5-year Management Plan Portsdown Hill SSSI

2021-2025



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1 Vision Statement

1.1 Vision Statement

Anyone walking along the length of Portsdown Hill S.S.S.I. should encounter extensive and continuous flower-rich grassland along with well managed scrub habitats that supports a characteristic array of biodiversity that is typical of the chalk downland landscape. During their visit everyone should feel confident that they are welcome to explore the whole site via a network of accessible paths.

1.2 Executive summary

- Portsdown Hill SSSI is a site of considerable ecological interest due to the conspicuous biodiversity of its chalk downland habitats.
- To retain these habitats, the site has to be managed, this involves grazing and scrub control.
- The nearby proximity of a large population presents challenges in the form of visitor pressure but there are also opportunities for voluntary input and a chance to present accessible wildlife-rich habitats to the wider public
- Wider environmental issues, such as Climate Change and the loss of biodiversity from the landscape, are factored into the management

Portsdown Hill S.S.S.I. hosts a significant area of biologically rich chalk grassland complimented by a mosaic of scrub and other vegetation types. There are striking views and the area has a readily interpreted historical significance. Therefore, the hill has a high conservation, amenity and educational value, especially as it borders a large centre of population.

The site has a long history of grazing and was grazed with livestock until the 1950s and was, until this time, predominantly a short grassland site. The hill remained unmanaged from the 1950s until the mid-1990s. Over this time there was a substantial change in the hill's vegetation as scrub and bramble spread to cover most of the site. Paths and flower-rich grassland were lost under hawthorn scrub. There was substantial disturbance, particularly from vehicle misuse and fires on the site.

Habitat management, in the form of scrub clearance and the reintroduction of grazing, prescribed in earlier versions of this plan has reduced scrub cover and increased the diversity of the grassland, see figures 1 and 2. To maintain public enjoyment of Portsdown Hill and safeguard the site's ecological value, continued intensive downland restoration work is needed with the implementation of a sustainable management system informed by the experience of the first 25 years of management.

The most appropriate management is extensive grazing and scrub removal and control. Prolonged grazing was responsible for the site's ecological interest and offers the most

effective way of retaining it. In addition, the landowners and relevant conservation bodies also endorse it. However, limited departmental resources, the requirement to maintain open public access, urban fringe problems and the extent of scrub regrowth constrain the management options. External funding is necessary to overcome these difficulties.

The plan's primary objective is to maintain all habitats currently present whilst pursuing management that will increase the proportion of species-rich calcareous grassland to 57% at the expense of scrub and coarse grassland.

The second objective is to carry out focused surveys and management that will protect and maintain viable populations of notable species.

The third objective is to encourage public enjoyment and appreciation of the site as this is essential to protect its wildlife in the long term.

A fourth is to incorporate measures into the plan that address the site's contribution to climate change, how wider biodiversity loss can be reduced and how the site contributes to ecological provision.

This management plan has been drawn up by the Portsdown Hill Countryside Service, which is responsible for most of the Portsmouth City Council managed open-access land on Portsdown Hill including the majority of the Site of Special Scientific Interest (S.S.S.I.). The plan's format is that of the Countryside Management System and broadly follows the Management Planning Handbook, Alexander, (1993).





Figure 1, Compartment 1 before scrub clearance in 2005 (left) and 2015 (right)



Figure 2, Compartment 9 in Feb 1993 (top left), April 2021 (top right), June 2017 (bottom). In 1993 scrub was spreading vigorously and would be now approaching woodland if it has been left. What grass there was left, was a coarse thatch. Now the scrub is much reduced and much of the grassland is short species-rich grassland.

Images looking west from south-west of Fort Widley. An aerial view of this area in 1955 is shown in Fig 12.

2 POLICY AND LEGISLATION

2.1 Legislation

The following legal and non-legal obligations have to be considered in carrying out any management operations:

- The Health and Safely at Work Act; 1974
- Agreements arising from the site's status as a S.S.S.I.
- Wildlife and Countryside Act 1981
- Occupiers Liability Act
- Animal welfare and livestock regulations
- Formal agreements, such as those with Natural England, which require notification regarding potentially damaging operations (see appendix 5).
- Environmental Protection Act 1990
- Waste Management Licensing Regulations 1994
- The Dog Control Orders (Prescribed Offences and Penalties, etc.) Regulations 2006
- Section 9 and 10 Open Spaces Act 1906
- Countryside and Rights of Way Act 2000
- Natural Environment and Rural Communities (NERC) Act 2006 obliges Local Authorities to consider biodiversity in its activities

Section 40 of the NERC Act states

"Every public authority must, in exercising its functions, have regard, as far as is consistent with the proper exercise of these functions, to the purpose of conserving biodiversity".

2.2 Policy

1 Portsmouth City Council's Adopted Plan (PCC, 2012)

PCS13 a greener Portsmouth

The city council will work collaboratively to protect, enhance and develop the green infrastructure network in the following ways:

Protect green infrastructure by:

For nationally designated Sites of Special Scientific Interest:

the city council has a duty to further the conservation and enhancement of S.S.S.I.s under the Countryside and Rights of Way Act.

2 Portsmouth City Council's Sustainability Strategy (Sustainability Strategy 2010, PPC (2010)

Objective 6: Protect and enhance Portsmouth's natural environment including safeguarding local biodiversity and improving air and water quality.

3 Parks open spaces strategy 2012 Parks strategy

3 GENERAL DESCRIPTION

3.1 General information

Portsdown Hill S.S.S.I. is a non-cultivated site on the south-facing escarpment of an eastwest chalk anticline. The S.S.S.I. notification, <u>see appendix 2</u>, describes a rich chalk grassland flora which supports a diverse insect fauna, despite extensive scrub and a *Bromopsis erecta* (upright brome) dominated grassland. Since the last S.S.S.I. notification, in 1984, the site was left unmanaged and deteriorated for a decade. From the mid-1990s management has gradually been reintroduced so that scrub comprises around 50% of the site and species-rich grassland communities occupy the other half the site.

Table 1 Portsdown Hill S.	S.S.I Information Summary	
Site: Portsdown	County: Hampshire	Local authorities: Portsmouth
Hill,		City Council & Fareham
Also known as Ports		Borough Council.
Down, see OS maps		
Status: S.S.S.I	OS Grid. Ref: SU 618068 in west	OS Sheets : 1:50,000 - 196,
Scheduled 1978.	to SU 666064 in east.	Explorer -119, 1:10,000 -
Revised 1984		SU60NE & SU60NW
Soil Survey: Soils of	Geological survey: Fareham No	Historic Photographic cover:
south east England	316 (1:63,360)	Map library University of
No 6 (1:250000)		Portsmouth, Portsdown Hill
		Countryside Service
Site manager:	Address:	Owners: Portsmouth City
Richard Jones	Portsdown Hill Countryside	Council; Fareham Borough
PCC area	Service, Fort Widley, Portsdown	Council; MoD
	Hill Road, Portsmouth. PO6 3LS	
	023 9238 9623	
	Richard.iones2@portsmouthcc.gov.uk	Area covered by this plan 55 ha
		Total area: 80.67 ha
	parkslei@portsmouthcc.gov.uk	Dian propored by:
		Plan prepared by.
Not set 5 actors 1		
Natural England	Holding number:	Last updated:
site information	Portsmouth 15/130/8002	14/09/2021

3.1.1 Location and site boundaries

Portsdown Hill lies immediately to the north of the City of Portsmouth. It is on the urban fringe and clearly marks the boundary between the northern edge of Portsmouth and Fareham and rural South East Hampshire. The area described in this plan is crossed by several roads, notably Portsdown Hill Road (B2177), and Southwick Hill rd. Most of the south of the site adjoins housing and associated access roads, see fig 3.

3.1.1.1 Areas of the S.S.S.I. excluded from the Plan

The most westerly compartment of the S.S.S.I., Portchester Common, is separated from the road by a narrow strip of arable land and has vehicular access at only one point, which is off Skew Road. The plan does not cover this part of the site as it is under separate ownership, that of Fareham Borough Council.

Approximately 5 ha of land covering the western end of Paulsgrove Chalk pit and nearby housing lies within the original S.S.S.I. boundary. The S.S.S.I. boundary pre-dates the extension of the chalk pit westwards. This area was excavated to a considerable depth and left as a chalk pit for several decades. In 1998 this area was landscaped and vegetated whilst the southern 2 ha were destroyed by being built upon. The established vegetation in the chalk pit is calcareous grassland species. This land is covered by the <u>non</u> <u>S.S.S.I. plan</u>.

There is a small amount land south of Fort Southwick that is within the S.S.S.I. boundary, (part of Natural England unit 3) that is owned by the organisation that owns the fort. It is not covered by this plan.





Figure 3 Compartment map

500 metres

3.1.2 Compartments

Due to its linear shape, (approximately 200 m x 4 km) the site has been divided into management compartments. The 10 compartments chosen for this plan range in size from 3 to 12 ha and where possible have boundaries that reflect topographical features, see site map, fig 3. The compartments have no relationship to <u>Natural England</u> units that relate to the site.

3.1.3 Tenure

This is not a legal document.

Compartments 1, 2, 3 and part of 4 are owned by the MoD and leased to Portsmouth City Council (PCC) as public open space. Compartments 4 (greater part) and 5-10 are owned by PCC.

The verge alongside many sections of Portsdown Hill rd, James Callaghan Drive and Southwick Hill rd is within a Private Finance Initiative maintained by Colas for PCC.

<u>Appendix 8</u> shows the land ownership and areas of responsibly. There are bylaws relating to the site. <u>See appendix 4</u>.

3.1.4 Past status of the site

Formally much of the site was owned by the <u>Southwick Estate</u> until, in the mid-19th century, it was purchased by the military prior to the building of the hill forts that dominate the top of the hill. Various boundaries are marked by War Department stones. Literary and artistic references from the 19th and early 20th century describe an open landscape with grazing livestock. Extensive grazing occurred for centuries and drove roads leading to Portsmouth crossed the site.

Military manoeuvres were carried out on its slopes in Victorian time which were watched by large crowds. Fairs were held on its lower slopes until the early 20th century.

3.1.5 Relationships with other plans

This plan follows on from the 2016 - 2020 management plan for the site (Jones, 2016). A management plan, (Jones, 2017) for non-S.S.S.I. PCC land on Portsdown follows this plan's format. The land is adjacent to the S.S.S.I. and extends the area managed for conservation and access.

The S.S.S.I. falls under Portsmouth City Council's Adopted Plan area, Portsmouth City Council, (2012).

3.1.6 Management Infrastructure

Management of compartments 1-10 is implemented by the Portsdown Hill Countryside Service (PHCS), which is based at Fort Widley. The PHCS has a single employee (Portsdown Hill Countryside Officer) and is part of Portsmouth City Council's Parks,



Culture, Leisure and Regulatory Services. Practical management of the site is carried out by the Portsdown Hill Countryside Officer, contractors, volunteers and various community groups. Most of the volunteer work is done by the Portsdown Hill Conservation Volunteers, see table 2. Certain legal and administrative functions are carried out by other departments within Portsmouth City Council.

Table 2 Number of available workdays per year, compartments 1-10				
<i>Source</i> Portsdown Hill Countryside Officer	Days 120	<i>Comments</i> Commitments to PCC and on non-S.S.S.I. land		
Portsdown Hill Conservation Volunteers	600	Average of over 12 volunteer days per week		
Other community volunteer groups	100	Butterfly conservation, school and cub groups		
Other PCC staff	20	Line manager		
Contractors	4	Input needed to carry out various task		

The roadside verge of James Callaghan Drive and some others are nominally managed by PCC'S Highway contractor Colas. COLAS commissioned a vegetation survey with recommendations of the verges in their control, McKay (2005).

The PHCS is directly responsible for the management of other areas of non-S.S.S.I. land of conservation interest across Portsdown Hill. It is active in influencing the management of land in the control of agencies such as, the MoD, utilities and farmers.

A friends group (<u>Friends of Portsdown Hill</u>) represent some of the local views on the site and the wider area, in particular taking an interest in the area's history and wildlife.

The site is currently (until 2022) in a Higher Tier Countryside Stewardship scheme, see appendix (3). Which sets management prescriptions within its options. It is proposed that the scheme will be extended beyond its expiry date.

3.1.7 Site infrastructure

A path runs the length of the site with many minor paths that appear to be relics of livestock tracks and other historic routes. There are no intact buildings, although there are the remains of structures that were demolished after the 1940s.

Gas, water, telephone and electricity companies have mains and cables with wayleave agreements crossing the site. A number of pylons cross the site. Some of these are substantial and need to be considered when carrying out constructive works. Utility firms require access to their infrastructure with the potential to cause damage and impinge on site management.

There is approximately 12 km of HT stock netting fencing along with gates, water troughs and holding pens. There are four informal wooden benches in the eastern compartments. See appendix 6

3.1.8 Map coverage

Ordnance survey 1:25 000 Map 119

3.2 Environmental Information

3.2.1 Physical

3.2.1.1 Climate

There are few weather readings available from the site. The nearby meteorological recording station is Solent MRSC. It records an average (1981-2010) highest temperatures as 21.4°C (July and August) and the lowest as 2.8°C February. Average annual rainfall was 699.1 mm.

Portsdown Hill S.S.S.I. is a relatively warm site in an area that enjoys warmer weather than much of the country. Winter temperatures remain higher than inland sites due the proximity of the sea and large urban area. Its south facing slopes are protected from cold northerly winds and therefore are noticeably warmer than the surrounding area during cold weather. Shelter from wind is easily found within the scrub whatever the wind direction. Extremely high summer temperatures occur due to the southerly aspect and the shelter provided by scrub.

3.2.1.2 Geology

Portsdown Hill is the product of an anticline in Upper Cretaceous chalk (84 to 90 million years old). It is considered an outlier of the South Downs. The chalk forms a continuous stratum that outcrops to the north to form the South Downs and to the south where it forms chalk cliffs on the Isle of Wight. A borehole found the chalk to be 400 metres thick. Details of the geology are viewable at the UK Onshore Geological Library, 2012.

The highest point of Portsdown's ridge is 120 metres. Within the S.S.S.I. the height ranges from 50 to 110 metres. The average slope is approximately 1:4.

3.2.1.3 Soil

The soil classification of England and Wales (Avery, 1980) place the soils of Portsdown Hill within the Upton 1 series where they are described as a 'chalky grey rendzina' with some loessial silt. An average soil pH of 7.83 has been recorded. The soil becomes more clayey at the base of the escarpment where the depth reaches 30 cm due to Coombe deposits. Higher up the slope the soil forms a layer less than 3 cm over considerable areas. There is a considerable variation in soil depth over short distances *i.e.* less than a metre. These variations are caused by historic disturbance such as the construction of defensive structures, trackways and turf stripping. There is evidence that brick earth forms a significant component of the soil (Brookes, 2017).

Analysis of soils, see appendix 9, suggests it is consistent with what would be expected from calcareous grassland. Soil chemistry results from the SSSI and adjacent site PCC sites in 2016 show pH to be high (all > 7.7) c.f. guidelines of pH 6.5 and phosphorous to be low (all < 10ppm) c.f. of 26ppm. The guidelines are based on minima for agricultural productivity rather that conservation.

3.2.1.4 Contamination

The site has several localised concentrations of dumped rubbish as well as a general contamination from litter. The major categories are: rubbish left by visitors materials left in the post-war period (notably in the vicinity of Fort Southwick), vehicle-derived historic fly tip, (adjacent to roads) materials originating from nearby housing, (where the southern boundary of the site abuts adjacent housing)

Much of the rubbish is not immediately obvious, it has been obscured by vegetation and an understanding of the distribution often requires excavation.

A risk arises from possibility of contamination by hazardous materials liberated by scrub clearance. So, scrub clearance has to follow from an assessment of what is hidden in the scrub.

Rubbish such a bottles and cans also entraps <u>small mammals</u> and invertebrates and should be cleared on that basis, (Moates, 2018). Left to disintegrate most containers will eventually contribute to the environmental problems arising from plastic.

3.2.2 Biological

The relatively warm conditions of Portsdown encourage plants and invertebrates that are at the northern extent of their range and thus uncommon in the rest of Britain. The site's accessibility and close proximity to large centres of population has meant the hill has attracted many naturalists over the years. Many biological records exist, see <u>appendix 1</u> for historic records, and iRecord for recent survey work.

3.2.2.1 Flora

The vascular plant species list from a vegetation survey of 2020 (Norton, 2021) is 275. It is known that at least another 6 new species are found, see appendix 1. A list of calcareous grassland indicator species and taxa of conservation importance recorded during 2020 are given in Table 3.

Species	English name	C-ind	ERL	\$41	Hants Notable	NS
Grasses, rushes & sedges						
Avenula pratensis	Meadow Oat-grass	С				
Avenula pubescens	Downy Oat-grass	С				
Briza media	Quaking-grass	С	NT			
Bromopsis erecta	Upright Brome	С				
Carex caryophyllea	Spring Sedge	С				
Carex flacca	Glaucous Sedge	С				
Catapodium rigidum	Fern-grass	С				
Danthonia decumbens	Heath-grass	С				
Festuca ovina	Sheep's Fescue	С				
Koeleria macrantha	Crested Hair-grass	С				
Herbs						
Anacamptis pyramidalis	Pyramidal Orchid	С				
Anthyllis vulneraria	Kidney Vetch	С				
Arabis hirsuta	Hairy Rock-cress	С	NT		CS	
Arenaria leptoclados	Small Thyme-leaved Sandwort	С				
Asperula cynanchica	Squinancywort	С				
Betonica officinalis	Betony	С				
Blackstonia perfoliata	Yellow-wort	С				
Campanula glomerata	Clustered Bellflower	С				
Campanula rotundifolia	Harebell	С	NT			
Carlina vulgaris	Carline Thistle	С	NT			
Centaurea debeauxii	Chalk Knapweed	С				
Centaurea scabiosa	Greater Knapweed	С				
Centaurium pulchellum	Lesser Centaury	С				
Cirsium acaule	Dwarf Thistle	С				
Clinopodium vulgare	Wild Basil	С				
Cruciata laevipes	Crosswort		NT			
Cynoglossum officinale	Hound's-tongue	С	NT			

Table 3 Calcareous grassland in	dicator species and taxa of conservatio	n importance (from Norton, 2021)
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Species	English name	C-ind	ERL	\$41	Hants Notable	NS
Dactylorhiza fuchsii	Common Spotted-orchid	С				
Echium vulgare	Viper's Bugloss	С				
Erigeron acris	Blue Fleabane	С				
Euphrasia pseudokerneri	Chalk Eyebright	С	VU	Y	CS	NS
Galium verum	Lady's Bedstraw	С				
Gentianella amarella	Autumn Gentian	С	NT			
Helianthemum nummularium	Common Rock-rose	С	NT			
Hieracium spilophaeum	a hawkweed				CS	
Hieracium sublepistoides	a hawkweed				CR	
Hippocrepis comosa	Horseshoe Vetch	С				
Inula conyzae	Ploughman's-spikenard	С				
Knautia arvensis	Field Scabious		NT			
Leontodon hispidus	Rough Hawkbit	С				
Lepidium campestre	Field Pepperwort		NT			
Linum catharticum	Fairy Flax	С				
Lithospermum officinale	Common Gromwell	С				
Origanum vulgare	Wild Marjoram	С				
Orobanche elatior	Knapweed Broomrape	С				
Pilosella officinarum	Mouse-ear Hawkweed	С				
Pimpinella saxifraga	Burnet Saxifrage	С				
Plantago media	Hoary Plantain	С	NT			
Polygala vulgaris	Common Milkwort	С				
Poterium sanguisorba subsp. sanguisorba	Salad Burnet	С				
Primula veris	Cowslip	С				
Rhinanthus minor	Yellow-rattle	С				
Sanicula europaea	Sanicle		NT			
Scabiosa columbaria	Small Scabious	С				
Spiranthes spiralis	Autumn Lady's-tresses	С	NT			
Succisa pratensis	Devil's-bit Scabious	С	NT			
Thesium humifusum	Bastard-toadflax	С			CS	NS
Thymus polytrichus	Wild Thyme	С				
Valeriana officinalis	Common Valerian		NT			
Verbascum nigrum	Dark Mullein	С				
Verbena officinalis	Vervain	С				
Viola hirta	Hairy Violet	С				

Calcareous grassland indicators	56
England Red List: Vulnerable	1
England Red List: Near Threatened	15
NERC S41	1
Hants Notables: County Rare	1
Hants Notables: County Scarce	4
Nationally Scarce	2

Table 4 Summary of notable plant species

The condition assessment given in the most recent vegetation survey described the grassland condition as 'fairly good'. This equates to 2.5 out of 3 when considered against the Biodiversity Metric 2.0 (Crosher *et al* 2019b). Recent guidance and best practice in evaluating biodiversity makes use of the principles of Biodiversity Net Gain,



Figure 1 Early Gentian Last seen in 2019

(Baker, 2019) in which the Biodiversity Metric evaluates the habitats.

Due to the presence of sparse chalk grassland Portsdown Hill also is known to be of interest for its lower plants including the lichens *Catapyrenium lachneum*, *Toninia coeruleonigricans* and *Leptogium schraderi*. There is a rich bryophyte flora including the several nationally scarce species, e.g. *Pleurochaete squarrosa* and *Didymodon acutus*.

3.2.2.1.1 Communities

The most recent vegetation survey of the hill Norton, (2021) proposed 10 vegetation types see fig. 5. These can be condensed into 6 broad vegetation types see fig. 6 and table 5.

In essence half the site is scrub, with a small amount of woodland. A similar area is species rich calcareous grassland, half of this is an ecotone with short, cleared scrub regrowth which is kept in check with mowing. Species poor grassland, both calcareous and neutral account for around 3 % and around 6% is a bramble clematis community.



See legend on separate page



Figure 5 Vegetation types - NVC plant communities

Table 5 Broad vegetation types

	Area (m²)	Area (ha)	% of total
Bare ground / un-vegetated areas	562	0.06	0.10%
Species rich calcareous (to neutral) grassland (Priority Habitat)	125825	12.58	22.84%
Species rich calcareous grassland/scrub mosaic (CSE)	123589	12.36	22.43%
Species poor calcareous to neutral grassland	16606	1.66	3.01%
Rubus-Clematis scrub (RC)	30877	3.09	5.60%
Scrub and woodland	253441	25.34	46.01%
Total	550900	55.09	1.00



Figure 6 Broad vegetation types

Very little of the grassland is free from scrub. Cropped scrub plants occur in most 3 m² quadrats. The scrub is predominantly *Crataegus monogyna* (Hawthorn) with other species including: *Prunus spinosa* (Blackthorn), *Cornus sanguinea* (Dogwood), *Ligustrum*

vulgare (Privet), *Ulex europeaus* (Gorse), *Clematis vitalba* (Clematis), *Rubus fruticosa,* (Bramble), *Rhamnus cathartica* (Buckthorn) and *Fraxinus excelsior* (Ash).

Following the Biodiversity Net Gain criterion condition assessment, (Norton, 2021) described the grassland as 'fairly good' i.e., 2.5 out of 3 and the scrub as good 3 out of 3.

Below is a brief description of the plant communities in the compartments, see compartment vegetation map, fig 5.

Compartments 1-2 These are the most westerly compartments in the plan. Most of the area was cleared of scrub in 2005 and 2006, returning it to grassland. This grassland is species rich and but is subject to spreading *Ulex europea* and *Cotoneaster*. There are smaller areas of long established chalk grassland containing notable plants *Euphrasia pseudokerneri*, (chalk eyebright), *Gentianella anglica* (Early Gentian) and *Thesium humifusum* (Bastard toadflax). Much of the scrub that remains is diverse *Rhamnus cathartica* (Buckthorn) dominated vegetation with species that suggest it has been established a long time but not given way to taller woodland. *Daphne laureola*, (Spurge laurel) *Taxus baccata* (Yew), *Juniperus communis*, (Juniper), *Ruscus aculeatus*, (*Butcher's broom*) *Mercurialis perennis* (Dog's mercury) and *Quercus robur* (Oak).

Compartment 3 - In the compartment above Paulsgrove Chalk pit *Ulex europeaus* (Gorse) is common and locally dominant. The presence of *Teucrium scorodonia* (Wood sage) suggests the formation of less basic. An old track way complex in the east of this compartment has short established species-rich grassland on its banks. Another area of species-rich grassland has abundant *Hippocrepis comosa* (Horseshoe vetch). Substantial scrub clearance (1 ha) is reverting to grassland. As in compartments 1 and 2 there is stunted *Rhamnus* scrub with oak trees.

Compartment 4 - This compartment contains the largest expanse of grassland that was not scrubbed over by the 1990s. This area is known to have a good terrestrial lichen community, as well as some uncommon mosses. Various banks, pathways and earthworks exist many with short species-rich grassland. Three hectares of previously thick scrub has been flailed and cleared leaving scrub islands of *Crateagus* (hawthorn) *Cornus* (dogwood), Rhamnus and *Juniperus communis*, (Juniper), The cleared ground is and it is a mix of scrub regrowth and establishing grassland. It retains large patches of *Hippocrepis comosa* (Horseshoe vetch) rich turf. At the bottom of the slope a Fraxinus-Ulmus woodland strip is well established. Stunted *Rhamnus* scrub with oak trees occurs in the north western corner of the compartment.

Compartment 5 - The predominant cover is open moderately diverse grassland with patches of scrub. The strip next to the road is tall *Arrhenatherum elatis* /ruderal grassland community with scrambling plants such as *Rubus* (bramble) and *Clematis*. A trench-like earthwork has been cleared of scrub giving rise to loose soil and chalk.

Compartment 6 - Scrub clearance before 2010 has given rise to abundant scrub regeneration and tall herb but some areas retain moderately diverse if mesotrophic grassland. Dense scrub with emergent *Acer pseudoplatanus* occurs at the eastern end. A large amount of scrub (around 6000m²) was cleared or thinned out during a Police operation in 2020 giving rise to bare ground.

Compartment 7 - Tall grassland with many ruderal species form a mosaic with scrub, bare ground and short species rich grassland on earthworks and tracksides. There is a diverse bryophyte community on the earthworks. The southern roadside is mown with a hedge-cutter from the road to create a band of scrub that is reverting to grassland.

Compartment 8 - This compartment contains earthworks and track ways with steep engineered slopes. Areas of short species-rich grassland occur on the steeper slopes with much of the area dominated by *Bromopsis erecta* (Upright brome). Scrub and scattered tree species are obvious and the margin next to Southwick Road is almost totally scrubbed over. The southern roadside is mown as compartment 7.

Compartment 9 - At the bottom of the slope tall scrub is over-topped with occasional trees, *e.g.*, *Quercus ilex* (Holm oak), *Fraxinus excelsior* (Ash), *Ulmus* (Elm) and *Acer pseudoplatanus* (Sycamore). Holm oak control in recent decades has resulted in bare ground now occupied by a varied habitat characterised by downland, woodland, ruderal plants with the dead and living stumps of Holm oak.

Much of the rest of the site is diverse grassland that varies from short rabbit grazed turf to a tall herb community. Among the grassland is scattered dense scrub. Several small areas of short rich *Thesium*-containing grassland are found on old trackways. This area is heavily trampled as it used for recreational purposes and has numerous paths crossing it.

Compartment 10 - Dominated by moderately diverse short much trampled grassland with small patches of scrub. *Brachypodium sylvaticum* (False wood brome) is a prominent feature of the grassland. *Helianthemum nummularium* (Rockrose) and *Thesium humifusum* (Bastard toadflax) are notable. Scrub with a few emergent *Acer pseudoplatanus* (Sycamore) and other trees are concentrated in the southeast corner and southern boundary with a Clematis Bramble community.

3.2.2.2 Fungi

Grassland fungi, notably *Hygrocybe* (waxcaps) are well represented on the site especially in short turf. Indicating a healthy and diverse community of soil microorganisms. Fungi associated with scrub include *Verpa conica* and *Helvella lacunosa*. The site's fungi are poorly recorded.



Figure 7 Location of Waxcap Hygrocybe conica Sept 2020

3.2.2.3 Fauna

3.2.2.3.1 Mammals

Casual observations of small mammal surveys reveal healthy populations of *Apodemus sylvaticus* (Wood mouse), *Apodemus flavicollis*, (Yellow-necked mouse), *Microtus agrestis* (Field vole), and *Sorex araneus* (Common Shrew). *Oryctolagus cuniculus* (Rabbits) are common on the site and have a significant effect on the vegetation, by close grazing. Small numbers of *Capreolus capreolus* (Roe Deer) live on the hill all year. *Mustela erminea* and *M.nivalis* (Stoat and Weasel) are often seen. *Vulpes vulpes* (Fox) and *Meles meles* (Badgers) breed on the site.

3.2.2.3.2 Birds

Many birds can be seen on the hill as it provides a variety of habitats, food and shelter. The scrub is ideal habitat for warblers such as *Phylloscopus collybita* (Chiff-chaff). Also breeding on the site are *Sylvia communis* (Whitethroat, see fig 7), *Sylvia curruca* (Lesser whitethroat). Other scrub nesting birds include *Saxicola torquata* (Stonechat) and *Emberiza citrinella* (Yellowhammer). *Alauda arvensis* (Skylark) and *Anthus pratensis* (Meadow pipit), nest in the open grassy areas. The abundant hawthorn berries and ivy provide winter food. The hill's value is increased for birds as it is on a migratory route for many species.

Falco peregrinus (Peregrine), Falco tinnunculus (Kestrel) and Buteo buteo (Buzzard) nest on or near the site and are frequently seen hunting. Picus viridus (Green woodpecker) are often seen on the open grassland.



Figure 8 Whitethroat - one of the many birds that breed on hill

3.2.2.3.3 Reptiles

The site supports large populations of *Anguis fragilis* (Slow worm) and *Zootoca vivipara* (Common lizard).

3.2.2.3.4 Invertebrates

Much of Portsdown's scientific interest stems from its invertebrate community. The diversity of food plants and microclimate supports a considerable range of invertebrates.

Appleton *et.al.* (1975) produced a record of Lepidoptera, Hymenoptera, Coleoptera and Orthoptera. The findings of more recent workers <u>Pinchen</u> (2014, 2015, 2018), strongly suggest that a diverse invertebrate community remains. Many insect species that have shown considerable declines across their former range are still present, see, Table 6 and Figure 8.

Table 6 Uncommon or notable insects from insect surveys		
2014/15/18		
Species status		
Forfigure loop of (Netionally Coorse D)		
Gonocerus acuteangulatus (Red Data Book 1*)		
Cheilosia soror (Nationally Scarce)		
Chrysotoxum elegans (Red Data Book 3)		
Thecophora fulvipes (Nationally Scarce)		
Gymnosoma rotundatum (Red Data Book 3)		
Mutilla europaea (Nationally Scarce B)		
Hylaeus signatus (Nationally Scarce B)		
Nomada flavopicta (Nationally Scarce B)		
Bombus rupestris (Nationally Scarce B)		
Bombus humilis (BAP Priority species)		
Cupido minimus (BAP Priority species)		
Stenobothrus lineatus (Noteworthy)		
Corizus hyoscyami (Noteworthy)		
Canthophourus impressus (Noteable)		
Colletes hederae (Recent colonist)		
Tephritis divisa (Recent colonist)		
Bombus hypnorum (Recent colonist)		
Oxythyrea funesta (Recent colonist)		
Harmonia axyridis (Recent colonist)		
, , , ,		

3.2.2.3.4.1 Lepidoptera

Two <u>UKBMS</u> butterfly transects are walked on the site, Portsdown (compartments 1-3) and Portsdown SSSI 7-10. There are substantial populations of *Lysandra coridon* (Chalkhill Blue) and Cupido minimus, (Small Blue) as well as many of the commoner butterflies. *Aricia agestis* (Brown Argus) and *Argynnis aglaia* (Dark Green Fritillary) have returned in the last decade seen after an absence of several years. *Thecla betulae* (Brown hairstreak). Two moth species, *Cynaeda dentalis* and *Hyopchalcia ahenella* have their only known Hampshire locations on Portsdown Hill, but have not been recorded for several years. Their food plants are abundant on the site.

Other species *e.g. Plebejus argus* (Silver Studded Blue) and *Polyommatus bellargus* (Adonis Blue) disappeared from the site in the 1960s, Appleton et al, 1975.



Figure 9 Some Notable Insects

Top Left	Dark Green Fritillary
Mid left	Red bartsia bee (Melitta tricincta)
Bottom left	Chalkhill blue

Top RightBrown hairstreakMid RightRobberfly (Machimus rustics)Bottom RightDown Shieldbug, on Bastard Toadflax

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3.2.2.3.4.2 Hymenoptera

There is a rich bee and wasp fauna associated with the hill's summer-long flower rich grassland. The sun warmed sparsely vegetated banks are ideal habitat for many species that have life cycles with an underground larval stage. There are many notable species see table 6.

3.2.2.3.4.3 Orthoptera

Grasshoppers and crickets are well represented. There are large numbers of individual and species. There is a large population of *Tettigonia viridissima* (Great Green Bush Cricket) and *Conocephalus discolor* (Long-winged Conehead).

3.2.2.3.4.4 Diptera

Notable species include *Asilus crabroniformis* (Hornet robber fly), *Machimus rusticus, Eudorylas horridus, Cistogaster globosa.*

3.2.2.3.4.5 Arenea

Notable species include *Atypus affinis* (purse web spider) and a large colony of *Argiope bruennichi*, a large colourful spider with a limited distribution.

3.2.2.4 Invasive species

3.2.2.4.1 Non-native invasive species

There are numerous non-native species on the site, most are not spreading. Several are invasive and would most likely dominate the site in a few years, if not controlled.

Acer pseudoplatanus (Sycamore) and Quercus ilex (Holm oak,) are present. They form a dense canopy that very little few species can grow underneath. *Fraxinus ornus* (Manna ash) is widespread and in the central compartments.

Several low growing *Cotoneaster* species, notably *C. horizontalis,* are established and spreading rapidly in grassland or areas of cleared scrub that are being managed as grassland. The tendency of these invasive plant to spread and dominate is opposed by ongoing control measures. Holm oak trees, see fig. 10, are tenacious and it can take several seasons to kill off the stumps.

Other species may require monitoring, for example *Symphyotrichum* sp. (Michaelmas daisy) *Solidago canadensis* (Canadian goldenrod) which forms dense clumps in the eastern compartments and appears to be capable of colonising adjacent grassland.



Figure 10 Holm oak stumps. The regenerating grassland contains species of chalk grassland and woodland.

3.2.2.4.1 Native invasive species

Brachypodium sylvaticum (false wood brome), is the dominant grass in several areas that have been cleared of scrub. It appears capable of spreading into adjacent grassland.

3.3. Cultural

The scientific interest of Portsdown is largely due to centuries of interaction of people with the environment. Agriculture, chalk extraction and military construction have all left their mark, as did misuse of the site, see fig 11.

3.3.1 Archaeology and past land use A <u>Historic Environmental Record</u> has been produced which lists the recorded finds and outlines the significant archaeological features of Portsdown Hill.



Figure 11 Burnt out cars (in 2000). They were a regular feature of the site.

As with many hill sites on Southern England's chalk, Portsdown has been a site of human occupation from prehistoric times. Evidence of flint working is readily found.

Neolithic, Bronze Age, Iron Age and Saxon burial sites have been found within the S.S.S.I. (Corney, 1967) or close by elsewhere on the hill, (Rudkin, 1989).

The hill forms an important defensive barrier for Portsmouth and so has strategic military importance. During Roman, Saxon and Norman times inhabitants must have taken account of this fact and so it is likely that Portsdown has been under constant human influence for many centuries.

In addition to military exercises, defensive constructions and disturbances during the world wars, the hill has been used for leisure purposes. Picnicking and tobogganing are well recorded and large fairs were held on part of the site until the early 20th century.

Although there is some evidence of historic and archaeological occupation on Portsdown much archaeological evidence was lost during the construction of five hill forts during the 1860's. The Victorian forts, which dominate the skyline today, were obsolete soon after being built. The disturbance that occurred when building the forts and constructing wartime defences has left, in places, a varied soil profile and surface layers.





Figure 12 Compartments south of Fort Widley in 1955 (top). There was very little scrub when compared with 2020, which is a reduction from that of 1990. The same area in 1910 but looking from the north east down the road (bottom). Sheep were still grazing then as they had been for centuries

The most important land use was that of grazing, see fig 12. Tithe maps of 1839 describe the hill as pasture with arable land to the north and south. Paintings and various accounts, *e.g.*, Cobbett, (1830) describe

sheep grazing on open grassland. It seems likely that drove roads converged on Portsdown as livestock were driven towards the dockyard in Portsmouth to supply the navy. In the fifty years after WWII grazing ceased and the area of dense scrub on Portsdown increased from 5% to over 65%. In the last 20 years scrub has been reduced to approximately 50%. All of the photographs of Portsdown taken before the 1970s show an open grass-dominated landscape.

Quarrying occurred for many years with a substantial expansion in activity from the 1950s to the 1980s when Paulsgrove Chalk pit was expanded west.

Tree planting in the grassland of compartment 4 in occurred in the 1980s which accounts for the occurrence of ornamental species such as *Fraxinus ornus* (manna ash) in some areas.

3.3.2 Past Conservation management

The conditions found on the hill in the mid-eighties and prior to management starting are described in, (Johnson, 1985), (Portsmouth City Council, 1988), Rowe, J (1987, 1992) and (Brewis *et al* 1996). The site's calcareous grassland was declining due to a lack of management and substantial urban fringe problems made management difficult. Conservation management of Portsdown Hill S.S.S.I began in 1991 with the formation of the Portsdown Hill Countryside Management Project,



Figure 13 Collector unit in action on land cleared of scrub

which became the Portsdown Hill Countryside Service in 1997. In the first few years, a small amount of scrub clearance was carried out.

A vegetation survey was carried out in 2000, Norton, 2000). The site was re-surveyed in 2010 changes in the vegetation over the 10 years are detailed in Wilson, 2010. Changes in the vegetation between 2010 and 2020 are detailed in Norton, 2021. There was a considerable reduction in scrub and improvement in the grassland diversity.

The first five-year management plan was written in 1994 (Jones, 1994) and identified the following long-term objectives:

- 1. To maintain existing habitats and associated fauna and flora.
- To improve, maintain and increase (to 70%) the area of species-rich calcareous grassland.
- 3. Safeguard all notable species.
- To provide for public access and educational use of the site and to enhance public awareness and appreciation of downland habitat, except where it compromises objectives 1, 2 and 3.

The most significant result of the plan was the application and implementation of a programme of scrub clearance and grazing supported by a 10-year Countryside Stewardship application. The Stewardship Scheme ended in 2005 and was replaced by a 10-year Higher Level Stewardship scheme.



Figure 14 Scrub clearances in 2004 (top) and the resulting grassland in 2015 (below)

During the first, five-year plan fencing and grazing was extended over half the site and limited scrub clearance was carried out in many areas. The scrub clearance was aimed at connecting grassland across the hill and preventing scrub encroachment onto particularly species-rich grassland.

Where winter grazing with cattle occurred, the grassland became more diverse especially where there was an active rabbit population. All scrub clearance was followed by vigorous regrowth. Mowing and focused scrub clearance was applied to check regrowth.

A second, five-year management plan retained the long-term objectives. During this time the fencing was completed and grazing introduced to the whole site. This has led to a much shorter sward. A more extensive scrub clearance programme was carried out with the aim of reducing the scrub cover to no more than 30% in each compartment and managing 70% of the site in a way to produce or maintain species-rich calcareous grassland. Although around 15 ha of scrub was converted to grassland scrub cover

remained over 40% despite the presence of grazing animals. From 2005 horse grazing (in winter) at a density of one horse per 2.5 ha was used to maintain the grassland. To augment the reduction of soil fertility by nutrient export some of the dung (50 - 70 sacks per year) was collected from the site.



Figure 15 Cattle grazing scrubby slopes in 2004 (top) and the view in 2015 (below)

Subsequent five-year plans saw the maintenance phase. Much of the grassland is kept short through grazing with horses and mowing of scrub. Management concentrates on improving grassland biodiversity control of invasive species and the prevention of scrub expansion.

3.4 People, Stakeholders, Access

3.4.1 Stakeholders

A volunteer group under the umbrella of the <u>Friends of Portsdown Hill</u> work closely with site manager. Activities include habitat management, monitoring and infrastructure maintenance.

There are numerous visitors, often concentrated near the car parking nearest to the eastern compartments. Dog walking is a frequent purpose for visit but increasingly people are on site to see wildlife. The SSSI status means Natural England are stakeholders in site management.

3.4.2 Access and tourism

Under the Crow Act 2000, the site is Open Access. Dog Control Order covers the site. Portsmouth City Council has <u>two separate</u> web pages that provide information. The SSSI is the centre of a network of <u>paths and open space</u> that extend to adjacent PCC land and the wider land scape.

3.4.3 Interpretation provisions

Interpretation panels are positioned at several points.

3.4.4 Educational use

The Hill has been used by students at different academic levels and on non-vocational courses. Resulting projects are produced of which copies are kept at the PHCS office. Wildlife courses organised by PCC museums occur as do informal community and school events. Offsite events are attended are by staff and volunteers where Portsdown's wildlife is brought to a wider audience.

3.5 Landscape

Using the National Character Area (NCA) profile approach, Natural England, (2014) Portsdown Hill sits within the South Hampshire Lowlands 128 as an atypical chalk ridge in a coastal/urban/Hampshire lowland setting.

In the NCA profile the Statement of Environmental Opportunity (SEO 4) identifies management consistent with this plan, and the plan for the adjacent PCC managed land, e.g., grazing, arable reversion to chalk grassland, encouragement of sympathetic public use and raising awareness of the hill's ecological and historical interest.

3.6 Environmental relationships which may have implications for management

3.6.1 Human induced issues

The proximity of a large centre of population brings about the well-known urban fringe problems. Damage to the site is foreseeable and has been a regular occurrence. Vigilance is required to ensure all is well with livestock and the associated infrastructure. Measures will be needed to attend to and deter littering, disturbance through digging, metal detecting, vehicle use and fires.

Dog walking, including commercial dog walking, contributes unwanted nutrients and the associated insect toxic neonicotinoids, (Perkins, *et al* 2021), (de Lima e Silva, *et al* 2017). It also generates conflict when uncontrolled dogs are allowed to run across the site.

Low level grazing by sheep and goats would be an effective management technique. If it gave rise to the local production of fibre or meat it would be a considerable sustainability credit thus further supporting the practice. However, dogs prevent the use of sheep or goats on the site as dogs would almost certainly attack the livestock.

The accumulation of a considerable amount of past fly-tipping and the daily addition of new litter of various types is a factor in site management. The removal of rubbish and discouragement of those who add it requires action.

The local community make a considerable contribution to the management of the site through voluntary conservation work, e.g., habitat improvement and litter clearance.

3.6.2 Vegetation dynamics

The cover of grassland, scrub, woodland and transitional communities is a product of the normal successional progress to woodland which is opposed by the management. The greater the intensity of the intervention the more grassland and less woody vegetation. This process is distorted by the presence of established invasive non-native species that often out-compete the native vegetation. An absence of management would result in a dense cover of scrub with a large proportion of holm oak and cotoneaster. An assessment of the relative ecological value and aesthetic value of the different types of vegetation has to be assessed in deciding priorities.

3.6.2.1 Calcareous grassland

Chalk grassland is one of Britain's most diverse habitats. Many plant species can occur in close proximity. A diversity of plants in turn supports an even greater variety of insects and other invertebrates, especially those that require pollen and nectar. In addition, the sparse sun-baked vegetation allows the sun to warm the soil that in turn encourages warmth demanding invertebrates. Jukes, (2021), described key features for sites rich in terrestrial invertebrates as mosaics/juxtaposition of habitats, structural variation, topographical variation, strong flower abundancies and areas of sunlight.

The floristic diversity of calcareous grassland is due to restricted plant competition, (Grime, 1990). The conditions found in chalk downland favour low-growing perennials and other species that can tolerate the chronic environmental stress associated with chalk grassland. Therefore, many species of small stature can grow together.

Environmental stress on plants is due to the interaction of centuries of grazing on an inherently infertile soil. Grazing animals remove nutrients from the pasture and incorporate them into their bodies so when they leave the nutrients leave with them. In the absence of nutrient replacement, *e.g.*, fertiliser application, downland developed a characteristically impoverished soil.

In addition, the site's geology has influenced the vegetation because soils derived from chalk have high calcium levels and a high pH, but tend to be low in nitrogen, phosphorous and potassium. The combination of thin, infertile, basic soil with a poor water holding capacity, plus continual moderate defoliation by grazing leads to the suppression of dominant competitive plants.

The ecology of Portsdown Hill, like all chalk grassland sites, is therefore strongly modified by centuries of extensive grazing and to some extent intermittent cultivation which followed the clearance of any primeval forest by Neolithic farmers five to six thousand years ago. Other human activities have led to the variations in soil depth through the formation of trackways and excavations. Adjacent patches of thin and deep soil give rise to distinct abrupt variations in vegetation. This is a common feature of chalk grassland,

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(Ratcliffe, 1977). There is a relationship between vegetation types and soil depth. On the site it was found that the deeper the topsoil the more vigorous and less diverse the plant assemblage, (McIntosh, 1997).

Without grazing, organic material builds up from uneaten vegetation. Organic matter retains water and nutrients and therefore encourages more vigorous plant growth and therefore the dominance of a few competitive species, especially those which are intolerant of grazing. If grazing is not re-established scrub invades and dominates until it is replaced by woodland. Chalk grassland is considered a plagio-climax in which natural succession is held in check by the human intervention of grazing. There has been a dramatic loss and fragmentation of chalk downland during the 20th century (Keymer and Leach, 1990, Ridding *et al*, 2015). The JNCC (2004) guidance on conservation objectives for calcareous grassland sites suggests a scrub cover of no more than 5%.

Intervention (grazing and scrub control) is required if calcareous grassland is to be maintained. Management techniques for increasing the diversity and reducing the vigour of coarse grassland on chalk are mowing and grazing, (Kirby, 2001). A rewilding approach is gaining traction in conservation management thinking, (Fuller and Gilroy, 2021). An interpretation of rewilding would be that wild large grazers are allowed to live on the site and grassland is maintained by adjusting the population of these grazers. This rewilding approach is not appropriate for this site it as is too small, has too much public access and is separated from the wider countryside by busy roads. It is not necessary to engage semi-permanent resident herbivores to control the rank grassland. There are already wild grazers on site which have a noticeable effect, *i.e.*, rabbits and to a lesser extent deer. The remaining grazing effort is achieved by short periods of suitable horses or cattle.

There is a direct relationship between grazing pressure and vegetation type. Only since the 1960s has coarser and taller vegetation been allowed to develop, when grazing by livestock and rabbits stopped. The vegetation cover of 1995 of mostly scrub and relatively tall grassland communities was historically unusual. Today's vegetation cover of around 50% scrub and 50% species rich grassland mixed with cleared scrub regrowth is even more unusual. In the 1950s the hill's landscape was open with short grassland maintained by grazing, see fig 12. All the evidence suggests this was the case for many centuries previously.

Chalk downland is a much threatened, ecologically diverse habitat. However, there are also considerable positive ecological attributes to scrub and taller grassland ecotone communities. Both scrub and coarse grassland provide suitable habitats for many species that would not flourish on open downland. They also improve the wider habitat for some species by providing shelter in adverse weather conditions when downland insects are on the wing.
Taller grassland and tall herb communities have a lower botanical diversity than the short downland communities they replace. However, they do add to the overall habitat range. For instance, they provide larval food for species like *Melanargia galathea* (Marbled white butterfly) and essential over-wintering sites for many invertebrates. Tall grassland also provides shelter and food for small mammals, which in turn supports a range of predators such as *Falco tinnunculus* (Kestrel) and other raptors. If a full complement of downland wildlife is to be retained, the site should be managed to retain some taller grass and scrubby regrowth communities in order to add structural diversity to the site.

3.6.2.1.1 Calcareous grassland - Mowing

As a short-term measure mowing is a useful management technique that can retain the short-turf species and prevent scrub invasion. The benefits of mowing can be further increased by harrowing to break up the dense *Bromopsis* sward. Breaking up the sward is necessary to produce gaps for the seeds of downland plants to germinate.

The aim is to have a suppressive effect on the *Bromopsis erecta*, Wells, (1971) recommends mowing the first growth of the year in an effort to deplete the plant's energy reserves. Most research recommends that conservation mowing is carried out in autumn after seed is set, Crofts and Jefferson, (1999).

Mowing has a catastrophic effect on invertebrates and its use (timing) has to recognise this. As the site is now adequately grazed so mowing of grassland is only needed to control scrub invasion. This means most of the scrub regrowth habitat has to be mown once a year to keep it as grassland and once every two years or three years to stop it reverting back to scrub. Currently around 50 hrs a year are spend doing this. Mowing involves the use of oil powered machinery so it has to be considered in the carbon budget of site

3.6.2.1.2 Calcareous grassland - Grazing

From an ecological standpoint, grazing is the most effective management tool. It was continuous grazing with a variety of animals that produced downland and maintained it for many hundreds of years. The response of grassland to grazing centres the timing, intensity and duration of grazing and the type of grazing animal, <u>see appendix 5</u>.

The case has been made for carefully considering the need to graze as it has been shown to have an adverse effect on the range of species and numbers of invertebrate species (Helden, 2018). From the perspective of invertebrate conservation there is a case for the maintenance of some longer grass within or adjacent to the site.

The grazing intensity should be adjusted to keep the calcareous grassland in a favourable condition and sufficient ungrazed (within that season) vegetation onsite, or immediately off site, to maintain structured habitat for invertebrates. Ongoing defoliation and nutrient removal by grazing animals is the best way promoting a grassland habitat. The

choice of livestock and grazing regime should reflect the aim of gradually reducing coarse vegetation without damaging the remaining patches of species-rich grassland.

3.6.2.2 Scrub

Once scrub is established its further spread is self-perpetuating as it increases the fertility of adjacent soil through leaf and seed fall. Shrubs are deep-rooted and so can draw moisture from deeper in the soil profile than grass and herbs. This means that plant growth and organic accumulation continues, even when drought restricts the growth of herbaceous plants.

Several non-native scrub species are invasive and are capable spreading more vigorously than native ones. Retained scrub blocks can be a reservoir for these plants.

Scrub is a valuable habitat for many insects and birds. Many species are associated with the scrub edge habitat and downland species benefit from the shelter provided by bushes. Scrub adds value to a site's conservation value. However, the habitat associated with scrub, changes as it grows. If scrub is to be retained on a site there is a case for managing it on a coppice cycle, (Oates, 1990).

Wild graziers such as deer rest during the day in scrub, and rabbits require the shelter scrub provides for their burrows. If the grazing action of rabbits is to be maintained, scrub will be beneficial. It is possible to influence the rabbit population by scrub management.

3.6.2.3 Woodland

Woodland has developed on the deeper soil at the base of the slope. Trees occupy a small area of the site, adding both visual and ecological interest. It would be difficult and undesirable to attempt to return woodland to grassland and so these areas have been designated as woodland in the plan.

Where seed-bearing *Acer pseudoplatanus* (Sycamore) and *Quercus ilex* (Holm oak) occur they are spreading to both grassland and scrub and are capable of dominating any stands of trees. Both trees have few associated invertebrates and their presence has serious implications on the site's biodiversity. Unless Sycamore and Holm oak are controlled before they are old enough to set seed, they will spread to other habitats. Both species have effective means of spreading and coppice vigorously when cut down.

Native tree species with many associated insects *e.g., Fraxinus excelsior* and *Ulmus* sp. have established themselves and where woodland is to be retained species such as these can be left whilst Sycamore and Holm oak are felled. Felled timber or standing dead trees killed by pathogens (notably *Ulmus* and *Fraxinus*) that are left will support a host of deadwood dependant invertebrates and fungi. If there is little risk of trees falling on

walkers consideration can be given to producing standing dead timber by ring barking trees that are to be removed.

Trees and bushes often support epiphytic lichens and bryophytes, especially as they age. The presence or absence of them informs the decision-making process that occurs when considering scrub clearance. Although Sycamore is invasive the bark of older trees is often covered in lichens and bryophytes.

The strip of woodland at the base of compartments 4 and 5 has 132kw and 33kw overhead power lines running through it. The wayleave clearance of the trees to prevent electrical shorting can be factored into the woodland management on the site. There is scope to increase the current uncommon deadwood habitat on the site and stacked scrub can be used to reduce motorcycle access.

3.6.3 External considerations - climate change, wider landscape biodiversity and the maintenance of ecosystem services

Any land management plan has to consider wider environmental issues, notably climate change, the loss of biodiversity from the surrounding landscape and sustainable land management. It would be possible, but undesirable to have an effectively managed site with a disproportionally large carbon footprint or other polluting effects that failed to address to loss of biodiversity in the adjacent area and beyond. Any land management must have reference to these issues, even if the land is managed for conservation.

It is important to remove contamination and invasive species from the site and this approach should be encouraged on adjacent land as well. Harmful land use that results in agriculturally-related contamination e.g., agrochemicals, excessive faecal bacteria, phosphate and nitrogen, has no place on the site. Likewise, it would be better if it doesn't occur in the neighbourhood.

3.6.3.1 Climate change

The contribution to climate change of site works through the emission of greenhouse gases should be weighed against the benefits to biodiversity of the habitat management. The climate change impacts are likely to be modest but they should be evaluated and compared with other land management practices, the <u>Farm Carbon Calculator</u> is of assistance with this. The software suggests the organisation's operations across the hill sequester more carbon that they release. A continued increase in the use of battery-powered machinery, which is charged using sustainable electricity, will reduce the carbon footprint. Some of the management work is done by hand, using carbohydrates rather than hydrocarbons. Evaluation of the climate change effects of site management activities is ongoing.

Permanent undisturbed grassland is recognised as an effective carbon sink. (Alonso *et al*, 2012). This is especially true if the vegetation is botanically diverse, (Fornara and Tilman,

2008). On that basis calcareous grassland is compatible with the amelioration of climate change. Planting trees or leaving the hill to scrub over again would not necessarily sequester substantially more carbon than managing it as grassland. In the past, fires have been a frequent consequence of more a continuous dense scrub/tall grassland vegetation cover. This situation would lead to the loss of the rich biodiversity associated with chalk grassland and then the re-release of the carbon.

The promotion of climate change embodied in grassland maintenance activities should be considered. The retention of grassland requires mowing and/or grazing. Mowing with oil-powered equipment will of course release fossil carbon. Livestock generate potent greenhouse gases such as methane and nitrous oxide.

Grazing animals (ruminants or not) will release methane, which is a much more potent (but shorter lived) greenhouse gas than CO₂. Concentration of dung into heaps produces gases that have a range of polluting effects, e.g., CH₄, N₂O and NH₃. The climate effect of grazing can be minimised by only grazing for enough time to have the desired effect. No supplemental feeding should be permitted and the creation of poached ground (that releases soil carbon) should be avoided. There is a strong case for the site's grassland to be incorporated into the agricultural system of the local area. This would reduce the need for conventional intensive agricultural practices on adjacent land because the animals are able to graze extensively on the large area of grassland on the site.

The avoidance of soil disturbance and the promotion of botanical diversity is the aim of the management plan thus it is compatible with climate objectives.

3.6.3.2 Wider biodiversity

The merits of habitat connectivity across the landscape to allow wildlife migration, gene flow and environmental adaptation are stated by Lawton, *et al* (2010). The SSSI is influenced by the biodiversity of adjacent landscape and it in turn influences the biodiversity of the rest of the hill. The SSSI can be considered a core part of a discrete landscape unit. Land elsewhere on Portsdown has been recognised as of potential for adding to an intact ecological network, (HBIC, 2020) see appendix 7. There are other sites that on the escarpment that retain species-rich calcareous grassland, some of which have wildlife designations and are managed. There are also areas of the hill that retain a diverse flora and the environmental conditions to retain it without deliberate regular management.

The obvious purpose of the plan is to conserve biodiversity on Portsdown Hill SSSI. With the landscape-wide loss of species and bio-abundance (RSPB, 2019) simply conserving what is within the site boundaries is not sufficient. Regards must to be given to the adjacent environment, elsewhere on Portsdown and further afield. The chalk grassland reestablishment work done on the SSSI is complemented by activities described in the non-SSSI management plan (Jones, 2016). The SSSI designation status prevents activities

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that might benefit a wider range of biodiversity supporting works, e.g., tree establishment, rare arable plant provision and pond establishment. Projects on adjacent land has achieved these outcomes with the potential for more.

Portsdown Hill (taking the definition to be land higher the 60m contour) is around 500 ha (see Appendix 7). It extends to around 2.5 km to the west and east and 500 m to the north of the SSSI. The SSSI is well positioned to act as the centre of any biodiversity reconnection initiative especially as it sits in an area of 150 ha that is managed in a way that has regard for its biodiversity. Encouragement could be given to the various land management agencies that currently make no reference to conservation management of their land with emphasis on making habitat connections. A related issue is the control of large stands of invasive plants on nearby sites e.g., cotoneaster, to prevent re-infestation of the SSSI.

There is scope to integrate management across the whole Portsdown landscape, across different ownerships and administrative boundaries such that different components of a healthy functioning ecosystem occur in the optimal locations. Liaison and outreach to landowners such as farmers, local government, Highways and the MoD is suggested so benefits can be co-ordinated.

3.6.3.3 Ecosystem Services

As the site is not intensively managed for human purposes, such as agriculture or recreation, it can be considered a natural resource that provides ecosystem services to benefit the wider environment.

Ecosystem services have been placed into four categorises (Hains-Young and Potchin, 2017) 1 *Provisioning* e.g. Food, fibre, 2 *Regulating and maintenance*, e.g. water quality, pollination, 3 *Cultural Services* e.g. Wellbeing, health. 4 *Supporting or enabling* e.g. Biodiversity that allows the ecosystem to function so that oxygen is generated, nutrients are recycled or carbon is sequestered.

When considering how environmental relationships influence management the site's contribution to ecosystem services should be factored in. The four categories above are interconnected and it would seem likely that management likely to achieve a diverse calcareous grassland-dominated site will also maintain a healthy natural resource. However, it is reasonable not to assume this and that any management actions should review their implications.

3.6.4. Summary of environmental relationships which may have implications for management

Portsdown Hill SSSI has several species-rich chalk grassland communities along with varied scrub communities and grassland/scrub ecotone communities. Without management, scrub, with a large proportion of scrubby non-native species, would

dominate within a few years. The main consideration is identifying the most beneficial proportion of different vegetation types. The ideal percentage coverage is affected by the value of each vegetation type; how easy it is to re-establish, the abundance in the local area and the historical presence.

Extensive grazing by multispecies groups of animals that form part of the local agricultural economy of the area would be the most effective and sustainable management practise. Sheep, goats, cattle would have the desired effect of controlling the vegetation with minimal use of machinery and fossil fuels. However, the limited availability of a full range of suitable livestock and the prevalence of dog walking on the site make this unlikely. Winter grazing with robust animals to complement that of grazing by wild grazers, has been sufficient to remove the annual growth of herbaceous material and is having the desired outcome on the grassland.

In the absence of browsing animals, scrub control can only be achieved by extensive phased cutting largely outside the growing season augmented by cautious localised clearance when it is growing. Mowing regrowth outside the growing season reduces the impact on invertebrates and it is important that is phased so that substantial areas are left uncut each year for the over wintering stages of their life cycle.

When light scrub is cleared it produces a low open scrub habitat where grasses, herbs and scrub regrowth compete for light. If managed by grazing and mowing then herbaceous plants will dominate and the area will become grassland. If left unmanaged the scrub will re-establish itself. Low intensity management produces an ecologically valuable variety of intermediate vegetation types. It is a dynamic equilibrium.

Recognition of the climate impacts of management works so that minimal climate affecting gases are released whilst maintaining a favoured vegetation cover. A consideration of land use that is sustainable and promotes biodiversity and bio-abundance on adjacent areas of the escarpment play a role deciding onsite priorities.

3.6.5 Species considerations

It is difficult to identify all the environmental requirements of a single species let alone all the species present. Managing the site to achieve the desired botanical composition may have undesirable consequences for the invertebrate population, (Kirby, 2001). For the purposes of illustration, important environmental factors associated with several of the key species are in <u>appendix 5.</u>

The key point is to maintain continuity of grassland and scrub habitats across the site. Mowing necessary to control scrub regrowth must always leave a large proportion of uncut vegetation in any single cutting episode but the regrowth must be cut before the scrub establishes itself. Site features that are associated with invertebrate diversity are described by Jukes, (2021). Areas of high biodiversity and sensitivity require protection from damage caused by the public or utility firms.

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4 EVALUATION AND OBJECTIVES

4.1 Evaluation of features

This chapter evaluates the information from the preceding description. It identifies and confirms the important features and finally identifies and allocates the priorities of the site management objectives.

4.1.1 Evaluation

Several criteria are commonly used when assessing nature reserves and when these are applied to Portsdown Hill it is clearly a valuable site, despite a previous considerable decline. The conservation value of the site increases when other examples of the same habitat are lost; this is especially true for chalk downland. The site is a good example of a priority habitat in good condition.

The S.S.S.I. is positioned halfway along the length of the hill and therefore it has the important role of as an intact biodiverse core and ecological corridor for the numerous calcareous grassland fragments to either side of it. It can be seen as a biological reserve for re-colonisation operations in the locality.

The site is extremely valuable as it contains intact viable short grassland communities notably (NVC communities CG3a/CG2/CG7), as a host to numerous pollinator species and their supporting habitats. Portsdown has a high value as a site in which large numbers of people can encounter wildlife and benefit from the well-being generated by contact with the natural environment.

4.1.1.1 Size

The importance of a site generally increases with size. Larger sites can maintain larger, more viable populations and provide a wider range of habitats. Portsdown Hill S.S.S.I. is important because it is one of the larger expanses of semi-natural vegetation on chalk in Hampshire. The land covered by this plan is augmented by adjacent sites under complementary management (by PCC) and the most western compartment of the SSSI, Portchester Common.

4.1.1.2 Diversity

The extensive species list and variety of habitats show the site to be diverse before restoration began in the 1990s. Since then, habitat management has increased the diversity. The past land use has given rise to a varied topography, aspect, and soil depth. Therefore, there is a commensurate variety in vegetation and the insect life it supports.

Diversity is one of the most important attributes of high-quality sites, and on this criterion Portsdown Hill can be considered especially valuable.

4.1.1.3 Potential

The potential to improve the conservation and recreational value of the site that was identified in earlier plans has to a large extent been met in recent years. The factors that may have dissuaded legitimate usage in the past have been reduced. Vandalism, litter and inaccessible expanses of scrub have been replaced by open flower-rich grassland in which quiet enjoyment of the views and the natural environment are possible.

A safe, well-managed site enhances the quality of life for local people and visitors and the local authority can be proud of an attractive and significant landscape feature. There is potential for increased legitimate use of the hill which would raise appreciation and further discourage misuse.

An opportunity exists to provide a valuable educational resource close to a large centre of population. There is considerable scope for environmental education as there is both abundant biodiversity and easily demonstrated ecological processes. Historical, archaeological, geographical principles can be conveniently conveyed on site.

4.1.1.4 Intrinsic value

The intrinsic value of the site is extremely high as it offers excellent views over Portsmouth, the Solent and Isle of Wight. Contact with the natural world is recognised as promoting wellbeing and improving mental and physical health to visitors. The open spaces and the views are extremely uplifting and chalk grassland supports many attractive species, such as butterflies, and colourful flowers. It is the nearest open countryside to the Portsmouth area and if made more accessible, by continued scrub clearance and promotion the public usage will almost certainly increase. The intrinsic value could be increased if the well cared for, attractive environment on Portsdown Hill is refined with increased access features, signage and off-site literature.

4.1.1.5 Rarity

The chalk grassland habitats found on Portsdown Hill are now very rare. Almost all flower rich grassland has been lost from the countryside since the 1940s.

4.1.2 Summary of Important Features

4.1.2.1 Vegetation

The vegetation with the highest ecological interest is a range of species-rich calcareous grassland, with short species rich grassland being most valuable. The ecotones and transitional areas of taller vegetation also contribute to the overall value. It is a scarce priority habitat and is restricted to a limited set of historic and environmental circumstances. Therefore, most of the site should be managed to promote this habitat and its deterioration prevented.

The scrubby and woody vegetation that currently occupies half of the site is also of substantial ecological and aesthetic value and in conjunction with the shorter vegetation supports more biodiversity than either vegetation category would on their own.

It is not easy or desirable to remove a significant amount of the woody vegetation, approximately 9 ha. It often consists of well-established trees and shrubs on deeper soil, or in some places post-war building rubble, that will not readily produce species rich grassland. On the edge of the site, it often forms a barrier to unwanted access. Much of it lies outside the fences so it cannot be grazed. Much of the scrub is diverse and of interest its own right.

From this, a judgment needs to be made regarding the ideal proportions of the different vegetation types. A range of values with calcareous grassland dominating would seem acceptable however as scrub is reduced to below 40% it will become more difficult to profitably further clear it and expect to revert to calcareous grassland as the soil nutrients will be high.

The first assessment of the idealised desirable cover occurred in 1994. The proposal was to aim for 70% species rich grassland and the rest a mix of scrub habitats. UK JNCC guidance on conservation objectives for monitoring designated sites on the management of chalk grassland suggested much lower levels of scrub cover (5%). The precedent from the recent historical record (1960s) was that of little scrub. On that basis getting the scrub down to 30% cover from around 70%, as it was at the time, seemed a reasonable aspiration. Especially as the plan then included Portchester Common, which had a much lower proportion of scrub.

For reasons detailed above the cover of 70% short grassland has proven difficult to achieve and should be revised downwards as it would require the removal of a substantial amount of woodland and mature scrub at the cost of the associated wildlife habitat and carbon release. There would also be a requirement to mow an increased area of regrowth, equating to more climate impacts.

It is unlikely that species rich grassland would establish on all of the cleared ground. In light of the ecological value of taller grassland / scrub mosaic communities for invertebrates and the benefit of shelter given to grassland species given by scrub there is less need to aim for 70% short grassland. Especially as there is now an extra 10 ha of sympathetically-managed grassland is now on adjacent sites, e.g., the Top Field, north of compartment 4. A viable contribution to chalk grassland conservation and habitat and visual diversity benefits can be achieved with 40% of the site under scrub.

The distribution of the retained scrub/permanent woodland should overlay that of the enriched soils, non-grazed areas, and buffer zones with houses and roads that do not favour species-rich grassland.

4.1.2.2 Species

Chalk grassland, in conjunction with other habitats, supports a rich fauna and flora. Portsdown Hill is a reservoir for many uncommon species that were formerly widespread. Many rare insects that are dependent on food plants and other habitat features restricted to chalk grassland retain breeding populations on the site. The longterm retention of these chalk grassland species is dependent on the effective management of the vegetation especially the control of localised scrub.

4.1.2.3 Access and recreation

Unrestricted public access on the urban fringe means that damaging activities such as arson, exercising uncontrolled dogs, camping, vandalism, rubbish dumping and illegal vehicle use are likely without vigilance. The most effective form of management is grazing, but it is particularly vulnerable to the above problems. There is also the constraint of maintaining access, as the site is an important area for informal recreation which has to be recognised and accommodated in such a way that it does not have a detrimental effect on the site's ecological value.

Anything that reduces the input of canine-associated nutrients and veterinary pesticides is of assistance in maintaining the site in a favourable condition. There are bins for dog waste immediately off site, it is important that they are visible, accessible and regularly emptied. Signage relating to their use should be clearly displayed.

4.1.2.4 External considerations

The contribution to climate change of site management and its role in reversing wider biodiversity losses should form part of the plan. The impact on climate of management should be described and reduced if it is thought to be unacceptably high. Management should reflect the conservation status of the wider landscape and seek to improve the whole of Portsdown's biodiversity and in so doing improve the situation on the site.

4.1.3 Long-term Management Objectives

(The ideal objectives in the absence of constraints)

- 1. To improve, maintain and increase (to 60%) the area of species-rich calcareous grassland dominated habitats
- 2. To retain existing habitats, apart from those dominated by invasive non-native species
- 3. To safeguard all notable species

- 4. To provide for public access and educational use of the site and to enhance public awareness and appreciation of Portsdown's habitats, except where it compromises other objectives
- 5. Incorporate wider environmental considerations into the plan by: ensuring climate change considerations are accounted for; opportunities to improve and connect biodiversity across Portsdown are defined and sought; land management is sustainable

4.2 Factors influencing the achievement of long-term management objectives

4.2.1 Owners objectives

The landowner's overall objective is that of safeguarding the ecology of Portsdown Hill SSSI, whilst simultaneously promoting its recreational use. See section 2.2

4.2.2 Internal natural factors

Seral succession from grassland to scrub is the most important factor on the site.

Where scrub has been cleared in the last twenty years the soil contains the viable roots of the cleared bushes ready to repopulate the area with more scrub. There is also increased fertility associated with the increased organic matter. The scrub that established itself in the last 30 years of the 20th century has left a mark that will take many decades to remove.

Continuous management pressure (grazing and mechanical scrub control) is required to counter the tendency for scrub and rank grass to dominate the vegetation. If management ceases, succession will once again lead to the loss of chalk grassland. Annual scrub clearance is required to maintain the current vegetation cover. Invasive alien species require vigorous control to prevent them from taking over much of the vegetation.

4.2.3 Internal human-induced factors

The site has the status of public open space. Some areas have many visitors, e.g., the eastern compartments, 9 and 10. People radiate out from car parks and nearby housing. There is a requirement to maintain open paths.

Legitimate public usage brings the serious problem of accommodating people and their dogs whilst grazing livestock are present. It is unlikely that will be sheep grazed on the site for fear of attack. Dogs may worry larger animals or chase them so that they escape enclosures and stray onto roads. Those dog walkers who fail to comply with the dog 'pick up' laws that apply to the site add unwanted and damaging enrichment and veterinary chemicals to the soil.

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Any management work on the site must accommodate legitimate access to the hill by utility firms and the public within relevant legal constraints. Enclosures that contain livestock also have to minimise the restriction to access they cause, so that less agile people can negotiate gates and stiles, *etc.* Unobtrusive fencing and access points reduce the complaints and lessen the workload of vandalism repair.

There are several damaging activities that are prohibited under legislation such as, metal detecting, encampments, vehicle use and arson. The proximity of housing increases the likelihood of such issues and requires that the site be checked regularly, especially when livestock are present. This creates a staffing shortage that is so far only overcome by the efforts and goodwill of staff and volunteers.

Motorcycling and horse-riding is damaging to species-rich grassland. Shod horses damage the vegetation. Any access point that will permit a horse to enter or leave a stocked, fenced area will also allow a livestock to escape. The droppings of horses import nutrients and therefore lead to soil enrichment and thus reduce botanical diversity.

There is a substantial amount of rubbish on the southern boundary of the site. It appears to have been thrown over the fence from nearby housing. There is considerable input of dropped and windborne litter from the roads that run adjacent to the site.

4.2.4 Physical Constraints

Like many grassland sites on steep slopes, only specialist tractor-mounted machinery can be used and then with caution and when the ground is dry enough. Suitable machinery is owned. Access on to roads is often difficult because site security is required to prevent unauthorised entry.

4.2.5 Resources

Reducing the scrub cover down to 40% by clearing over 6 ha of scrub in the next 5 years is unlikely. 3 ha of clearance is a more realistic target as scrub clearance is necessary to keep the scrub/grassland ratio constant.

The landowners, Portsmouth City Council, provide no direct budget, other than staff costs for the management of the area of the S.S.S.I. that falls within the administrative boundary. Although assistance with is some undertakings is available.

The site is in a Countryside Stewardship Higher Tier scheme, see <u>appendix 3</u> which provides adequate funds for maintenance works but not further scrub clearance from the current levels.

The active Countryside Stewardship agreement recognises the current proportion of scrub as desirable, thus before significant scrub clearance can continue it will be

necessary to engage with Natural England to amend the agreement or draw up a new one.

The costs of maintaining the ongoing grazing and mowing pressure will need this funding. The presence of livestock generates administration and animal welfare considerations that cannot easily be sustained without extra funding assistance.

Operations likely to achieve all the management objectives will require more resources than are currently available to the PHCS. Habitat management is achievable through external grants but the removal of the rubbish is not yet costed.

It is essential to monitor the effects of management and this process has been greatly assisted by commissioned surveys, student projects and volunteer surveyors. The extent of future volunteer assistance in this area is unknown, but the likelihood is that it will continue.

The provision of suitable livestock is dependent on good relations with trustworthy graziers who are willing and able to supply, transport and attend to livestock and deal with the associated compliance and administration. This has been possible so far.

Staff availability falls a long way short of what is necessary, see table 2. In common with many sites of nature conservation interest, the volunteer input is greater than that of paid staff and contractors.

4.2.6 Summary of factors influencing the achievement of long-term objectives

4.2.6.1 Internal natural trends

Without suitable mowing of scrub regrowth and grazing, natural succession will lead to the loss of species rich chalk grassland through the encroachment by scrub and the coarsening of the remaining grassland.

4.2.6.2 Resources

The site is grazed, and a local grazier is currently able to provide livestock to augment the natural grazing provided by rabbits. A specialist mower machinery has recently been acquired and its running costs are covered. The input of a large and well-motivated volunteer group is a valuable asset in managing the site.

Portsmouth City Council's contribution (staff costs and other support) is insufficient to cover all expenditure, however external funding (Countryside Stewardship Scheme) is available to fund core habitat and basic site management costs. Currently the grant system is changing and it is hoped the replacement Environmental Land Management scheme will continue to support management.

The partially concealed longstanding rubbish concentrations will require extra resources and thus the removal process has to be described and costed.

4.2.6.3 Internal human-induced trends

Public usage will continue to affect management in that irresponsible dog owners and vandals prevent the use of the optimal grazing regime, *i.e.*, the use of sheep and goats. Individuals and organisations wish to carry out recreational activities that damage the site. Undesirable behaviour, has to be monitored, dealt with and taken into account when planning any management. Litter and encampments require attendance.

4.3 Operational Objectives

This section considers how the long-term objectives may be modified by the impact of trends and constraints. This leads to the formulation of short term or Operational Objectives that can be achieved by the end of the plan period *i.e.,* January 2025. The operational objectives present a route by which the long-term objectives can ultimately be achieved.

Long Term Objectives and Operational Objectives derived from them $(See 4.3.1.1 + 4.3.1.4)$ for discussion			
Long Term Objectives	Operational Objectives		
 To improve, maintain and increase (to 60%) the area of species-rich calcareous grassland dominated habitats To retain existing habitats, apart from those dominated by invasive non-native species 	 Manage 57% of the site as species-rich calcareous grassland dominated habitats to produce and maintain, throughout the site, a mosaic of the existing habitats with their associated flora and fauna (apart from those dominated by invasive non-native species) 		
3. Safeguard notable species.	2. Safeguard notable species		
4. To provide for public access and educational use of the site and to enhance public awareness and appreciation of Portsdown's habitats, except where it compromises other objectives	3. To provide for public access and educational use of the site and to enhance public awareness and appreciation of Portsdown's habitats, except where it compromises other objectives		

4.3.1 Rationale and Operational Objectives

5 Incorporate wider	4. Incorporate wider environmental
environmental considerations	considerations into the plan by:
into the plan by: ensuring	ensuring climate change
climate change considerations	considerations are accounted for;
are accounted for;	opportunities to improve and connect
opportunities to improve and	biodiversity across Portsdown are
connect biodiversity across	defined and sought; ensuring land
Portsdown are defined and	management is sustainable
sought; ensuring land	
management is sustainable	

4.3.1.1 Rationale Long Term Objectives 1 and 2

- 1. To improve, maintain and increase (to 60%) the area of species-rich calcareous grassland
- 2. To retain existing habitats, apart from those dominated by invasive non-native species

These long-term objectives can be considered together as they both relate to the dominant vegetation cover. The seral progression of short, species-rich chalk grassland, to coarse, species-poor grassland, to scrub and then woodland, is undesirable in terms of both conservation and public access. Neither scrub nor tall grassland is rare or restricted to a single soil type. They are comparatively easily replicated elsewhere, whereas species-rich calcareous grassland only occurs where chalk outcrops and where there has been long standing management involving grazing.

As there are so many species associated with chalk grassland there is the strongest case for maintaining it at the expense of scrub. This is especially true as most of England's chalk grassland has disappeared WWII and it has been a key landscape feature on chalk hills for many centuries.

In common with most sites of wildlife interest in Lowland Britain, chalk grassland is a semi-natural habitat - it is artificial and is a response to management. However, the species that depend on it are natural parts of our biodiversity. The original post-glacial forest cover was removed over 6 thousand years ago and cannot be restored as the soil conditions have changed. Even before early humans arrived and cleared the trees it seems likely that areas of grassland existed due to concentrations of wild herbivores and soil slippage on steep slopes. Grassland species would have been restricted to these areas across a predominantly wooded landscape.

As there is little merit, in terms of grassland conservation, of reducing the scrub to less than 40% cover. A reasonable aim would be to have 60% of the site covered by a range of calcareous grassland dominated habitats. This would require 6.2 ha from the scrub /clematis-bramble. A realistic goal of the gradual removal of 4 ha over the next 5 years is an achievable target, producing a 57% grassland cover. The removal of the remaining 2.2 ha of scrub is a consideration for the next plan to achieve the long term objective.

The habitat created by the regrowth that follows scrub clearance is of interest in its own right. A small amount, about 15-20%, will add diversity to the site and so the work programme should always aim to retain this habitat in conjunction with scrub control.

Scrub should be retained as a visual and physical barrier. The use of maintained hedges to: protect and obscure livestock fences, give trample-free zones in the scrub and give a managed appearance to the site should be pursued.

Where small areas of mature trees have established on the lowers slopes they should be retained, but not allowed to spread. Management should aim to reduce invasive species such as holm oak, and sycamore and encourage other species such as ash, hawthorn, elm and oak.

Grazing and scrub control is necessary to retain the species-rich plant communities and to encourage them to expand over ground that until recently was coarse grassland or scrub. Under appropriate management pressure, the vegetation types take up different proportions. Management techniques *e.g.* those of scrub clearing machinery, can inadvertently damage perilously small populations. Therefore, careful planning and supervision will be required for the remaining scrub clearance work.

The landowners agree with the above objectives and it is a legal requirement to manage Sites of Special Scientific Interest to maintain their features.

The ideal management to achieve the objectives is some form of grazing. The use of livestock will reproduce the conditions that originally brought about the site's wildlife interest. Grazing is a sustainable and ecologically effective option, a conclusion that meets with the support of Natural England and is in line with the proposals within the Hampshire Biodiversity Action Plan. All relevant conservation bodies, *e.g.* The Hampshire Wildlife and Isle of Wight Trust and the RSPB endorse this approach to chalk grassland management.

Other positive considerations of grazing are that it creates interest and a pleasant rural atmosphere and therefore engenders a positive public attitude towards the site. The obvious presence of livestock demonstrates a management commitment that removes the perception of Portsdown Hill being an untidy urban fringe site. For hundreds of years the site has been maintained as open downland, the restoration of grazing recreates its

historic usage. A more open chalk downland landscape provides fewer opportunities for undesirable activities such as rubbish dumping and arson. Short grassland does not burn, even in a drought, unlike tall grass and scrub; therefore the Fire and Rescue call out rate is much reduced when downland occupies most of the site.

Winter grazing reduces the vigour of the *Bromopsis erecta* and removes the thatch of the dead vegetation. This allows desirable species to grow and thus botanical diversity increases. However, this grazing regime has a limited effect on the scrub and there are areas outside the stock fences which require grassland management in the form of cut and clearance.

Although grazing benefits the grassland at low levels, it requires higher stocking rates and different species to control scrub. Incidents of vandalism have decreased in recent years so that is now possible to graze at an intensity likely to achieve a suitable sward height and effect some control over the scrub. However, a considerable mechanical and manual scrub clearance effort will still be required to augment the scrub control achieved by grazing animals because sheep and goats cannot be used.

The current practice of winter and spring grazing with cattle and unshod horses should continue to produce the improvements seen in grassland diversity but more needs to be done to control scrub. Further scrub clearance and the ongoing prevention of regrowth is necessary.

Management that will produce downland in the long term will create a range of intermediate low scrub and grassland vegetation types in the short term. Future Operational Objectives should be devised in the light of the response of the vegetation to the management.

Long-term objective 1 can be modified to increase grassland to 57% (rather than 60%) and combined with Long-term objective 2 as the desired proportions of each vegetation type can be achieved and maintained. They can be combined in a single operational objective.

4.3.1.2. Rationale Long term Objective 3

Safeguard all notable species

The long-term retention of all notable species (as defined by recent surveys) can best be achieved by successfully fulfilling long-term objectives 1 and 2. It is essential that fragments of species-rich grassland are not damaged during any scrub clearance and fencing operations and the opportunity to connect adjacent ones is taken.

It would require fewer resources to simply maintain many of the notable species in small, carefully managed areas without attempting to manage habitats across the entire site. However, this is undesirable in the long term as genetic diversity is likely to be reduced and small populations are vulnerable to sudden extinction. Where notable species are threatened, they should be retained by intensive local management. Saving desirable species from immediate extinction, *e.g.*, scrub encroachment onto an area of bastard toadflax, should be part of a strategy to retain them until appropriate long term management can be implemented.

It is foreseeable that operations by utility companies will threaten notable species. For instance, the routing or repair of buried services may impact on areas of particularly rich grassland. The impact will need to be identified and avoidance or mitigation agreed.

For the most part it will be necessary to rely on the successful fulfilment of preceding objectives to maintain all the notable species. The work of surveying the more cryptic species may be suited to student projects and enthusiastic amateur naturalists, thus this should be actively encouraged. It is important that invertebrate and plant surveys are conducted and status of Red Data Book species be investigated, so if necessary, they should be commissioned. A NVC vegetation survey (Phase 2) and an insect survey should be conducted every 10 years.

The only amendment necessary to long term objective 3 is one to reflect the fact that there is limited value in attempting to locate all notable species associated with the site, as they will almost certainly benefit from the proposed management. A sufficiently accurate guide to the short-term well-being of these species can be inferred from the ongoing butterfly transects and other surveys as well as opportunistic survey work that arises out of any interest shown by students. A longer-term aim would be a more thorough review of the sites biodiversity, notably the invertebrates. The outline prescriptions reflect the points raised in the discussion of long-term objectives 1 and 2.

4.3.1.3 Rationale Long term Objective 4

To provide for public access and educational use of the site and to enhance public awareness and appreciation of Portsdown's habitats, except where it compromises other objectives

Portsdown's location on the urban fringe gives it a valuable role for informal countryside recreation. Extensive scrub and tall vegetation are incompatible with this and so the maintenance of open grassland and easily negotiated paths is desirable from a public access point of view. This approach accords with operational objectives 1 and 2 that seek to conserve landscape and biodiversity interest. The provision of public access is likely to be met with the achievement of operational objectives 1 and 2 so there is no need to amend long-term objective 4 as it relates to public access.

The achievement of long-term objective 4 assists in the previous objectives as public interest plays an essential role in safeguarding the site's nature conservation interest. A major constraint on the grazing programme has been vandalism and livestock worrying. Misuse of the site is discouraged by a well informed and interested visiting public. Pressure on sensitive vegetation can be avoided by the careful routing of paths and positioning of access points.

The local communities will only support and tolerate management that includes grazing and extensive scrub clearance if they have an appreciation of the downland habitat and the threat caused by the lack of management. Grazing is necessary to achieve the operational objectives 1, 2 and 3. It is highly desirable to form an association of the site with grazing livestock in the public perception.

Damaging activities should be discouraged through a considered interpretation programme that points out the damage and legislative position of such behaviour.

The resources required to achieve the long-term objective (often just talking to people) are less than those associated with the previous objectives and many of these are in place. Therefore, to some extent the long-term objective need not be modified. Many more resources could be used to produce ever more effective literature, signage and media presence.

4.3.1.4 Rationale Long term Objective 5

5 Incorporate wider environmental considerations into the plan by: ensuring climate change considerations are accounted for; opportunities to improve and connect biodiversity across Portsdown are defined and sought; ensuring land management is sustainable It is important that the work programme and its underlying aims are not in conflict with wider environmental aspirations such as pollution avoidance, sustainability and regional/local biodiversity conservation. Through outline prescriptions, projects can be described that:

Evaluate how works contribute to climate change and how this can be avoided;

Assess the how local biodiversity conservation can be complemented by onsite works and how offsite works could benefit onsite biodiversity;

Access how works contribute to the site's role as a provider of ecological services and ensure that operations are sustainable;

The intention is to ensure wider environmental concerns are addressed as management proceeds. As much how things are to be done as what will be done. This means assessing and mitigating contributions to climate change and other polluting activities. In a similar vein the value of the land as an ecological service provider is something that should be defined and incorporated in descriptions of the site.

It is appropriate to seek opportunities to increase biodiversity beyond the plan area that complement the habitats within the SSSI. It requires an assessment of the potential to join and enlarge wildlife supporting land management across the Portsdown escarpment. This objective is mirrored in the management plan for the non-SSSI land it is anticipated that works will integrate to maximise benefits.

4.3.2 Limits

The following limits can be identified: No dumping of rubbish and cars No paths or other routes should be directed over remaining areas of species-rich downland turf. No encampments No horse riding

5 ACTION PLAN

The operational objectives are achieved by the completion of a series of outline prescriptions each of which in turn are achieved through a group of projects. To enable comparison with other organisations' projects they have standardised codes and names written in a stylised form.

The project codes begin with R (record) M (management) or A (administration). A second letter subdivides them *e.g.* V (archive) F (flora). A number further subdivides codes to the level where the short stylised description of the project is added.

e.g. RV10 List/collect photographs ground

The project is further qualified by a site specific number and may be subdivided further with a short phrase. Unlike the project code, the project number and associated phrase are devised by the management planner. The final project identification may appear like this:

RV10/01 List/collect photographs ground - fixed point

5.1 Project register

The project register lists all projects within the hierarchical structure of:

Operational objective > Outline prescription > Project

The CMS handbook recommends a full description and details of costs, time spent, *etc*. This time consuming and rather precise approach is not possible within management structure of this site. To prevent the unnecessary diversion of resources into providing and updating a detailed list of projects and the achievement of each project a simplified approach has been adopted. The simplified project register, description and review are held in the form of a spreadsheet.

5.2 Project records and review

The Operational Objectives and the Outline Prescriptions arising from them are given below. The full project list, records and project reviews are held in a spreadsheet.

Operational Objectives and Outline Prescriptions			
Operation objectives	Outline Prescriptions	Projects/review/ records	
Operational objective 1 Manage 57% of the site as species-	Outline prescription 1.1 Monitor habitats	<u>See project</u> spreadsheet	
to produce and maintain, throughout the site, a mosaic of	Outline prescription 1.2 Maintain grazing		
the existing habitats with their associated flora and fauna (apart from those dominated by invasive non-native species)	Outline prescription 1.3 Reduce by 2025, the scrub cover to 43%		
Operational objective 2 - Safeguard notable species	Outline prescription 2.1 Collate existing records and establish status of notable species		
	Outline prescription 2.2 Prevent human activity from threatening notable species		
	Outline prescription 2.3 Protect notable species		
Operational objective 3 To provide for public access and	Outline prescription 3.1 Monitor public use of the site		
educational use of the site and to enhance public awareness and appreciation of Portsdown's habitats, except where it compromises other objectives	Outline prescription 3.2 Maintain footpaths and other access,		
	interpretative features		

	Outline prescription 3.3 Maintain programme of walks, talks and other events that inform public and interest groups about the site	
	Outline prescription 3.4 Ensure the site is a pleasant, welcoming, safe place to visit	
Operational objective 4 Incorporate wider environmental considerations into the plan by: ensuring climate change considerations are accounted for; opportunities to improve and connect biodiversity across Portsdown are defined and sought; ensuring land management is sustainable	Outline Prescription 4.1 Incorporate climate change prevention and adaptation into management projects Outline Prescription 4.2 Assess how biodiversity provision on adjacent land can be improved with the aim of producing ecological network across Portsdown Outline Prescription 4.3 Incorporate sustainable land management practices into plan projects Outline Prescription 4.4 Plan for removal of accumulated rubbish from site	

5.3 Projects

Outline prescription 1.1 Monitor habitats

Project Name	Project description	Progress by date
RV10/01 List/collect photographs	Take photographs of site from fixed points and archive with existing ones	Ву 2025
RF03/01 Collect data, monitor vegetation - carry out survey to investigate effect of grazing on botanical composition	Take quadrat data from grazed and ungrazed sites to describe the effect of grazing. Re- sample quadrats every five years. Prepare student projects to help with data gathering. See projects.	By 2025
RF03/02 Collect data, monitor vegetation - update vegetation map	For an illustrative proportion of the site update scrub map / GIS layer that describes the extent of scrub and grassland.	By 2025

Project Name	Project description	Progress by date
MG00/01 Manage grazing animals, general	Graze with cattle/horses sufficiently to remove annual growth of grass. Winter-graze with no more than 1.5 livestock units per ha.	Each winter/spring
MG00/02 Husband grazing stock,	Check animals daily when on site. Ensure all are in good condition and have water available. Assess level of fodder and ensure that animals will be moved before they run out to avoid supplemental feeding. Follow DEFRA animal welfare guidance notes.	Daily when livestock are on site.
AF01/02 Grant application - claim /renew comply with funding scheme	Claim grants according to schedule. Pursue new/replacement agreement when it is likely to be available.	Ongoing
ME01/02 Boundary structures - maintain existing fences, fence remaining compartments	Ensure that fences and gates are kept in good repair. Refer to findings of MP00/01	As necessary
ML80/01 Liaise other, graziers	Maintain contact with graziers. Ensure contact is maintained with established graziers, maintain contact to ensure livestock will be available.	Ongoing
MP00/01 Protect site by patrol	Check fence line, daily when site is stocked, monthly otherwise, and ensure that fences and gates are in good repair. Record locked gates and infrastructure. Report anyone committing damaging behaviour to the Police.	Daily when livestock on site.

Outline prescription 1.2 Maintain grazing

Project Name	Project description	Progress by date
AP10/01 Prepare/revise work programme - plan mowing and scrub removal	Produce updated report showing how further scrub clearance and scrub regrowth control will achieve species-rich grassland. Use scrub map from 2020 phase 2 survey. Mow and clear, at least annually, 90% of all scrub regrowth. Always mow less than 25% of the possible area of any compartment at any one time. Allow at least 2 weeks between mowing operations when mowing outside the winter.	May 2021
ME07/01 Manage habitat, woodland/scrub, by scrub control	Following AP10/01 Clear scrub and scrub regrowth	End of plan
MS00/01 Manage species tree/shrub /control invasive alien species	When clearing scrub cut and remove all Sycamore, Cotoneaster, Manna ash and Holm Oak from the work site and the immediate area. Fell/ring bark and poison seed bearing sycamore. Poison or dig up <i>Cotoneaster</i> <i>horizantalis</i> , remove and destroy, in fire, plants producing berries. Following AP10/01 aim to remove invasive cotoneaster from the site.	Until it is under control
MH14/01 Manage habitat, grassland - by mowing	Mow annually up to 25% of the ungrazed grassland to diversify the sward and prevent scrub growth. For any compartment always mow less than 25% of the possible area at any one time. Allow at least 2 weeks between mowing. Clear and compost (off-site) the arisings.	Annually
MM/01 Manage machinery and equipment, general	Maintain vehicles and tools. Keep record of maintenance of significant items. Time spent using vibrating hand tools. Pesticide usage.	Annually or as necessary

Outline prescription 1.3 Reduce by 2025, the scrub cover to 43%

Project Name	Project description	Progress by
		date
RB06/01Collect data, biological, list	Update species list for site.	As new records
species		are received
RA44/01 Collect data, Lepidoptera,	Staff and volunteers to	Weekly during
count/estimate/measure/census -	carry out two butterfly	the transect
continue butterfly transect	transect in compartments	season (April-
	1, 2 and 3 and 8, 9 and 10.	September)
	Conservation.	
RA70/01 Collect data, other insects,	Carry out bumblebee	Monthly during
general	transect in compartment.	the transect
	7, 8 and 9. Send data to	season (April-
	Bumblebee Conservation.	September)
RA10/01 Collect data on birds	Note and record	As they occur.
	occurrence of significant	Record
	birds	annually
RA70/02 Collect data, other insects,	Note and record	Add species to
general	occurrence of significant insects.	list annually
RV70/01 Collect data, other vascular	Map extent of Hippocrepis,	Over plan
plants survey - Hippocrepis/	Helianthemeum, Thesium,	period
Helianthemeum, Thesium	Gentianella anglica GPS	
	produce GIS layers	
RF62 Collect Data fungi , survey	Record all grassland fungi	Over plan
	findings	period

Outline prescription 2.1 Collate existing records and establish status of notable species

Outline prescription 2.2 Prevent human activity from threatening notable species

Project Name	Project description	Progress by date
ME04/01Remove litter	Remove litter, encourage agencies that are responsible for clearance on adjacent land to carry out their responsibilities, support volunteers who assist.	Clear litter as it is found. Ongoing repeating activity
ML20 Liaise stakeholders, right-holders - prevent utility	When utility firms e.g. SSE approach to carry out work on SSSI	When approached
firms from damaging site during operations.	ensure plans are agreed to avoid damage. Log contact.	

Outline prescription 2.3 Protect notable species

Project Name	Project description	Progress
		by date
MS10/01Manage	Dedicated tasks to prevent encroachment	As
species, other vascular	onto Hippocrepis, Thesium and	necessary
plants	Helianthemeum. Informed by project	
	AP10/01.	
MH19/01 Manage	Collect and remove dung from grazing	Each
habitat, grassland, by	animals to prevent localised concentrations	spring
other activities dung	of nutrients encouraging growth of rank	
collection.	vegetation on species rich grassland. Aim to	
	collect around 200 sacks (25kg bags) over the	
	course of the year.	
AT50/01 Liaise/supervise	Following AP10/01 ensure scrub removal by	Every task
volunteers - supervise	volunteers does not inadvertently damage	
volunteers that clear	intact species-rich grassland.	
scrub		

Outline prescription 3.1 Monitor public use of the site

Project Name	Project description	Progress by date
RH34 Collect data, public use, count visitors	Count people using the site, modal description. Volunteer project. How many people use the site, what are they doing, how often. Transect format	Within plan period

Outline prescription 3.2 Maintain footpaths and other access, interpretative features

Project Name	Project description	Progress by date
ME06/01Erect/maintain signs/interpretation boards	Keep information boards and signs in good condition.	Check in Jan and June. Replace as necessary. Consider updates biannually
ME00/01 Site infrastructure, general	Monitor path network and infrastructure. Walk paths and record activity on GPS.	Annually

Outline prescription 3.3 Maintain programme of walks, talks and other events that inform public and interest groups about the site

Project Name	Project description	Progress by date
MI50/01 Provide interpretation	Prepare literature and interpretation e.g., update websites Keep PCC and FoPH websites updated	Review annually.
MI20/01 Inform visitors, educational	Prepare and update notes for educational visits. Input in to visits. Talk to lecturers and teachers. Carry out walks and bug hunts, attend events.	Up to 5 events a year.
MI00/01Inform public off site- attend events and fora.	Provide slide shows, provide material for exhibitions and attend fairs and similar events. Attend Solent Ranger Forum. Provide events at museums and other venues.	Up to 5 events a year.
MI10/01 Inform visitors, general - explanatory notices to cover practical work	Place notices advising of presence of livestock.	When livestock are present

Project Name	Project description	Progress by date
MP00/02 Patrol general to investigate site misuse	Link in with path inspection observations ME00/01 and incident specific patrols	Monthly visits to all areas
ML80 Liaise stakeholders others. Use External agencies to control misuse	Report problematic issues and incidents to Community Wardens and Police. Attend meetings.	As necessary
MI10 Inform visitors, onsite information	Signage to welcome visitors to the site and remind them of the requirements not to damage it. Remind people of bylaws regarding dogs, metal detecting and camping.	In plan period

Outline prescription 3.4 Ensure the site is a pleasant, welcoming, safe place to visit

Outline Prescription 4.1 Evaluate climate change impact of operations and comply with carbon neutral targets

Project Name	Project description	Progress by date
AR60 Prepare report - other	Subject work programme to carbon accounting, such as Farm Carbon tool kit. Establish carbon footprint and make comparisons with other land use.	Jan 2022

Outline prescription 4.2 Assess biodiversity provision on adjacent land can be improved with the aim of producing ecological network across Portsdown

Project Name	Project description	Progress by date
RF04/01 Collect data, vegetation estimate	Produce an assessment with a GIS layer of intact calcareous grassland and other wildlife habitats on the Portsdown escarpment managed by other agencies. Describe opportunities how habitats may be connected, enlarged and enhanced.	Jan 2023
AP21/01	Based on product of RF04/01 produce priorities for	Jan 2023
Prepare plan	integrating wildlife-based management along	
strategic	Portsdown.	

Outline Prescription 4.3 Report how the management effects the site's ecological services provision

Project Name	Project description	Progress by date		
AR01 Prepare report, project review, new projects	List in report how ecological services (Provisioning, Regulating and Maintenance, Cultural Services Supporting or enabling) are delivered by site	Jan 2023		
Outling Prescri	ntion 4 4 Plan f	or removal of	accumulated rubb	ich
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Outime Fresch	PUUII 4.4 PIAII I			1311

Project Name	Project description	Progress by date
RH07 Collect data, human impact, pollution	Assess the requirements of removing rubbish build ups, predominantly at base of slope	Jan 2023
ME04/02 Remove litter	Remove rubbish identified by RH07	In plan period

6 APPENDICES

Appendix 1 Species list

Appendix 2 SSSI Designation

Portsdown Hill SSSI Hampshire

LOCAL PLANNING AUTHORITIES: Hampshire Council Portsmouth City Council; Fareham Borough Council

NATIONAL GRID REFERENCE SU 618065-SU 666064 ORDANDNCE SURVEY SHEET 1:50 000:196 1:25000:SU 60 HECTARES/ACRES: 80.67/199.36

DATE NOTIFIED (**1949 ACT**) : 1978 **DATE OF LAST REVISION**: DATE NOTIFIED (**1981 ACT**) 1984 **DATE OF LAST REVISION**: OTHER INFORMATION

Owned mainly by Fareham Borough Council and Portsmouth City Council and managed as open space. A small part is registered and confirmed as common land.

REASONS FOR NOTIFICATION:

Portsdown Hill is an isolated east-west chalk anticline with a long south-facing escarpment which remains unreclaimed. On the lower south-facing slopes raised beaches mark former sea levels and it is postulated that former wave erosion has removed the Tertiary deposits and some of the chalk, leaving very steep slopes. Despite the absence of grazing and extensive disturbance, these slopes still support a rich chalk grassland flora and a rich and diverse insect fauna. Hawthorn *Crataegus mongyna* scrub is extensive and much of the grassland is dominated by Upright brome *Bromus erectus*, a tall vigorous species which responds rapidly to lack of grazing. Areas of finer turf dominated by Red Fescue *Festuca rubra*, Sheep's Fescue *F. ovina* and a wide range of small herbs, remains widespread, however, whilst the site supports a number of species of limited distribution, including Hairy Rock-cress *Arabis hirsuta*, Pale Flax *Linum bienne*, Meadow Cranesbill *Geranium pratense*, Horseshoe Vetch *Hippocrepis comosa*, Bastard Toadflax *Thesium humifusum*, Early gentian *Gentianella anglica*, Knapweed Broomrape *Orobanche elatior*, Bee Orchid *Ophrys apifera*, and Fly Orchid *0.insectifera*

The insect fauna has been studied in detail and includes a comprehensive range of chalk downland butterflies (Lepidoptera), beetles (Coleoptera), bees and allied insects (Hymenoptera). Of interest is the occurrence in an atypical habitat of the Bush Cricket *Conocephalus discolor* and a substantial population of the largest of the British Bush Crickets *Tettigonia viridissima*.

STATUS: SITE OF SPECIAL SCIENTIFIC INTEREST (SSS1) NOTIFIED ~ SECTION 28 OF THE WIIDLIFE AND COUNTRYSIDE ACT 1981

PORTSDOWN SITE OF SPECIAL SCIENIFIC INTEREST HAMPSHIRE OPERATIONS REQUIRING PRIOR CONSULTATION WITH THE NATURE ~ CONSERVANCY COUNCIL

Standard Type of Operation

Ref. No.

1 Cultivation, including ploughing, rotovating, harrowing and re-seeding

2 The introduction of grazing and subsequent changes in the grazing regime (including changes in type of stock or the intensity or seasonal pattern of grazing and cessation of grazing).

3 The introduction of stock feeding.

4 The introduction of mowing etc., and subsequent changes in the mowing or cutting regime.

5 Application of manure, fertilisers and lime.

6 Application of pesticides, including herbicides (weedkillers).

7 Dumping, spreading or discharge of any materials.

8 Burning of vegetation.

9 The release into the site of any wild, feral or domestic animal, plant or seed. ("Animal" includes any mammal, reptile, amphibian, bird, fish or invertebrate).

11 The destruction, displacement, removal or cutting of any tree, shrub or turf.

12 The introduction of tree and/or woodland management (including afforestation, planting, clear and selective felling, thinning, coppicing, modification of the stand or underwood, changes in species composition, cessation of management).

14 Water abstraction through boreholes.

20 Extraction of minerals, including topsoil, sub-soil and chalk.

21 Construction of roads, tracks, walls, fences, hardstands, banks, ditches or other earth works, or the laying, maintenance or removal of pipelines and cables, above or below ground.

22 Storage of materials.

23 Erection of permanent or temporary structures, or the undertaking of engineering works, including drilling.

26 Use of vehicles or craft likely to damage or disturb vegetation.

27 Recreational or other activities likely to damage vegetation.

28 Introduction of game or waterfowl management.

Higher tier Countryside Stewardship agreement relating to Portsdown Hill SSSI - Agreement number 310166

Parcel Name	Sheet Number	Parcel Number	Option Code	Option Title	Total Parcel Area ha	Option Area/length	Area length	Option Duration	Option Start Date	Option End Date
SSSI				Management of species-rich						
1-6	SU6406	2852	GS6	grassland	41.49	20.46	ha	5	01/01/2017	31/12/2021
SSSI				Management of species-rich						
7-10	SU6506	7931	GS6	grassland	18.35	10.35	ha	5	01/01/2017	31/12/2021
SSSI 1-6	SU6406	2852	SP1	Difficult sites supplement	41.49	20.46	ha	5	01/01/2017	31/12/2021
SSSI 1-6	SU6506	7931	SP1	Difficult sites supplement	18.35	10.35	ha	5	01/01/2017	31/12/2021
SSSI 1-6	SU6406	2852	SP4	Control of invasive plant species supplement	41.49	1.5	ha	5	01/01/2017	31/12/2021
SSSI				Control of invasive plant species				_		
7-10	SU6506	7931	SP4	supplement	18.35	0.3	ha	5	01/01/2017	31/12/2021
SSSI				Management of successional						
1-6	SU6406	2852	WD7	areas and scrub	41.49	20.65	ha	5	01/01/2017	31/12/2021
SSSI		7024		Management of successional	40.05	7 0000	h	-	04 104 1004 7	24 /42 /2024
7-10	206206	/931	WD7	areas and scrub	18.35	7.9908	na	5	01/01/201/	31/12/2021

DATED 4 April 1995



BYELAWS

Made under Section 164 of the Public Health Act 1875, Section 15 of the Open Spaces Act 1906 and Sections 12 and 15 of the Open Spaces Act 1906

- relating to -

Portsdown Hill, Portsmouth

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CITY OF PORTSMOUTH

PORTSDOWN HILL BYELAWS

BYELAWS made by the Council of the City of Portsmouth under section 164 of the Public Health Act 1875, section 15 of the Open Spaces Act 1906 and sections 12 and 15 of the Open Spaces Act 1906, with respect to part of Portsdown Hill, Portsmouth.

Interpretation

In these byelaws:

"the Council" means the Council of the City of Portsmouth;

"the land" means such of Portsdown Hill, Portsmouth, as is within the administrative area of the Council, as shown shaded in grey on the plan attached to these byelaws;

"officer of the Council" means any person employed by or acting with the authority of the Council for the purposes of these byelaws.

Vehicles

- 2. (1) No person shall, without reasonable excuse, ride or drive a motor cycle, motor vehicle or any other mechanically propelled vehicle on the land, or bring or cause to be brought on to the land a motor cycle, motor vehicle, trailer or any other mechanically propelled vehicle, except on any part of the land where there is a right of way for that class of vehicle.
 - (2) If the Council has set apart a space on the land for use by vehicles of any class, this byelaw shall not prevent the riding or driving of those vehicles in the space so set apart, or on a route, indicated by signs placed in conspicuous positions, between it and the entrance to the land.
 - (3) This byelaw shall not extend to cycles or invalid carriages.
 - (4) In this byelaw:

"cycle" means a bicycle, a tricycle, or a cycle having four or more wheels, not being in any case a motor cycle or motor vehicle:

"invalid carriage" means a vehicle, whether mechanically propelled or not, the unladen weight of which does not exceed 150 kilograms, the width of which does not exceed 0.85 metres and which has been constructed or adapted for use for the carriage of one person, being a person suffering from some physical defect or disability and is used solely by such a person;

"motor cycle" means a mechanically propelled vehicle, not being an invalid carriage, with less than four wheels and the weight of which unladen does not exceed 410 kilograms;

"motor vehicle" means a mechanically propelled vehicle, not being an invalid carriage, intended or adapted for use on roads;

"trailer" means a vehicle drawn by a motor vehicle, and includes a caravan.

Camping

3. No person shall on the land, without the consent of the Council bivouac or erect a tent or use any vehicle, including a caravan, or any other structure for the purpose of camping, except on any area which may be set apart and indicated by notice as a place where camping is permitted.

Overnight Parking

4. No person shall, without the consent of the Council, leave or cause or permit to be left any vehicle on the land between the hours of 12.00 midnight and 6.00 am.

Fires

- 5. (1) No person shall on the land intentionally light a fire, or place, throw or let fall a lighted match or any other thing so as to be likely to cause a fire.
 - (2) This byelaw shall not prevent the lighting or use of a properly constructed camping stove or cooker in any area set aside for the purpose, in such a manner as not to cause danger of or damage by fire.

Protection of Wildlife

 No person shall on the land intentionally kill, injure, take or disturb any animal, or engage in hunting or shooting, or the setting of traps or nets, or the laying of snares.

Grazing

No person shall, without the consent of the Council, turn out or permit any animal to graze on the land.

Climbing

 No person shall, without reasonable excuse, climb any wall or fence on or enclosing the land, or any tree, or any barrier, railing, post or other structure.

Removal of Structures

9. No person shall, without reasonable excuse, remove from or displace on the land any barrier, railing, post or seat, or any part of any structure or ornament, or any implement provided for use in the laying out or maintenance of the land.

Removal of Substances

10. No person shall remove from or displace on the land any stone, soil or turf, or the whole or any part of any plant or tree.

Metal Detectors

11. No person shall on the land use any device designed or adapted for detecting or locating any metal or mineral in the ground, except in any area which may be set apart and indicated by notice as an area where the use of such devices is permitted.

- 12. (1) No person on the land shall, after being requested to desist by an officer of the Council, or by any person annoyed or disturbed, or by any person acting on his behalf:
 - (a) by shouting or singing;
 - (b) by playing on a musical instrument; or
 - by operating or permitting to be operated any radio, gramophone, amplifier, tape recorder or similar instrument;

cause or permit to be made any noise which is so loud or so continuous or repeated as to give reasonable cause for annoyance to other persons on the land.

- (2) This byelaw shall not apply to properly conducted religious services.
- (3) This byelaw shall not apply to any person holding or taking part in any entertainment held with the consent of the Council.

Trading

Noise

13. No person shall on the land, without the consent of the Council, sell, or offer or expose for sale, or let to hire, or offer or expose for letting to hire, any commodity or article.

Aircraft

14. No person shall, except in case of emergency or with the consent of the Council, take off from or land upon the land in an aircraft, helicopter, hang-glider or hot-air balloon.

Obstruction

- 15. No person shall on the land:
 - (a) intentionally obstruct any officer of the Council in the proper execution of his dutics;
 - (b) intentionally obstruct any person carrying out an act which is necessary to the proper execution of any contract with the Council; or
 - (c) intentionally obstruct any other person in the proper use of the land, or behave so as to give reasonable grounds for annoyance to other persons on the land.

Savings

16. (1) An act necessary to the proper execution of his duty on the land by an officer of the Council, or any act which is necessary to the proper execution of any contract with the Council, shall not be an offence under these byelaws. (2) Nothing in or done under any of the provisions of these byels shall in any respect prejudice or injuriously affect any publi right of way through the land, or the rights of any person acting legally by virtue of some estate, right or interest in, over or affecting the land or any part thereof.

Removal of Offenders

17. Any person offending against any of these byelaws may be removed from the land by an officer of the Council or a constable.

Penalty

 Any person offending against any of these byelaws shall be liable on summary conviction to a fine not exceeding level 2 on the standard scale.

Revocation

- 19. The following byelaws are hereby revoked insofar as they apply to the land:
 - (a) the byelaws made by the Lord Mayor, Aldermen and Citizens of the City of Portsmouth acting by the Council on 23 February 1934 and allowed by the Minister of Health on 16 April 1934 in respect of various pleasure grounds and open spaces;
 - (b) the byelaws made by the Council on 3 November 1977 and confirmed by the Secretary of State for the Home Department on 5 January 1978 in respect of various pleasure grounds and open spaces; and
 - (c) the byelaws made by the Council on 20 February 1985 and confirmed by the Secretary of State for the Home Department on 1 October 1985 with respect to the prevention of nuisances caused by motor cycles and other vehicles.

DATED the 4th day of April 1995

L.S.

THE COMMON SEAL of the PORTSMOUTH CITY COUNCIL was hereunto affixed in pursuance of a resolution of the Council passed at a meeting duly convened and held:-

(Signed) S Mitchell Authorised Signatory

The foregoing byelaws are hereby confirmed by the Secretary of State and shall come into operation on 4 September 1995.

Signed by authority of the Secretary of State

(Signed) M E Head M E HEAD An Assistant Under-Secretary of State 8 August 1995 Home Office LONDON, SW1

Appendix 5 Vegetation and species management further considerations

Grazing

Grazing - defoliation

The herbage that livestock choose to eat affects botanical composition. Some plants flourish in grazed grassland because they are tolerant of, or resistant to herbivory. Tolerant species such as plantains (*Plantago*) have growing points close to the ground while other species simply grow quickly and produce many seeds. Plants that are resistant to grazing are often unpalatable *e.g. Thymus* (thyme) and *Senecio jacobaea* (ragwort) or are spiny *e.g. Cirsium* (thistles). Plants that are actively selected by grazers and are unable to grow back quickly will eventually be driven from the site.

The nature of the grazing has important implications for the invertebrate fauna. The correct grazing pressure can retain short species-rich turf whilst maintaining areas of tall grass habitat. An uneven sward, with a variety of microhabitats is suitable for a wider range of species. Livestock remove vegetation gradually and so do not have the catastrophic effect on invertebrates, as mowing. Small mammals and reptiles also benefit from a range of vegetation densities.

The timing of any grazing will also affect the grassland's response. Many plant species have flowering periods restricted to only part of the growing season. If grazing animals remove all the flowers then the recruitment of new seedlings will be adversely affected. In plants with long-lived seeds and/or perennial species the loss of a year's seed will not affect the population; however, it may affect any invertebrates that are dependent on the seeds or flowers. *Rhinanthus minor* (Yellow rattle) is an example of an annual plant with short-lived seed that will be reduced by early summer grazing. The grazing preferences of different stock are another important factor.

Grazing - trampling

Livestock, especially cattle, break up accumulated dead vegetation and create bare ground as they move about the site. A low level of such ground disturbance is beneficial as it stimulates the regeneration of plants from the seed bank. Patches of soil exposed to the sun's warmth are important during the underground larval stage of many invertebrates. Where excessive trampling by heavy livestock occurs susceptible plants may be lost.

Plants are more sensitive to disturbance when they are actively growing. Therefore, the timing of grazing has important considerations. Heavy grazing at the beginning of the growing season will adversely affect one suite of species whilst leaving other (late growing) species little affected.

There are small areas of species-rich grassland scattered across the site. Where animals are obliged to walk over these areas due to the funnelling effect of scrub the risk of damage by trampling is increased. Bushes have been cleared to open these bottlenecks and alternative routes through cleared scrub made available.

Grazing - manuring

Chalk grassland is a nutrient-poor habitat. Livestock deposit urine and dung and therefore have the potential to raise the nutrient status and thus cause a shift in the vegetation towards coarse competitive species. Provided that supplementary feeding does not occur and livestock only eat vegetation from the site all they are doing is concentrating some of the nutrients that are already present. When they leave the site they are, in effect, removing nutrients and perpetuating conditions that give rise to downland by reducing soil fertility.

Whilst grazing animals lower the nutrients within a system they can increase the rate at which they are recycled. Nutrients locked up in dead or old vegetation are available for new growth. Where grazing has

been established cattle have cleared much of the ivy from the scrub and deposited a proportion of the nutrients on other parts of the site.

The physical removal of dung may speed up the export of nutrients although it has to be remembered that there are many invertebrates and fungi that benefit from dung, as do the predators that in turn feed on them. It is important that livestock are not wormed using a prophylactic bolus that administers an Avermectin based compound. This drug persists in the dung and prevents invertebrates from colonising.

With the right grazing pressure all habitats can be retained and the need for other active management greatly reduced.

Stocking rates and timing of grazing

From the experience of the first 15 years it takes approximately 8 weeks of winter grazing at the stocking rate of 1 cow per ha to remove the annual growth of grass. The time taken to do this is less than it was at the outset of grazing because the dominant grass is now less vigorous and produces less biomass. Also much of the fodder value associated with the scrub (ivy) has been eaten and it is unable to regenerate to pre-grazing levels.

A guide to the carrying capacity of calcareous grassland is 0.25 LU/ha/yr, see Crofts and Jefferson, (1999). A LU (livestock unit) is 550 kg of animal and is a means of comparing livestock of differing age and species. e.g. 4 adult ewes at 60 kg are equal to a 1 year old beef animal at 240 kg – both equal approximately 0.5 LU, Crofts and Jefferson, (1999).

The cattle and horses that have grazed Portsdown Hill have been approximately equivalent to 1 LU, giving a stocking level of 0.16 LU/ha/yr. Agriculturally improved grassland rates are several times higher (2.0 LU/ha/yr) than this, which suggests that the grassland on Portsdown is unproductive. However, it has to be remembered that much of the area is covered in scrub and there is limited grass regrowth during the winter when the site is grazed.

On dry south-facing slopes like Portsdown Hill, winter grazing with cattle has produced the desired effect of suppressing the *Bromopsis erectus* (upright brome), and opened up the sward and allowed other species to grow. Grazing has been restricted to a relatively short time during a time of year when most plants and animals are dormant. Although there is some evidence of poaching on paths there seems to be little trampling damage on the best areas of grassland. Existing areas of fine downland turf retain their characteristic species *e.g. Thesium humifusum* (bastard toadflax).

From a grassland management perspective winter grazing at one cow or large unshod horse per ha is increasing botanical diversity and suppressing *Bromopsis*. Scrub is not controlled by cattle grazing, neither are scrub seedlings that have established themselves in the grassland. In order to control scrub a more elaborate grazing regime is necessary for example grazing during the growing season and the use of scrub-eating livestock such as goats.

Grazing - choice of livestock

Each livestock species has unique grazing characteristics that will in turn have a distinct effect on the vegetation. The essential characteristics for sheep, cattle, goats and ponies are given below. Differences in breed and age also affect grazing behaviour.

Sheep

Sheep are the preferred animal at many sites, (Bacon, 1990, 1993). Their nibbling mouth action is recognised as producing the best (*i.e.* finer) downland turf. They are capable of grazing on steep

slopes and cause less soil erosion than larger animals. They are not as susceptible to the toxic effects of ragwort as other livestock and some breeds will eat a certain amount of scrub.

They are selective feeders that tend to take flower spikes but leave grass stems, tussocky grass and dead vegetation. Unpalatable species tend to be avoided. A management consideration of sheep is the threat of dog worrying and likelihood of becoming entangled in brambles.

Cattle

Cattle are good at removing coarse grass and feed non-selectively by wrapping their tongue around the vegetation and biting it off. Feeding in this way they have produced a short sward on Portsdown. They are less susceptible than sheep to dog worrying and other problems caused by the close proximity of an urban area. Cattle will push deep into scrub looking for ivy and therefore make subsequent scrub clearance much easier. If droppings are to be removed, they make this procedure much easier by producing cowpats. They can easily cause excessive trampling, especially in wet weather.

Goats

Goats graze, strip bark and browse. They will eat a variety of scrub and herbaceous vegetation often concentrating on one particular type of vegetation for a while before turning their attention to something different. From trials with domestic goats on the site and in Fort Widley as well as with semi-feral goats in Fort Southwick it is clear they are efficient at controlling scrub of any type and grazing off rank grass. There is plenty of scope for their use on the site. Like sheep, they are vulnerable to dog worrying.

Goats heft, that is they tend not to stray from a chosen location. On Portsdown they moved barely 200 m from where they first introduced to the site in 3 months. This means they graze and browse a small area thoroughly.

Horses and ponies

Horses can graze very close to the ground due to their forward pointing incisors and so potentially have a role in managing chalk grassland. On a nearby field a good mixture of downland species is maintained by low level horse grazing. However, they are not usually recognised as suitable grazing animals. A commonly seen situation is that of poached overgrazed horse paddocks that are prone to *Senecio jacobaea* (Ragwort) invasion. They are known to produce localised concentrations of nutrients by dunging in selected areas. This would be a problem if they were to choose a patch of species-rich grassland. Shod horses would soon damage sensitive grassland so are not suitable.

Low level horse grazing may be an appropriate option provided adequate control is maintained, (Gibson, 1996).

Grazing - wild grazers

There are roe deer (*Capreolus capreolus*) on the site, but too few to have a noticeable effect on the vegetation. Rabbit grazing has been significant at the western end of the site, *i.e.* compartments, 1 and 2 from the being in of the plan period, 1995. The rabbit population has increased considerably in the last ten years to the extent that it has reduced the need for grazing. By 2010 compartments 9 and 10 also developed a large rabbit population so that the grass is short all year.

The potential for rabbits to influence the need for grazing management is considerable and rabbit numbers should be monitored. Over most of the site the rabbits make beneficial contribution to the grazing effort

and their presence is welcome. It is significant that the rabbits live within the blocks of scrub. There is the potential to influence rabbit numbers by adjusting the area of scrub.

Scrub management

Advantages and effects of coppicing scrub:

- it prevents retained scrub from becoming over-mature and degenerate, thus losing most of its conservation value;
- it promotes vigorous regrowth which benefits those butterflies that have scrub species as foodplants;
- it prevents retained scrub areas from maturing and thus producing seeds which lead to colonisation of nearby grassland sites;
- it retains scrub as an impenetrable barrier, which can be desirable in some situations;

Scrub regrowth forms a distinct, if temporary, habitat it is own right and benefits invertebrates such as Bush Crickets. The flowering ruderal plants that occupy recently cleared ground provide nectar and pollen for a variety of insects. For much of the year they appear to support more flowers that the adjacent grassland. In addition the taller vegetation offers more shelter from bad weather and opportunities for invertebrates to over winter.

Whilst a programme of long-term scrub coppice may have some advantages it poses the problem of disposal of arisings. They cannot be left on site as they will lead to a localised build-up of nutrients and so encourage coarse vegetation.

Converting scrub back to grassland

Effective scrub clearance is difficult. Most scrub species coppice vigorously when cut and so it has to be uprooted, poisoned or repeatedly defoliated in order to kill it - sometimes all three as it often regenerates from severed roots. If it can be removed, it leaves behind an area of enriched soil (laden with scrub seeds) that does not favour re-colonisation by downland species.

The most appropriate method of clearance depends on the structure of the scrub. Individual bushes or discrete scrub blocks surrounded by intact grassland are best felled and removed intact and the stumps treated or extracted. Large expanses of springy thickets are best shredded *in situ* with a tractor-mounted flail.

Disposal of arisings creates as much work as cutting down the scrub. They cannot be left on site so they have to be burnt on an area that was previously dense scrub, and the ashes removed. Otherwise, the material has to be removed for composting. Slope permitting a collection machine can be used; otherwise they have to be raked up or scraped with together with a front-end loader.

Inevitably, much of the scrub is a mixture of established shrubs surrounded by a younger halo of privet, clematis and bramble. Therefore, a staged clearance is more appropriate. The mass of tangled, pliable scrub can be flailed out of the way revealing the more substantial bushes that can be treated separately. The steepness of the slope and the proximity of extraction point and/or species-rich grassland influence the choice of technique.

The scrub is concentrated on the lower slopes suggesting there is a positive relationship between soil depth and scrub growth, McIntosh, (1997). The removal of scrub and reversion to chalk grassland is likely to be more successful if the scrub control reflects the distribution of the least overgrown areas. Where scrub is to be retained the densest scrub should be left or coppiced as this will be the most difficult to return to grassland.

Where scrub has been cleared to ground level the site has been smothered in vigorous bramble-dominated regrowth after a growing season. There will also be opportunistic ruderal species, *e.g.* groundsel and thistles. There will also be a small number of downland plants which germinate from the seed bank, *e.g.* violets. In order to achieve grassland on these areas regular mowing with clearance and/or grazing is necessary to stunt the scrub species and favour grassland plants. This can take years or even decades.

Mechanical excavation of scrub roots and the enriched soil has the advantage of reducing the follow up work necessary to regenerate grassland. It is straightforward (and beneficial, see below) to reseed the stripped ground with seed collected from the same site and so retain genetic variation associated with the site. It poses the problem of extraction and disposal of material. The scale of the operation also requires vehicular access. It is important that transportation routes are aligned to avoid areas of intact species-rich grassland.

It should be noted that the removal of large areas of scrub and roots with an excavator will dramatically alter the vegetation, the soil structure and the appearance of an area. It should be used with caution. Scrub may contain viable plants and seeds of grass and grassland species that will be buried by the scrub removal process. They may not be able to recolonise the bare soil if buried too deep. If the scrub is cut at ground level and the roots left, grass will establish more readily than if the roots are dug out and the ground disturbed.

Soil is a complex environment with many interacting living and mineral components. Soil fungi and bacteria are fundamental to the functioning of the soil. Scrub removal that disturbs the soil will have a dramatic effect on microbiological life. As the soil dries out mycorrhizae will damaged or killed.

Goat grazing can quickly reduce the vigour of scrub, and given time even kill it. In a relatively short while it can make it easier to clear scrub. For comments on goat grazing see the discussion on grazing.

Whilst it is clear scrub cover should be reduced, the previous comments also suggest that some scrub should be retained, but if it is left unmanaged many of its positive aspects will be lost. The conservation benefits of scrub can be maintained in a much-reduced area. The greatest biological value of the site is found in chalk grassland.

Species considerations

Using *Polyommatus coridon* (Chalkhill Blue Butterfly) as an illustrative example, it illustrates the complexity of insect life cycles. *Hippocrepis comosa* (horseshoe vetch) is necessary as a larval food-plant. This plant requires open grassland and is lost when scrub encroaches. Ants belonging to the genus *Lasius* and *Myrmica* protect the larvae, a range of flowers are needed to provide nectar sources for the adults. Sheltered roosting sites in tall vegetation greatly assist its survival. Other controlling factors are predators and pathogens that attack it throughout its life cycle. In addition, the weather has a dramatic effect on the breeding success. A very bad year can wipe out a weak colony. Once insects have failed to breed on a site they have to re-colonise from elsewhere. Unlike plants, insects cannot survive local extinctions as seed, however being mobile they may recolonise, or be persuaded to.

Management has to provide an appropriate habitat in which the desired species can live in association with everything else in an ecosystem. The ecosystem that developed on Portsdown Hill did so under a form of low-intensity livestock based agriculture and the best way of retaining it is to reintroduce and maintain a similar form of management. Small areas of species-rich grassland supporting vulnerable, hard to replace species have a particularly high value.

Hippocrepis comosa (horseshoe vetch) - Dependant on recently disturbed areas or short turf, free from shade. Slow to colonise new sites.

Ophrys apifera (bee orchid) - This plant is dependent on similar conditions to those favoured by the Horseshoe Vetch, but has the extra complications of at least an eight- year life cycle and a monocarpic flowering strategy. Early devolvement is in the form of an underground callus in association with a symbiotic fungus.

Adrabis hirsuta (hairy rockcress) - Dependant on bare patches of soil and disturbed ground. Benefits from the environment found next to paths, thus a certain level of trampling encourages this plant.

Orobanche elatior (knapweed broomrape) - This parasitic plant is totally dependent on the well-being of its host, *Centaurea scabiosa* (greater knapweed). The two plants grow best on the edge of scrub in taller grass.

Thesium humifusum (bastard toadflax) - Only found in short turf. Like several other species *e.g. Rhinanthus minor* (yellow rattle), this plant is a semi-parasite. The close proximity of suitable host roots (*i.e.* downland grasses) is an important factor in this plant's success. This plant has very poor powers of distribution and therefore is an indicator of ancient downland.

Cupidio minimus (small blue butterfly) - Portsdown Hill has been described as supporting one of the largest colonies in Hampshire. It has benefited from the expansion of its larval food plant, *Anthyllis vulneraria* in recent years. The adults roost in the tall *Arrhenatherum elatis* (False oat grass).

Odonteus armiger - Notable A. Listed in a published Red Data Book as category "3" This beetle has larvae that are dependent on rabbit dung. They are restricted to warm grassland.

Bombus humilis - BAP species. Requires flower rich grassland rich in red clover and tall grass in which to nest.

Asilus crabroniformis (hornet robber fly) - The fly's larvae are believed to prey on the larvae of large dung beetles and the adult flies

eed on a variety of insects, including grasshoppers, dung beetles and flies. As such, it requires suitable grassland sward to support its prey community. As a dung species, it is thought to be adversely affected by the presence of persistent anti-parasite compounds (avermectins) in animal dung.

Appendix 6 Infrastructure map



Appendix 7 Relative position of Portsdown Hill SSSI on Portsdown escarpment and HBIC Ecological Network Map for Portsmouth Position of Portsdown Hill SSI within the 60m contour shown in blue



Ecological Network Map held by HBIC





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Appendix 8 Land ownership and responsibility



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Appendix 9 Soil analysis 2016

SSSI compartments 7-10

Analysis	Result	Guideline	Interpretation	Comments
рН	8.1	6.5	High	Possible interference on availability of P, K, Mn, B, Cu, Zn and Fe.
Phosphorus (ppm)	7	26	Very Low	(Index 0.7) 120 kg/ha P2O5 (96 units/acre).
Potassium (ppm)	70	241	Low	(Index 1.1) 80 kg/ha K2O (64 units/acre).
Magnesium (ppm)	61	50	Normal	(Index 2.2) Adequate level.
Organic Matter DUMAS	4.4	3.0	Normal	Adequate level.

SSSI compartments 1 -6

Analysis	Result	Guideline	Interpretation	Comments
рН	8.0	6.5	High	Possible interference on availability of P, K, Mn, B, Cu, Zn and Fe.
Phosphorus (ppm)	6	26	Very Low	(Index 0.6) 120 kg/ha P2O5 (96 units/acre).
Potassium (ppm)	83	241	Low	(Index 1.3) 80 kg/ha K2O (64 units/acre).
Magnesium (ppm)	64	50	Normal	(Index 2.2) Adequate level.
Organic Matter DUMAS (%)	4.5	3.0	Normal	Adequate level.

Paulsgrove chalk pit

Analysis	Result	Guideline	Interpretation	Comments
рН	7.9	6.5	High	Possible interference on availability of P, K, Mn, B, Cu, Zn and Fe.
Phosphorus (ppm)	7	26	Very Low	(Index 0.7) 120 kg/ha P2O5 (96 units/acre).
Potassium (ppm)	80	241	Low	(Index 1.3) 80 kg/ha K2O (64 units/acre).
Magnesium (ppm)	55	50	Normal	(Index 2.0) Adequate level.
Organic Matter DUMAS (%)	2.2	3.0	Slightly Low	Incorporate organic material when possible.

Two Dells trail Mill Lane

Analysis	Result	Guideline	Interpretation	Comments
рН	7.7	6.5	High	Possible interference on availability of P, K, Mn, B, Cu, Zn and Fe.
Phosphorus (ppm)	5	26	Very Low	(Index 0.5) 120 kg/ha P2O5 (96 units/acre).
Potassium (ppm)	104	241	Low	(Index 1.7) 80 kg/ha K2O (64 units/acre).
Magnesium (ppm)	67	50	Normal	(Index 2.3) Adequate level.
Organic Matter DUMAS (%)	5.4	3.0	Normal	Adequate level.

Childrens Wood

Analysis	Result	Guideline	Interpretation	Comments
рН	8.0	6.5	High	Possible interference on availability of P, K, Mn, B, Cu, Zn and Fe.
Phosphorus (ppm)	10	26	Low	(Index 1.1) 80 kg/ha P2O5 (64 units/acre).
Potassium (ppm)	95	241	Low	(Index 1.5) 80 kg/ha K2O (64 units/acre).
Magnesium (ppm)	59	50	Normal	(Index 2.1) Adequate level.
Organic Matter DUMAS (%)	7.6	3.0	Normal	Adequate level.

Farlington Avenue

Analysis	Result	Guideline	Interpretation	Comments
рН	8.0	6.5	High	Possible interference on availability of P, K, Mn, B, Cu, Zn and Fe.
Phosphorus (ppm)	7	26	Very Low	(Index 0.7) 120 kg/ha P2O5 (96 units/acre).
Potassium (ppm)	56	241	Very Low	(Index 0.9) 120 kg/ha K2O (96 units/acre).
Magnesium (ppm)	54	50	Normal	(Index 2.0) Adequate level.
Organic Matter DUMAS (%)	3.4	3.0	Normal	Adequate level.