troopers Hill as being Avon Notable Species:

Silvery hair-grass	<i>Aira caryophyllea</i>
Early hair-grass	<i>Aira praecox</i>
Thyme-leaved sandwort	<i>Arenaria serpyllifolia</i>
Ling	<i>Calluna vulgaris</i>
Small mouse-ear	<i>Cerastium semidecandrum</i>
Heath grass	<i>Danthonia decumbens</i>
Wavy hair-grass	<i>Deschampia flexuosa</i>
Bell heather	<i>Erica cinerea</i>
Blue fleabane	<i>Erigeron acer</i>
Fennel	<i>Foeniculum vulgare</i> (probably introduced)
Heath bedstraw	<i>Galium saxatile</i>
Soft grass	<i>Holcus mollis</i>
Imperforate St John's wort	<i>Hypericum maculatum</i>
Bitter vetch	<i>Lathyrus linifolius</i>
Narrow-leaved everlasting pea	<i>Lathyrus sylvestris</i>
Heath woodrush	<i>Luzula multiflora</i>
Birdsfoot	<i>Ornithopus perpusillus</i>
Buckshorn plantain	<i>Plantago coronopus</i>
Sessile oak	<i>Quercus petraea</i>
Sheep's sorrel	<i>Rumex acetosella</i>
Golden rod	<i>Solidago virgaurea</i>
Rowan	<i>Sorbus aucuparia</i>
Least trefoil	<i>Trifolium micranthum</i>
Common corn salad	<i>Valerianella locusta</i>
Squirrel's-tail fescue	<i>Vulpia bromoides</i>
Rat's-tail fescue	<i>Vulpia myuros</i>

3.6.6 Lower Plants

Surveys of lower plants have not been as complete as those of vascular plants, and there is less information allowing the analysis of the importance of those species that have been recorded. However, there have been surveys of mosses, lichens and fungi, largely carried out by the late Justin Smith and more recently by the North

Somerset and Bristol Fungus Group, and the results of these are shown at www.troopers-hill.org.uk/info.htm. They have found the grassland across the LNR to be excellent for waxcaps (*Hygrocybe spp*) and spindles (clavaroids). There is also a good diversity of species forming mycorrhizal associations with trees, especially silver birch and willows.

Mosses, including *Polytrichum commune* and *Polytrichum piluliferum*, form a large part of the grassland sward around rock outcrops and various species of *Cladonia* lichen are present in similar situations. Mosses including *Pseudoscleropodium purum* and *Rhytidiadelphus squarrosus* are abundant under areas of heath. Troopers Hill is the only site in the Bristol area where *Polytrichum commune ssp commune* is known to occur.

3.7 Fauna

There are known populations of two protected species – badger and common lizard – on the site. Common lizard is uncommon in Bristol. A breeding bird survey was carried out in 2007 and found good numbers of several widespread species. Regularly occurring birds include species of conservation concern, including willow warbler, song thrush and dunnock. Raven, buzzard and peregrine are regularly seen overhead and the hill is visited by mistle thrush, great spotted and green woodpeckers that breed in nearby woodlands.

It is, however, the invertebrates that are of outstanding interest. There have been several dedicated surveys by David Gibbs and the conclusion from the first of these, carried out in 2000, includes the following:

*“Given the small size and isolation of this site its conservation significance for invertebrates is really quite extraordinary. The only sites so far investigated, which have proved to be better than Troopers Hill are very large more diverse sites, often abutting other good areas in the wider countryside. If we had sufficient information to score all the species according to their rarity Troopers Hill would probably come out as the most important site of its type in the Bristol region. This is not only because of the large number of local rarities including some new county records but the presence of an endangered species, *Nomada guttulata*, massively increases its importance. Not even the spectacularly productive Dolebury Warren has any species so rare. Records from previous years only serve to confirm these conclusions.”*

In 2000 13 species with Nationally Scarce or Red Data Book status were found. The 2006 survey, which had a longer survey period, identified 23 species of conservation significance, including five which had Red Data Book status. *Nomada guttulata* was not recorded in this survey, although this does not give major cause for concern, as small populations on isolated sites will inevitably be vulnerable, and may also be missed during surveys.

Further visits by the Bristol and District Moth Group and other observers have revealed a wide diversity of locally rare and uncommon species to be present, together with at least two additional Nationally Scarce species: the moth yellow-legged clearwing and the beetle *Amara consularis*.

Aculeate hymenoptera (bees and wasps) are the most notable group on the LNR, and the table below shows species of conservation concern that have been recorded:

Species	Status	Pre-2000	2000	2001-05	2006	2007	2015
<i>Andrena bucephala</i>	Na			X			
<i>Andrena fulvago</i>	Na	X				X	
<i>Andrena humilis</i>	Nb	X	X	X	X	X	
<i>Andrena labiata</i>	Na	X	X				
<i>Andrena tibialis</i>	Na	X		X			
<i>Andrena trimmerana</i>	Nb	X			X		
<i>Aporus unicolor</i>	Na				X	X	
<i>Arachnopsila minutula</i>	Nb				X		
<i>Bombus rupestris</i>	Nb	X					
<i>Ceratina cyanea</i>	RDB3						X
<i>Crossocerus distingeundus</i>	Na					X	
<i>Hylaeus cornutus</i>	Na					X	
<i>Hylaeus dilatatus</i>	Nb						X
<i>Microdynerus exilis</i>	Nb					X	
<i>Nomada flavopicta</i>	Na						X
<i>Nomada fucata</i>	Na	X	X	X	X		X
<i>Nomada guttulata</i>	RDB1		X				
<i>Nomada integra</i>	Na		X	X	X	X	
<i>Nomada lathburiana</i>	RDB3		X	X	X		
<i>Nysson trimaculatus</i>	Nb	X					
<i>Philanthus triangulum</i>	RDB2		X		X		
<i>Philanthus triangulum</i>						X	
<i>Psenulus schencki</i>	Na					X	
<i>Sphecodes crassus</i>	Nb	X	X			X	
<i>Sphecodes reticulatus</i>	Na		X		X		
<i>Tiphia minuta</i>	Nb	X					

Red Data Book Categories are RDB1 - endangered, RDB2 - vulnerable and RDB3 – rare, while Nationally Scarce species are divided into categories Na & Nb, with the former being the rarer.

It should be noted that the 2015 results are based on a much shorter survey than was carried out in previous years. The apparent absence of many species is therefore not an indication of any real decline; many are spring-flying species that would not have been evident during this survey. The fact that it was possible to record three additional notable species during this brief survey suggests that there are further species to be discovered on the hill.

Troopers Hill is also notable for huge populations of more widespread mining bees (mostly *Andrena spp*), which are a conspicuous feature of the bare slopes in spring. These attract predators and parasitoids including the various cuckoo-bees *Nomada spp* and dotted bee-fly (*Bombylius discolor*).

The exceptional insect species diversity on Troopers Hill is due to the combination of sparse grassland; patches of bare soil; shelter provided by nearby trees and scrub; hibernation sites in areas of unmanaged vegetation; and nectar sources provided by shrubs and tall herbs in close proximity to breeding sites.

3.8 Geology

Troopers Hill is a Regionally Important Geological Site (RIGS), with significant exposures of pennant sandstone and smaller exposures of mudstone. There are also beds of fireclay and coal seams. Several of the pennant sandstone exposures reveal plant fossils.

A 2012 soil survey confirmed that the Hill's soils are highly acidic, ranging in pH from 3.9 to 4.6. There is significant contamination of copper and arsenic, particularly in the area around the chimney, but the levels are not high enough to require remediation.

3.9 Cultural Heritage

The driving forces that created Troopers Hill as a place of public recreation and eventual LNR were industrialisation and the resulting difficult terrain for building. Many older residents have memories of using the site as a resource for informal recreation dating back to the years before it was acquired by Bristol City Council.

Troopers Hill is now used for many different activities, many of which have health, social or educational benefits. Events and activities organised by Friends of Troopers Hill include guided walks and training and volunteers' working parties. Walking for Health groups and other walking groups make regular use of the hill. Local schools make regular use of the reserve as an open air classroom and informal activities such as children's play and family picnics are an important feature of the LNR.

In 2014 Natural Learners started making use of the site for parent and toddler outdoor education activities, plus after school sessions for older children. They also led outdoor educational sessions for local primary schools.

Dog walkers are important users of Troopers Hill providing natural security for the site. Many dog walkers litterpick during their walks, contributing greatly to the lack of litter on the site.

3.10 Built Heritage

3.10.1 Listed Buildings

There are two Grade II Listed Structures on the site:

ST629 728 – pennant rubble with copper slag block dressing Square 2-stage chimney previously attached to an engine house, now demolished. The upper stage is set back. Probably a former colliery engine house.

ST629731 Chimney circa 1863. Pennant rubble with brick dressings. A round chimney, has a plinth with a semicircular brick flue arch and a coping of blue engineering bricks. A pronounced lean. Probably part of William Butler's tar works which was founded 1863 to which it was linked by a flue running up the hillside. A prominent landmark.

Note:- the date of 1863 may be an error. "It seems very likely that the chimney was built in the 1790s, a view supported by Joan Day. It is certain that the chimney was

built before 1826, since it is shown in a drawing from this date of the view from Arnos Court commissioned by GW Braikenridge.

3.10.2 Park Furniture

The only furniture items provided on the LNR are seats, with backs, and benches, without backs, interpretation boards and dog waste bins. They have been repaired and replaced as necessary. Additional provision, including play equipment and litter bins, has been provided on Troopers Hill Field.

3.11 Legal Agreements

The only known underground service is the Avon Valley sewer, which runs in a sewer under the corner of the site close to the junction of Troopers Hill Road and Crews Hole Road.

4 COMMUNITY USE

4.1 Visitor Facilities

There are relatively few visitor facilities on the LNR, in keeping with its objective to provide a setting for informal recreation and the appreciation of wildlife. More formal recreation is catered for at Troopers Hill Field.

Car parking is available on surrounding residential roads. The paths in the north-western part of the site are suitable for disabled access. There are five dog waste bins, five seats and two benches. Litter bins have not been provided on the LNR, although there is a bin adjacent to the northern entrance, and litter levels are generally low. Litter picks are carried out informally by members of the public and formally by Bristol City Council and Friends of Troopers Hill.

4.2 Consultation

Bristol City Council carried out a major consultation exercise in 2002: a questionnaire was delivered to 1,000 households and around 200 responses were received, with many respondents expressing an interest in being involved in the LNR. A public meeting was held and this led to the formation of the Friends of Troopers Hill.

The Friends of Troopers Hill ran a further consultation exercise in 2011, aimed primarily at gauging people's views on proposals to improve the steps but also canvassing opinions on other aspects of site management. Over 1,900 printed questionnaires were distributed, public sessions were run and a questionnaire was provided online. There were 464 responses, including 75 made online; a report can be seen at www.troopers-hill.org.uk/steppingforward/ConsultationResults.pdf.

A public event was held in December 2018 as part of the consultation process in drawing up this plan.

4.3 Community Groups and Other Interested Organisations

The Friends of Troopers Hill came formally into existence on 2nd December 2003; they have taken a continuous and active interest in the site and, with support from Bristol City Council, have led several initiatives. Their website is regularly updated and provides comprehensive information on the site; public events are run annually; surveys have been commissioned; and management works planned and implemented. The RHS It's Your Neighbourhood scheme rates the group at Level 5:Outstanding.

4.4 Access

Pedestrian access to the whole site is unrestricted, with four entrances from Troopers Hill Rd and Greendown and a level access from Troopers Hill Field. A gate suitable for wheelchair access has been provided at Malvern Road and the path from here to the chimney was upgraded to allow wheelchair access in 2007. There is also access via a woodland path, which includes steps, from Lamb Hill.

Bristol Development Corporation provided surfaced footpaths and steps across other parts of the site. These are maintained by adding loose stone and small scale vegetation removal. A major upgrade to the steps was carried out by Friends of Troopers Hill, supported by the Community Spaces Fund in 2012. The works were preceded by ecological surveys, to ensure that the biodiversity of the site was not damaged whilst meeting the aim of enabling as many people as possible to enjoy the hill's unique environment and wild and natural feel.

4.5 Public Transport

Several bus routes run along Air Balloon Road, approximately 400 metres from the LNR: 44 (Bristol Centre to Kingswood via Hanham Common); 45 (Bristol Centre to Longwell Green via Hanham and Cadbury Heath); 37 (Bristol to Bath via Hanham, Longwell Green and Bitton).

4.6 Informal Recreation

There is no organised sport on Troopers Hill. Large numbers of people use the LNR for walking, with or without a dog, and jogging, kite flying and picnicing are also popular activities.

4.7 Events

The Friends of Troopers Hill run an extensive programme of events each year, which have included wildlife walks, concerts, storytelling, a fun dog show and craft events. All of the events are free to attend.

Walking and specialist groups, including Bristol Magpies, Bristol Naturalist Society and Bristol Industrial Archaeological Society, have also organised guided walks and events on the hill.

An Easter service takes place annually on Troopers Hill on Good Friday, organised by local churches.

There is a Site User and Access Guide to provide information to external groups wishing to hold an event on the LNR at www.troopers-hill.org.uk/plan/SiteUserGuide.pdf.

4.8 Children and Young People

Children's events, including minibeast hunts, storytelling, bird box making and kite flying, are frequently organised. The Friends raised £80,000 for the provision of a play area and activity trail aimed at children up to the age of 12 in the adjacent Troopers Hill Field. This was opened in October 2016. The site provides a wide range of natural resources for play and relaxation and this is encouraged

4.9 Educational Use

The events programme enables adults and children to learn about wildlife and history in an informal way. The site has been used as a Forest School and groups from Summerhill Junior and Air Balloon Schools have visited the hill.

In 2014 Natural Learners started making use of the site for parent and toddler outdoor education activities, plus after school sessions for older children. They also led outdoor educational sessions for local primary schools.

Conservation work parties provide people opportunities to learn new skills and to develop an understanding of nature conservation management. As well as the regular monthly work parties organised by Friends of Troopers Hill outside organisations involved have included Community Payback, Crime Concern's Youth Inclusion Project, Groundforce and the Ministry of Defence, who ran a team-building day mending steps and a number of other organisations who have visited for corporate volunteering days managed by the Friends of Troopers Hill. The Friends have also hosted volunteering sessions by GoodGym Bristol and work alongside ParkWork on a second monthly conservation work parties.

Walks have included plant identification workshops, funded by the Big Lottery's Breathing Places fund, fungi forays, dawn choruses, bat, owl, geology, history walks and nature conservation walks.

Research projects are carried out by undergraduates, postgraduates and representatives of national bodies.

5 TRENDS

5.1 Biological

The nature conservation value of the LNR has, in general, been maintained since 2012: it continues to support large areas of acidic grassland and heath, with good quantities of bare ground. The uncommon plant species listed above at 3.6.5 continue to be present. One of these, birdsfoot, was recorded in 2017 for the first time in over 100 years. It was present in increased quantity in December 2018, probably as a result of the summer drought that year. Golden-rod, which is a species that has undergone severe declines in much of England, has become more frequent here, as have bell heather and common heather. There has not been a systematic survey of insects since 2007, but habitat assessment and casual observations suggest that the LNR continues to be of exceptional value for invertebrates.

Invertebrate survey will be carried out during 2019 funded by the National Lottery Heritage Fund.

The trend towards increased cover of heath species noted in several reports since the 1990s has continued. This represents an increase in nature conservation value.

There have, however, been noticeable changes in the vegetation on parts of the hill and some of these have led to significant localised declines in nature conservation value. The main change has been the spread of scrub, including gorse and broom, and tree saplings at the expense of more open habitats. This trend has been most marked on the southern and eastern slopes of the hill and is particularly noticeable in compartments 5, 7, 8, 9, 10, 15 and 16 and to a lesser extent in compartments 3, 6, 11 and 12 (as described in section 7.2 below). It has led, in places, to a marked decline in biodiversity interest as species diversity in these areas has declined and, in particular, the amount of habitat available for the rare and uncommon species for which the LNR is of particular importance has been reduced.

There are probably several reasons for the spread of tree and shrub species. In the past atmospheric pollution, high levels of public access and both deliberate and accidental burning all probably limited the spread of woody vegetation. A trend towards wetter summers may also have favoured trees and shrubs directly, as well as indirectly through reductions in the frequency and severity of fires.

Site management can be effective in arresting and even reversing the spread of scrub, as can be seen in the gully (compartment 13) where several previously shaded slopes now have valuable areas of heath. However, scrub and tree control is time-consuming and requires repeated intervention. The need to remove arisings from site increases the resource implications of management, and in places steep slopes make working extremely problematic. It is clear that, despite considerable efforts by Bristol City Council and the Friends of Troopers Hill, scrub and tree encroachment has reduced the biodiversity interest of parts of Troopers Hill. Without

increased effort it is likely that there will be a significant decline in the overall value of the LNR.

2018/19 and 2019/20 winter works funded by the National Lottery Heritage Fund, based on the recommendations of this plan aim to start addressing this.

5.2 Amenity

Appropriate public use of the LNR has increased substantially, due to a combination of increased population in the surrounding area and active promotion of the site. This is a very positive trend. There are various minor problems associated with public access, notably dog fouling and littering, but on the whole there are few conflicts with nature conservation and positive impacts associated with trampling, which maintain areas of bare ground used by invertebrates.

There has been a gradual increase in visitor facilities on the LNR, and occasional demand from members of the public for further structures such as memorial benches. However, the aim of site management is to maintain the hill as an urban wildspace rather than as a semi-formal park and the provision of further facilities, with a few minor exceptions, is not compatible with this aim.

6.0 CURRENT MANAGEMENT

6.1 Responsibilities

Management of Troopers Hill is the responsibility of the operations section of Bristol City Council's Parks and Estates Service, implemented through an in-house grounds maintenance service. Contractors are employed from time to time to carry out specialist works.

Much of the day-to-day work is implemented by The Friends of Troopers Hill whose activities include the following:

- Running work parties to undertake conservation tasks on site;
- Providing an opportunity for local people to get involved in activities on Troopers Hill and to give their views on site management issues;
- Raising the profile of Troopers Hill and attracting more visitors and positive publicity;
- Reporting issues on site to Parks and Estates and the police;
- Running community events;
- Recording and researching the wildlife and history of the site; and
- Fund-raising for events and site improvements.

Troopers Hill attained Green Flag Award status in 2007 and continued to do so for 7 years. While Bristol City Council cannot afford officer time to continue to enter its sites for Green Flags it is committed to maintaining Troopers Hill to a Green Flag standard. The Friends have entered Troopers Hill for the RHS South West in Bloom Pride in Parks award since 2015 and have been awarded the highest rating, five stars every year.

6.2 Interpretation and Promotion

6.2.1 Leaflets

Three leaflets, covering the wildlife, history and geology of Troopers Hill, were produced by The Friends of Troopers Hill in 2007, with funding from The Big Lottery Fund. These were updated and reprinted in 2012 with further National Lottery funding.

6.2.2 Interpretation Panels and Signage

There are four interpretation boards on Troopers Hill: two by the upper chimney; one by the lower chimney; and one at the entrance to the site from Summerhill Terrace. There are signs at site entrances.

A further interpretation board, on the subject of fungi was installed during 2019 at the second entrance up Troopers Hill Rd.

7 MANAGEMENT

7.1 Health and Safety

No work should be carried out by council staff, contractors, volunteers or any other group or individual until a risk assessment has been prepared by an appropriately trained person and approved by a BCC officer. Copies of risk assessments should be filed with BCC. A trained person must give a toolbox talk before work commences, and must be on site throughout work days.

Concern has been expressed about the safety of working in or close to stands of bracken. The risk from bracken is very low, and only exists when plants are producing spores. Spore production occurs, if at all, in the late summer. All works in areas with stands of bracken are proposed outside this period.

7.2 Compartment Descriptions



The hill has been divided into compartments of more or less homogenous vegetation, as shown on the above map. This section describes each compartment and sets out work guidelines for each.

COMPARTMENT 1

Description: Tall grassland dominated by false oat-grass (*Arrhenatherum elatius*). Not herb rich but with small quantities of black knapweed (*Centaurea nigra*) and meadow vetchling (*Lathyrus pratensis*). Small areas of more diverse grassland in the south-western part of the area, dominated by red fescue (*Festuca rubra*) and common bent (*Agrostis capillaris*). Bramble (*Rubus fruticosus agg*) encroachment at the western end of the area; at times in the past the whole area was dominated by bramble. There is a tall hedge at the western edge of the area, and a hedge that is flailed short along the northern, Green Down boundary.

Evaluation: This area is not exceptionally diverse, but it is an example of a habitat type that is otherwise absent from the LNR. The taller vegetation here is likely to be important as shelter for overwintering insects, and as a nectar source. It is adjacent to the site entrance from Troopers Hill Road / Green Down and therefore contributes to the welcoming place aspect of the LNR. It is overlooked by residents on Green Down. If overgrown it could become a locus for perceived or actual anti-social activities, and might deter some site visitors.

Ideal Outcome: Maintained as tall grassland with increasing herb component; scrub restricted to edge of compartment.

Work Guidelines

Maintain as open grassland in order to conserve habitat and the area's appearance. Avoid damaging ant hills and steep banks in the western part of the area.

Prevent scrub encroachment at the western end of the area.

Keep the hedge along Green Down flailed to the height of the fence, in order to retain dense growth, a tidy appearance and views into the LNR.

COMPARTMENT 2

Description: This compartment covers the top of the hill and many of the upper slopes. It consists of generally sparse grassland dominated by red fescue (*Festuca rubra*) and common bent (*Agrostis capillaris*) with a variety of herb species. There are small patches of both taller grassland and heath, the latter with plants of ling (*Calluna vulgaris*) and bell heath (*Erica cinerea*). Patches of bare soil are present, usually on small banks. Scrub and trees are generally absent, but there are small saplings of pedunculate oak (*Quercus robur*), ash (*Fraxinus excelsior*) and other species. This compartment includes one of the LNR's two listed structures.

Evaluation: This compartment is one of the most ecologically important on the LNR, supporting significant populations of locally notable plant species and nationally notable insects. It should be maintained as open grassland with scattered small patches of heath. The diversity of microhabitats, including small patches of bare ground and areas of taller grassland and scattered tall herbs providing a nectar source, is vital to the reserve's important insect communities. Management needs are generally low, since a combination of trampling and poor soils seems sufficient to maintain the habitats.

Ideal Outcome: Continues as short grassland with patches of bare ground and scattered clumps of heath species; chimney maintained in good condition.

Work Guidelines

Generally requires little intervention.

Remove all tree saplings as they appear.

COMPARTMENT 3

Description: This compartment comprises the boundary hedge to the allotments and the strip of grassland between this hedge and the main path. The hedge is dominated by semi-mature trees of pedunculate oak (*Quercus robur*), with other

species including ash (*Fraxinus excelsior*), silver birch (*Betula pendula*), hawthorn (*Crataegus monogyna*), hazel (*Corylus avellana*) and willow (*Salix x reichardtii*). There are large patches of bramble (*Rubus fruticosus* agg) associated with the hedge. Most of the grassland is dominated by red fescue (*Festuca rubra*) and common bent (*Agrostis capillaris*) with scattered plants of bell heath (*Erica cinerea*) and patches of taller grassland dominated by cocksfoot (*Dactylis glomerata*). The topography of the area is varied, with former mine workings and spoil heaps creating a range of slopes and aspects, supplemented on a smaller scale by a large number of active anthills.

Evaluation: The hedge is important in defining the boundary of the LNR and in providing shelter on the main north-facing boundary. It supports a variety of insects, including the nationally scarce moth yellow-legged clearwing, and the willow and hawthorn in particular provide an important nectar source for spring-flying bees. The associated bramble patches are also important for insects but their uncontrolled spread would threaten the grassland and would also create a less pleasant enclosed aspect for users of the footpath. The grassland supports a good range of notable plant and insect species.

Ideal Outcome: Hedge remains intact and diverse. Grassland is clear of scrub and bramble patches are contained.

Work Guidelines

Retain hedge as a line of tall trees and shrubs, with patches of bramble at the base. Reduce the larger bramble patches, and prevent further spread of bramble into the adjacent grassland areas.

Remove tree and shrub saplings from grassland.

Avoid damage to the species-rich grassland and associated ant hills.

COMPARTMENT 4

Description: This is an area that previously had dense Japanese knotweed (*Fallopia japonica*). Following treatment of the knotweed tall herb vegetation, including tansy (*Tanacetum vulgare*) and hemp agrimony (*Eupatorium cannabinum*) has developed but is now being threatened by scrub encroachment. There is a large patch of ornamental dogwood (*Cornus alba*) in the northern part of the compartment.

Evaluation: The tall herb vegetation provides a nectar source for bees and other insects and larval foodplants for moths. This contribution would be lost if scrub encroached across the area. The dogwood is of little ecological value and creates a slightly enclosed feel at the entrance to the LNR but has been managed by rotational cutting to create a visually attractive growth of red stems. More open views here may create a more welcoming feel for visitors.

Ideal Outcome: The area supports mixed and diverse tall herb vegetation with a small area of ornamental dogwood.

Work Guidelines

Monitor the area for any return of Japanese knotweed, and treat as appropriate.

Flail on an occasional basis to prevent scrub encroachment.

Reduce the extent of the ornamental dogwood patch; continue to manage the remaining area by rotational cutting.

COMPARTMENT 5

Description: This is one of the areas of the hill that has seen the most drastic changes over the last two decades. It previously consisted of open grassland with rocky outcrops and bare ground and small patches of heath species. There was a gradual increase in heath, followed by a dramatic spread of broom (*Cytisus scoparius*), silver birch (*Betula pendula*) and other scrub species. Although there have been efforts to remove silver birch and broom the latter in particular has regenerated strongly. It now consists of dense broom scrub with bramble (*Rubus fruticosus* agg), encroaching saplings of pedunculate oak (*Quercus robur*), holm oak (*Quercus ilex*), silver birch and other species. However, grassland species survive below the scrub and around the rock outcrops there are very species-rich patches with mouse-ear hawkweed (*Pilosella officinarum*), sheep's sorrel (*Rumex acetosella*), *Cladonia* lichens, *Polytrichum* mosses and other species.

Broom was cleared from the area during the 2018 / 2019 winter.

Evaluation: This compartment continues to support some of the most diverse grassland on the site and provides a sheltered area of value for insects. However, its interest has declined significantly due to scrub encroachment and if succession is allowed to proceed unchecked the area will be dominated by secondary woodland of low ecological value. This would also diminish from the experience of walkers using the lower footpath through the compartment. Unlike with a few other parts of the hill it is not too late to arrest and reverse this process, but ongoing intervention will be required.

Ideal Outcome: The area consist largely of grassland with patches of bare soil and areas of heath; broom is present in small quantities only.

Work Guidelines

Progressively clear the area of broom, bramble and tree saplings, working from the top downwards.

Repeat the management as necessary to maintain open habitats.

COMPARTMENT 6

Description: This is a band dominated by tall herb vegetation with smaller patches of scrub and grassland. Tall herb species include large amounts of rosebay willowherb (*Chamerion angustifolium*), tansy (*Tanacetum vulgare*) and wild carrot (*Daucus carota*). Trees and scrub has been cleared from parts of the area but bramble (*Rubus fruticosus* agg) and silver birch (*Betula pendula*) encroachment is threatening other area.

Evaluation: The mixture of tall herb vegetation and grassland, adjacent to a woodland edge, is of importance for insects and is diverse in plant species. These include locally distinctive species such as tansy. Scrub and tree growth threatens these open habitats, and would also result in the path becoming enclosed and losing

its current views across the hill. Enclosure of the path by trees and scrub may produce an impression of threat.

Ideal Outcome: An open area of mixed and diverse tall herb vegetation; scrub present in small quantities only, or absent.

Work Guidelines

Clear patches of scrub and tree saplings on a rotational basis in order to retain the current mix of open habitats. Aim to keep woodland 3-4 metres from edge of path.

COMPARTMENT 7

Description: This compartment consists of a north-facing slope facing the River Avon and with a steep gully running east to west close to its southern edge. Areas of bare mining spoil remain in places. In the 1980s and 1990s this slope had open grassland with very scattered plants of ling (*Calluna vulgaris*) and bell heather (*Erica cinerea*) over a grassy sward with frequent patches of bare ground, particularly on steep slopes. Golden-rod (*Solidago virgaurea*) is notably frequent here. On the lower parts of the slope damper conditions are reflected in the abundance of the moss *Pseudoscleropodium purum*. Scrub and tree encroachment is becoming evident across much of the compartment. To the north-west the woodland edge has crept into the area, with the spread of trees of silver birch (*Betula pendula*) and willow (*Salix x reichardtii*) and patches of bramble (*Rubus fruticosus agg*) and other scrub species reducing the area of heath and grassland. Pedunculate oak (*Quercus robur*) trees have become both larger and more numerous along the gully. Elsewhere there are scattered seedlings of various species, including holm oak (*Quercus ilex*), pedunculate oak, broom (*Cytisus scoparius*) and cotoneaster (*Cotoneaster spp*).

Evaluation: This is one of the most ecologically important and visually attractive areas of the LNR. The combination of heathland, grassland and bare soil support a wide variety of notable plant and insect species, and flowering plants are colourful in late summer. The increase in heath species since the 1990s has increased the compartment's value, but growth of scrub and trees has led to a reduction in the area and value of the compartment in recent years. Working conditions here are difficult due to steep slopes, particularly along the gully.

Ideal Outcome: A large area of heath with patches of grassland and areas of bare ground. Largely clear of trees but with small number of pedunculate oak in small gully; holm oak absent. Fringe of silver birch and willow on edge of adjacent woodland.

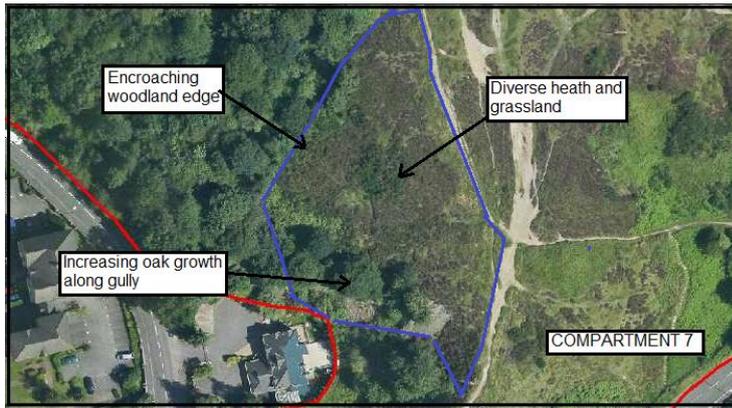
Work Guidelines

Remove trees and scrub from the north-western edge of the area.

Remove tree and shrub saplings across the central part of the area.

Remove smaller oaks from gully, and reduce canopy spread of larger oaks.

Note – works to push back the northwest ed of woodland winter 2018/19



COMPARTMENT 8

Description: Open sparse grassland dominated by red fescue (*Festuca rubra*) and common bent (*Agrostis capillaris*) with a reasonable diversity of herbs, including heath bedstraw (*Galium saxatile*). Broom (*Cytisus scoparius*) has spread rapidly across the area.

Evaluation: The compartment supports one of the LNR's key habitats, acidic grassland. Old mine working and patches of bare ground provide varied habitats for insects and the diversity of bee species here is high. Broom encroachment in recent years has reduced the value of the compartment, and if unchecked will cause a significant decline in biodiversity interest. Woodland should not be allowed to expand from the wooded area in the north-eastern part of compartment 9 into this compartment.

Ideal Outcome: Open grassland with patches of bare ground; bracken, broom and other scrub absent or present in small quantity only.

Work Guidelines

Remove encroaching broom.

Cut bramble and tall herb vegetation alongside path.



COMPARTMENT 9

Description: Scrub and tree encroachment has been rapid across the compartment, leading from a change in the upper parts of the area from open grassy slopes to scrub with patches of grassland. The lower slopes previously had scrub with open

patches. They now consist largely of dense scrub with large plants of hawthorn (*Crataegus monogyna*) and pedunculate oak (*Quercus robur*) and patches of bramble (*Rubus fruticosus* agg) with tall herb species. Small areas of species-rich grassland remain along the path, particularly around rock outcrops. One of the LNR's listed structures is in this compartment.

Evaluation: The upper slopes retain patches of grassland, which are of value for plants and insects. The path edges are also valuable for grassland plants, and rare insect species have been recorded here. Scrub and tree encroachment has caused a decline in value and in the future threatens further declines. The lower parts of the compartment have now been under scrub and tree cover for too long to make grassland restoration a realistic prospect. The path through the area is important for visitors to the site and the steps may require maintenance. Keeping a corridor along the path open will benefit both amenity and conservation interests.

Ideal Outcome: Open grassland along the upper slopes and to either side of the path, with developing woodland on the lower slopes.

Work Guidelines

Remove encroaching trees from scrub patches in the upper part of the compartment (above the bottom of the upper flight of steps).

Maintain a strip of open habitat between 2m and 3m wide to either side of the path.

Control bracken in north-eastern section of compartment.

Otherwise retain the lower part of the compartment (below the bottom of the upper flight of steps) as a non-intervention area.

Maintain the steps as necessary.

Maintain the listed structure as necessary.



COMPARTMENT 10

Description: This compartment was a slope of open grassland with very scattered scrub in the early 1990s. It has since been colonised by dense gorse (*Ulex europaeus*) and broom (*Cytisus scoparius*) scrub and has scattered young trees. Patches of scrub have been cleared in recent years, but regeneration of scrub has been rapid. Himalayan Balsam was found in this compartment in 2016 and again in 2019.

Evaluation: The spread of scrub has reduced biodiversity interest here and management has only temporarily reversed this loss. Raking off leaf litter from cleared areas may be of help in slowing regeneration.

Ideal Outcome: Restored open grassland with patches of bare ground, and scrub either absent or reduced to small patches. Eradication of Himalayan Balsam

Work Guidelines

Repeat scrub clearance, starting from the western and south-eastern edges of the area.

Remove majority of tree saplings

Monitor for Himalayan Balsam and remove prior to seeding.

Note – winter works of 2018/19

COMPARTMENT 11

Description: This compartment has a mixture of tall and sparse grassland with patches of heath and areas of encroaching scrub and bracken (*Pteridium aquilinum*).



Evaluation: The combination of grassland types and heath supports a wide range of plant species and the habitat diversity, shelter and proximity to scrub and tall herbs make this an important area for insects. It is another important entry point to the hill and retaining open habitats is important in providing a welcome to the LNR, with views up to the chimney and a reduced perception of risk. Previous scrub clearance has been successful here in restoring grassland habitat.

Ideal Outcome: Dominated by grassland with slightly smaller area of heath. Shrubs and trees absent, and bracken eradicated if possible.

Work Guidelines

Clear scrub patches on a rotational basis.

Maintain gate at site entrance.

COMPARTMENT 12

Description: This compartment comprises the main eroded slope, together with the grassland to either side of the bare areas. The surrounding sparse grassland also

has large quantities of bare ground, and is species-rich. Outstanding numbers of burrowing bees can be seen here in the spring. Small plants of gorse (*Ulex europaeus*) and broom (*Cytisus scoparius*) have begun to appear in the grassland.

Evaluation: The slope here is the most important single feature on the LNR for burrowing bees, and therefore of value in a national context. Bare patches in the adjacent grassland are also valuable for bees, and populations of uncommon plants are present here. The ecological value of this area is threatened by scrub encroachment, but on the whole the compartment requires little management input.

Ideal Outcome: Short grassland with large patches of bare ground and scattered heather plants. Scrub absent.

Work Guidelines

Remove gorse and broom plants, other scrub and any tree saplings from the compartment.

COMPARTMENT 13

Description: The whole of The Gully has been included in this compartment, including the tops of the slopes to the west and the south. The Gully has steep north- and south-facing slopes: the south-facing slope is the steepest and is almost vertical in places; the north-facing slope is slightly more shallow and is cut into bowls, which provide a variety of landform and microhabitats. Heath has spread across The Gully and is now the dominant habitat type, but there are also areas of grassland, patches of bare soil and slopes of scree. At the western end of The Gully quarrying for pennant sandstone has left a small rock exposure. Recent management has included periodic clearance of the rock exposure and the removal of trees and patches of scrub from the heath slopes. This has been successful, although tree saplings continue to appear in the heath.

Evaluation: Ecologically this is an important part of the LNR, supporting significant areas of heath and acidic grassland. The varied topography and shelter create conditions for a wide variety of insects, including rare species. The rock face is the most important geological exposure on the LNR, and also provides evidence of the area's industrial history. The Gully is an important part of visitor experience, providing a sense of wildness and enclosure, as well as dramatic views from both above and below. Continued removal of trees, saplings and patches of bramble is necessary to retain these features. This should include some trees above The Gully, but some should be retained as important landscape features. Two rowan seedlings are present here and are of importance as a locally uncommon species with value for birds and insects.

Ideal Outcome: Mixture of heath and grassland (approximately 50/50 in terms of area), both containing good amounts of bare ground. Specimen pedunculate oak, silver birch and rowan trees on the upper slopes. Geological exposures open and accessible.

Work Guidelines

Progressively remove all tree saplings from the base and slope of The Gully.

Remove saplings of oak, ash and other species from the northern edge of The Gully, but retain rowan (*Sorbus aucuparia*) seedlings / saplings.

Retain pedunculate oak (*Quercus robur*) trees growing on the southern edge of The Gully.

Restrict the spread of bracken and weaken existing patches by cutting and pulling. Clear the rock exposure of saplings and scrub on an occasional basis and keep lower faces clear of rosebay willowherb, stinging nettle and other species that expose important and accessible exposures.

COMPARTMENT 14

Description: This small compartment is dominated by a large pedunculate oak (*Quercus robur*) tree at the eastern end of The Gully. Saplings are spreading around this tree, particularly to the north. The vegetation below the tree is dominated by heath.

Evaluation: The oak does threaten to shade out adjacent areas of heath and grassland, but it is a prominent feature in the north-western part of the LNR that is doubtless valued by many visitors. Further spread of oak across the area would threaten significant areas of heath.

Ideal outcome: Single large oak tree, surrounded by heath and grassland.

Work Guidelines

Remove all oak saplings and seedlings, but retain the large tree.

Remove some of the lower limbs of the oak, to reduce the spread of the canopy.

COMPARTMENT 15

Description: This is the part of the eastern slope of the hill between the top of The Gully and the main path. It has become very overgrown with trees and shrubs in recent years, but retains substantial slopes of heath with grassland and bare soil as well as large patches of broom scrub and bramble. Trees and larger slopes are encroaching on the broom and bramble, with holm oak and several species of cotoneaster becoming particularly frequent.

Evaluation: The patches of heath and grassland retain significant interest for plants and insects and are worthy of retention. The more open broom and bramble scrub is also of some interest, which justifies effort to prevent encroachment by taller scrub and trees. The path at present provides a varied walk, which would be lost if trees and scrub were allowed to encroach across the whole area.

Ideal Outcome: Mixture of open heath and grassland (c30% of area), broom and bramble scrub (c40% of area) and mixed woodland dominated by pedunculate oak.

Work Guidelines

Remove trees and scrubs growing in heath and grassland patches.

Retain larger trees of pedunculate oak (*Quercus robur*), but remove saplings and other species, including holm oak (*Quercus ilex*) and cotoneaster (*Cotoneaster spp.*).

Flail areas of broom and bramble scrub on a five-yearly rotation, in order to keep free of trees and to rejuvenate growth.

Maintain path.

Manage gorse?

COMPARTMENT 16

Description: This compartment covers the band of the eastern slope between the path and Troopers Hill Road. It previously had patches of heathland between areas of scrub and secondary woodland, but heathland is now effectively absent. A large badger sett is present here.

Evaluation: The disappearance of scrub has led to a decline in biodiversity interest, but succession is now too advanced for there to be a realistic chance of restoring open habitats. The area is of value in providing habitat for birds and nectar for insects, and defines the edge of the LNR.

Ideal Outcome: Mixed woodland.

Work Guidelines

Retain as a non-intervention area.

Maintain the fence along the Troopers Hill Road boundary where scrub does not prevent access.

Prevent spoil from the badger sett causing an issue for vehicles.

Inspection/Felling of trees should they become a risk to the stability of the bank or like to fall on road or housing?

COMPARTMENT 17

Description: This small compartment consists of an area of bramble and mixed tall herb vegetation around the flag pole close to the north-eastern entrance to the LNR.

Evaluation: The area is not of high nature conservation value, although the bramble and tall herbs provide a nectar source, and possibly over-wintering habitat, for invertebrates. The compartment is of importance in providing a welcoming entrance to the site at one of the main access points. It should not become so tall as to obscure views across the site, or to provide a feature that might be perceived to be unwelcoming or threatening.

Ideal Outcome: Tall herb, young bramble and tall grassland, with a tidy appearance.

Work Guidelines

Cut back vegetation twice a year.

ALL COMPARTMENTS

There are several prescriptions that cover the whole LNR and are not compartment-specific. These include measures to keep paths open and in reasonable condition; ongoing surveys so that the effectiveness of management can be reviewed and prescriptions altered as necessary; and an annual meeting to plan works for the winter season.

Work Guidelines

Keep paths clear of vegetation, and maintain a 2m wide strip of short vegetation to either side of paths.

Repeat photographic monitoring and plant and insect surveys.

Hold a meeting between the Friends and BCC annually in November in order to plan works for the winter.

Maintain fencing and gates to prevent motorcycle access. NOTE – funding secured for Troopers Hill Rd boundary.

Adjacent sites

Woodland

Maintain paths to LNR, Crews Hole Rd, Lamb Hill and the Field

Monitor for Japanese knotweed

The Field

Keep woodland edge back by 4 metres from track on southwest edge of Troopers Hill Field

8 SCRUB CONTROL

One of the main priorities for management on the LNR is to control growth of trees and shrubs, in particular gorse and broom in compartments 5, 7, 8, 10, 12 and 15. Whilst gorse and broom have value for wildlife, and eradication from the site should not be an aim, spread of these species is a significant threat to the reserve's biodiversity, identified as a problem in plant, fungus and invertebrate surveys of the site. Previous experience has shown that regrowth from cut material has been rapid: for example of broom in compartment 5 and of gorse in compartment 15. Their distribution on the site was previously limited by fires, but burning is not a feasible or desirable management technique here and further spread is likely.

It is important that volunteers do not become discouraged by having to revisit areas in succeeding years to address the regrowth of scrub such as bramble. By continuing to cut back this encroachment they are preventing the growth of saplings and other scrub which would be the normal course of succession and the complete loss of the grassland and heathland habitat over time.

8.1 Proposed Methodology

Spreading young plants

The highest priority should be given to removing plants that are spreading into currently open areas. Experience on the LNR shows that broom does not regenerate from cut stems (at least not here) so cutting broom off at the base is effective. Gorse encroachment elsewhere has been successfully tackled by pulling young plants out by hand whilst wearing stout gloves. This is best achieved by not cutting seedlings, but allowing them to grow to approximately three years old: when the stems are large enough to be grasped and get purchase on, but not too large to uproot. This technique can also be used on other scrub and tree species, particularly oak species. Where possible and safe gorse and oak should be tested to see if they can be pulled; if pulling is not possible the plants should be cut. This technique can be used at any time of year, but is easier when the soil is slightly wet. It is better to

remove a small number of plants on repeated visits rather than attempt a large number in a single visit, to minimise the risk of back problems.

Recently Established Stands

Younger plants should be pulled up as above.

Older plants should be cut down. There is evidence that regrowth is reduced if works are carried out in the late summer, and if plants are cut as close to the base as possible. Dense stands may support nesting birds and should therefore be cut in September. More sparse open growth can be checked for nesting birds and therefore cut in July or August.

Even if these guidelines are followed there is likely to be regrowth. The most effective means of controlling this seems to be by using herbicide, with treatment of regrowth more effective than treatment of cut stumps. If this method is used then the cut area should be revisited two years after it has been cut in July and cut growth treated with glyphosate or a similar herbicide; this work can only be carried out by licensed specialists. Care must be taken to avoid spill onto adjacent vegetation. It may be necessary to carry out subsequent visits in following years. The use of this method will require consultation between Bristol City Council and Friends of Troopers Hill.

This consultation was carried out in 2019 and it was agreed that glyphosate would only be used on the Local Nature Reserve for the control of Japanese knotweed. This decision could be jointly revisited on case by case basis.

Older Stands

The method used for older stands should be the same as that for younger stands; the ground below cut material should be assessed. If there is significant build-up of leaf litter then consideration should be given to raking and removing this to reduce soil fertility and also to remove some seeds.



