

**Tadburn Meadows
Local Nature Reserve Romsey**

Management Plan

2019 - 2029

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1. DESCRIPTION

1.1 General Information

1.1.1 Location (see Appendix I Map 1)

Tadburn Meadows is located in Halterworth, Romsey.

A stream known locally as the Tadburn Lake runs through the centre of the site.

OS Grid Reference: SU369215

Ward:	Tadburn
District:	Romsey
County:	Hampshire
Local Planning Authority:	Test Valley Borough Council

1.1.2 Summary Description

Tadburn Meadows is flanked by housing on three sides with a railway line running along the northern boundary. The site includes an area of amenity grassland and a children's play area.

Tadburn Meadows consists of a mosaic of habitats which are only present due to the variation in hydrology around the site. The valley bottom is wet with drier valley sides. The stream running through the site is dynamic with a variable flow rate most noticeably during times of heavy rainfall. The stream is surrounded by alder and willow interspersed with oak and ash. Ornamental species have at some stage been planted on the site which includes weeping willow and horse chestnut. Also present throughout the site is the invasive garden escape Himalayan balsam, as well as the garden hedging plant *Lonicera nitida* in some areas. On the northern part of the site which is consistently waterlogged within the valley bottom alder and willow carr is dominant. Trees within this area are of similar age. This side of the site also contains a remnant old hedgerow which is adjacent to the Eight Acres entrance. Over time this has now become a line of semi mature trees.

Grassy glades adjacent to the footpath are present. These glades are managed through a cut and collect regime to encourage the development of the grasses and herbs present which include devil's-bit scabious, bird's foot trefoil and knapweed. One of these glades at the edge of the site also contains cuckoo flower, which a wet meadow species specialising in damp environments.

South of Tadburn Stream is a sloping valley side which is also dominated by alder and willow woodland. Also present are two small meadows which possibly gave Tadburn Meadows its name. This managed habitat predominately consists of wet meadow which is slowly being encroached by scrub, bracken and trees. The trees surrounding the meadows provide a useful screen between the site and the housing estate and should be retained.

1.1.3 Land Tenure

The site is owned by Test Valley Borough Council and is managed by the Community & Leisure Service, primarily for conservation and education with informal recreation for local residents.

The entrance off the road at Eight Acres is owned by Hampshire County Council, over which TVBC have a right of way.

Type of holding:	Public Open Space
Total area:	5.35 hectares (13.0 acres)
Boundaries:	See Appendix I, Map 2
Owner:	Test Valley Borough Council
Address:	Community & Leisure Service, Beech Hurst, Weyhill Road, Andover, Hampshire SP10 3AJ
Telephone:	(01264) 368000

1.1.4 Map Coverage

OS Map	1:50 000	Sheet No. 185
	1:25 000	Sheet No. SU32
	1:10 000	Sheet No. SU32 SE

Geological Map 1:50 000 Sheet No. 315

1.1.5 Access (see Appendix I, Map 3)

Permissive paths cross the site with three footbridges allowing access over the stream. The only Public Footpath (No. 3) is a tarmac path running along the southern edge of the site.

Parking at the site is possible from the access point at Eight Acres. There is also access from Halterworth Close, Halterworth Lane and Seward Rise. There is no access on the northern side due to the railway line and a six foot high palisade fence.

There is no vehicular access on the site apart from those necessary for management purposes. Access for these vehicles can be gained through the vehicle barrier located at the Eight Acres entrance, another access point located at Seward Rise.

1.2 Environmental Information

1.2.1 Physical

1.2.1.1 Hydrology

The site is located on a valley bottom which is regularly waterlogged and a stream that frequently spates in periods of high rainfall. The valley bottom also contains a number of drainage ditches. On the southern side of the stream is the gently sloping, drier valley side. The Tadburn stream flows west towards the South of Romsey town, eventually joining the River Test within the Broadlands Estate.

1.2.1.2 Geology and Soils

Most of the site is composed of alluvial deposits over bracklesham beds with neutral to basic, poorly drained soils. The stream bed is composed of gravel.

1.2.2 Biological

1.2.2.1 Habitats/Communities (see Appendix I, Map 6)

The broad habitat types found within Tadburn Meadows are as follows:

- i) Old Hedge
- ii) Wet woodland dominated by willow and alder carr
- iii) Stream banks
- iv) Tadburn Stream
- v) Wet Meadow
- vi) Amenity Grassland sward
- vii) Ditches

1.2.2.2 Flora

A number of floral surveys have been carried out (see Appendix II):

Table 1: Floral surveys carried out at Tadburn Meadows

Surveyor	Area	Date
Tadburn Conservation Volunteers	Meadow Mania event – upper and lower plant survey	May 2019
S. Davey	Upper & Lower plant survey	April 2008
I. Ralphs	Ancient Woodland Survey	11/07/1996
I. Ralphs	Amenity Area	11/07/1996
I. Ralphs	Tadburn Meadows	11/07/1996
J. Levitton	Whole Site	19/05/1996

The dominant flora are described with reference to the habitats outlined above (subsection 1.2.2.1), with the area covered by these habitats outlined in Appendix I (Map 6).

i) Old Hedge

The line of mature oaks along the west boundary of the site was clearly once a hedge marking the boundary of the site. At present it is quite sparse with a few hawthorn bushes and the base consists of rough grass with nettles, which has been cut on rotation to encourage a wider range of plant communities.

ii) Wet Woodland Dominated by Willow and Alder

Some of the area is dominated by willow, which is of similar age, with a few young oaks, some of which may have been planted, others appear to be self-sown. Currently the wood is dense, with minimal light reaching the woodland floor. The result is very little ground flora, except for a few patches of brambles where conditions allow. Between the woodland and the amenity grass area is a strip of rough grass, which provides a 'woodland edge' habitat and is frequented by a variety of insects, small mammals and birds.

A few areas of the wooded area are much wetter and mature alders are the dominant species, currently these are in a high density stand. There is currently holly and laurel present in this area, several patches of brambles and a few planted ornamental trees. The abundant broad-leaved buckler ferns and remote and pendulous sedges are an attractive feature of this area. Other areas dominated by semi-mature alder are generally in poor condition, being dense and shady with a poor understorey composed mainly of bramble.

iii) Stream banks

The stream banks near the amenity grass area are heavily shaded, with alders, nettles, Himalayan balsam and hawthorn growing under mature oaks. Some areas are very overgrown with brambles and climbing plants. Further upstream the banks are less shaded and the trees comprise of mature alders, oaks as well as hawthorn, ash and hazel. The ground flora is made up of bramble, wood avens, rough meadow grass, garlic mustard, giant fescue, cock's foot and Yorkshire fog.

iv) Tadburn stream

The stream, known locally as Tadburn Lake, is a tributary of the River Test, which is a statutory main river and is therefore the responsibility of the Environment Agency. The stream is generally fairly slow flowing but this can rapidly change depending on the amount of rainfall. Due to the fact that this stream is a main river and flows through Romsey, the major concern to the Environment Agency is as a potential flood risk and advice should be sought before any changes to the stream occur. To the north of the site, a wall protects houses in the local vicinity from the stream by canalising the water through this location and thus alleviating potential flooding.

The streams gravel substrate and varying velocity can in places lead to siltation, however this may be short lived due to the dynamic nature of the channel. The route of the stream through Tadburn Meadows appears to be mainly natural with some alterations occurring particularly where the footbridges have been erected.

Due to the shading and the frequent spates throughout Tadburn Meadows there is very little in the way of macrophytes (macroscopic plant life) occurring in the stream, with the main in-channel vegetation consisting of water moss. The community of invertebrate

species within the stream therefore consists mainly of detritivores (organisms that break down organic waste material).

Annual school visits to the site, during which students take part in kick sampling surveys within the stream, have provided a long term method of monitoring the chemical and biological condition of the stream. Results indicate that the stream is in good condition, with numerous clean water indicator species being recorded, for example dragonflies, banded demoiselle and freshwater shrimp (see Appendix V for full survey results). School visits were initially led by Roslyne Ecological using a Wild Trek trailer facility alongside Countryside Officers, until 2015. Since then, it has been led by the Countryside team within Test Valley Borough Council. This ongoing monitoring of the aquatic invertebrates follows on from surveys initially carried out in 2003 by Roslyn Ecological.

v) Wet Meadow

This habitat has been enlarged and maintained through scrub clearance as well as an annual cut and collect regime to enhance to the diversity of the meadows. Ongoing management is required to ensure this area remains open with specific attention being paid to the management of bracken and bramble.

One species that was dominant is the tufted-hair grass (*Deschampsia cespitosa* – National Vegetation Classification (NVC) categorisation of MG9), which has become less frequent over time due to positive annual management. The meadows now benefits from other plant species include Yorkshire fog, meadow foxtail, meadowsweet, oval sedge, greater bird's-foot trefoil, rough meadow-grass, common valerian and purple moor-grass (see Appendix II).

vi) Amenity Grassland Sward

Grassy glades that are regularly managed for amenity purposes are dominated by *Lolium perenne* (perennial ryegrass) and are categorised under NVC as *Lolium perenne-Plantago major* (greater plaitain) grassland (MG7). Some of these glades have recently been managed less intensively, to allow full development of grassland species. This has allowed a more attractive meadow sward to develop consisting of herbs such as creeping buttercup, knapweed, bird's-foot trefoil and devil's bit scabious.

Two areas of amenity grassland, adjacent to the formal play area, were improved for biodiversity through the installation of wildflower turf. The turf has now successfully established, and features a diverse range of species including Ox eye daisy (*Leucanthemum vulgare*), Field scabious (*Knautia arvensis*), Birds foot trefoil (*Lotus corniculatus*) and Red campion (*Silene dioica*).

1.2.2.3 Fauna

A number of surveys have been carried out at Tadburn Meadows focussing which focus on the fauna present (Table 2).

Table 2: Fauna surveys carried out at Tadburn Meadows

Surveyor	Area/Species	Date
Dr. J. Denton	Invertebrate survey	September 2008; 2019
Roslyn Ecological	Freshwater invertebrate survey	2003-2015
Countryside Officers	Freshwater invertebrate survey	2015 - present
Tadburn Conservation Volunteers	UK Butterfly Monitoring Scheme	2005 - present
Environment Agency	Fish survey	Ongoing
Local volunteers	Bird survey	1996/1997; 2019
Local volunteers	Annual bat survey	2013 - present

1.2.2.3.1 Invertebrates

The site has an abundance of invertebrate life both aquatic and terrestrial. Data on the aquatic species has been collected since 2003, first by Roslyn Ecological and later by Countryside Officers during the annual school visits programme (Appendix V).

In 2005 a transect was established to record butterflies using the site. With the help of local volunteers the data gathered has enabled Test Valley Borough Council to ensure that current management is having a positive effect on the site for conservation. All data collected is also submitted to the UK National Butterfly Monitoring Scheme to assist in monitoring butterflies locally as well as nationally (Appendix IV).

A comprehensive Invertebrate survey covering micro habitats around the site was carried out by Dr Jonty Denton in 2008 (see Appendix V) with subsequent surveys carried out in 2019. Ad-hoc surveys have also been conducted as part of Wildlife Discovery days (see Appendix V) which encourage the local community to discover more about their local nature reserve. Although these are not fully comprehensive surveys, they are still valuable as an interim update on the condition of certain species, and as a citizen science exercise.

1.2.2.3.2 Fish

Sporadic surveys are carried out by the Environment Agency, focussing specifically on fish species. In the 2018 survey of the Tadburn stream, bullheads (*Cottus gobio*) and brown trout (*Salmo trutta*) were the most prominent species, with brook lamprey (*Lampetra planeri*), perch (*Perca fluviatilis*) and stone loach (*Barbatula barbatula*) also recorded just downstream of the reserves boundary. One European eel (*Anguilla anguilla*) was recorded upstream of the reserve during this survey. Data from surveys undertaken across the Test and Itchen catchment are held by the Fisheries Team within the Environment Agency. Bullheads and brook lamprey have been observed during kick sampling as part of the annual school visits programme, both of which are indicative of reasonable water quality. Bullheads are listed by the UK Biodiversity Group as a species of national conservation concern, while brook lamprey are protected under the EU Habitats Directive. Other species recorded within this stretch of stream historically have included chub (*Squalius cephalus*) and stickleback (*Gasterosteidae spp.*). It is anticipated that further fish surveys will be conducted in the future by both the Environment Agency and Countryside Officers as part of ongoing ecological surveys.

1.2.2.3.3 Amphibians & Reptiles

Common frogs (*Rana temporaria*) frequent the site using seasonal pools and ditches for spawning, as early as February. The wet scrub habitat here should be retained to conserve them. It is anticipated that future surveys will be carried out to establish presence and absence of reptiles, these surveys could involve local volunteers, university students as part of their dissertation and/or local conservation groups such as the Hampshire and Isle of Wight Amphibian and Reptile Group (HIWARG).

1.2.2.3.4 Birds

The area is rich in bird life providing necessary nesting sites, perching and cover points in the copious amounts of scrub and woodland present. An out of date monthly bird survey was carried out by a local volunteer (see Appendix III) from 1996 – 1997. Ad hoc bird surveys have been conducted in subsequent years, during community events such as Wildlife Discovery Days, Bioblitz and Dawn Chorus guided walks. These have subsequently been added to the bird species list for the site (Appendix III).

More bird surveys will need to be carried out in the future and it is hope that with community engagement future surveys can be conducted by volunteers. Volunteers in the past have erected bird boxes throughout the site. These should be retained and maintained to encourage more nesting at the site. New nest boxes could be installed to encourage more birds to visit the site.

1.2.2.3.5 Mammals

There is potential that Water Voles may be present along the stream. Surveys could be conducted to establish the presence or absence. Small mammal surveys should also be carried out to establish presence and absence using longworth traps, this project could be carried out by students studying for a degree.

Tadburn Meadows provides not only good foraging habitat, but also potential roosting opportunities for various bat species. Since 2013, local volunteers have conducted an annual transect using bat detecting equipment, and have so far recorded 5 species including common (*Pipistrellus pipistrellus*) and soprano pipistrelle (*Pipistrellus pygmaeus*), noctule (*Nyctalus noctula*), daubentons (*Myotis daubentonii*) and more recently serotines (*Eptesicus serotinus*) (Appendix VI). Species recorded during the annual bat walk event are also noted and added to the species list for the site.

1.2.3 Cultural

1.2.3.1 *Land Use*

There is recorded information as to the previous land use of Tadburn Meadows. Prior to the urbanisation of the surrounding area, the land was part of two estates (see Section 2.2.1.5). Therefore it is possible that, prior to ownership by Test Valley Borough Council, the land was used primarily for grazing.

1.2.3.2 *Past Management in Nature Conservation*

No management specifically for nature conservation occurred until 1995, when TVBC, Hampshire and Isle of Wight Wildlife Trust along with the Environment Sub-Committee of

the Romsey and District Society, began organising monthly volunteer work parties. Work has included improving access and scrub clearance. In 2004 a group of local people set up 'The Tadburn Conservation Volunteers' to assist with the management of the site and have carried out practical and promotional events throughout the year to raise the profile of the site, encouraging people to engage with their local environment.

1.2.3.3 *Public Interest*

i) Through Route

The site is in the middle of Halterworth housing estate. The proximity to residential dwellings and ease of access is reflected in the varied and extensive use of the site by local people. There are a few paths through Tadburn Meadows which lead to housing estates on three sides of the site. The fourth side of the site is separated from another housing estate by a railway line.

ii) Recreation

With the close proximity of the residential dwellings to the reserve, the level of public interest in recreational use of the site is obviously high.

Many residents use the site for informal recreation, including cycling and dog walking. There is a children's play area and amenity grassland which is used for informal recreation. The majority of the local residents value the wildlife at the reserve, and other keen parties are also interested in helping to keep records of other species, such as bats and flowering plants. With the recent rise in awareness of the mental and physical benefits of public open green space, the recreational use of this site is likely to increase.

iii) Wildlife Interest

Tadburn Meadows has plenty to offer those who are interested in wildlife. As outlined previously, there is a diversity of habitats and therefore plant and animal species of interest, including several protected species such as bats. Wildlife Discovery days are hosted every year to enable the local community to learn more about the flora and fauna which inhabit the site.

Some people who visit the site are keen on nature, many of them being of an ornithological disposition and are therefore opposed to any disturbance to the site especially in terms of coppicing. Therefore, the long term benefit of coppicing must be stressed to these people before any management strategies are carried out.

1.2.4 Ecological Relationships and Implications

The alder and other species associated with the waterlogged soils of Tadburn Meadows depends on the continuing existence of unpolluted soil for optimal growth. Leaky dams have been constructed and will be maintained to ensure the soil remains waterlogged.

Over the last five years the removal of non-native species such as sycamore and Himalayan balsam has allowed native species to regenerate in places. In time, with the continuing management, will soon return to the historic ecological structure.

The coppicing of the alder that has been carried out over the last five years has improved the diversity of the ground flora and with continuing management in this manner will allow the site to become more diverse as more light reaches the wet woodland floor. The increase of wild flowers has led to an increase in the number of insects, especially butterflies and moths that use these plants as a food source.

The cutting of grass swards at differing heights along the paths and within the meadows has favoured many species of insects. This has also favoured the native plant species as the cuttings have been removed which in turn has lowered the nutrient level, leading to less vigorous competition from more rank species.

2. EVALUATION AND OBJECTIVES

2.1 Conservation Status of the Site

Local Nature Reserve (LNR) status was achieved for Tadburn Meadows in 2002. Tadburn Meadows is also classified as a SINC (Site of Importance for Nature Conservation).

2.1.1 The Planning History of the Site

The Test Valley Borough Council local plan (June 1992) identified Tadburn Meadows as an 'important open area and landscape feature'.

In the Test Valley the Borough Council Adopted the Local Plan Deposit (2006) which has identified Tadburn Meadows as 'an important open area'.

2.1.2 Operations Likely to Damage the Site

- Cultivation, including ploughing, rotovating, harrowing and re-seeding without ecological guidance
- Changes in the revised (see section 3) mowing or cutting regime.
- Spraying of pesticides except where necessary i.e. the treatment of bracken.
- Application of manure, fertilisers and lime.
- Dumping, spreading or discharge of any materials.
- Burning.
- The release into the site of any wild, feral or domestic animal, plant or seed.
- The killing or removal of any wild animal, including pest control. 'Animal' includes any mammal, reptile, amphibian, bird, fish or invertebrate.
- Significant changes to the hydrology of the site.
- Modification of the structure of water courses, including their banks and beds.

- The changing of water levels and tables and water utilisation including irrigation, storage and abstraction from existing water bodies and through boreholes.
- Extraction of minerals including peat, shingle, sand and gravel, topsoil, subsoil, chalk, shells and spoil.
- Storage of materials.
- Erection of permanent or temporary structures or the undertaking of engineering works, including drilling.
- Use of vehicles or craft likely to damage or disturb vegetation or fauna.
- Modification of natural or man-made features, clearance of boulders, large stones, loose rock.
- Removal of geological specimens, including rock samples, minerals and fossils.
- Increasing the size of the recreational area.

2.1.3 Site Definition and Boundaries (see Appendix I Map 2)

The site covers 5.35 hectares (13.0 acres). The northern boundary runs parallel to a railway line, which runs between Romsey and Eastleigh. The site forms a rectangular shape and runs from Eight Acres to Seward Rise, a cul de sac off of Halterworth Lane.

2.2 Evaluation of Features

2.2.1 Evaluation

2.2.1.1 Size

The wet meadow, although fairly small in size, is of great benefit to wildlife, and further management will ensure this value is increased.

The grassy glades found alongside the main path and between the open amenity area and willow dominant woodland are also only small segments. If managed properly and left to develop throughout the year, they could provide an interesting habitat for grassland flora and fauna.

The alder and willow dominated woodland provides a considerable scope for introducing a mixed age stand by continuing coppicing this would provide a greater wildlife interest by increasing diversity to the woodland understorey.

2.2.1.2 Diversity

There is a wide diversity of habitats including dry willow scrub dominated woodland, alder dominated wet woodland, a gravelly stream and wet meadows.

The stream is heavily shaded by alder and hazel coppice and is inherently poor in macrophytes. Although invertebrate diversity remains good this could be due to the number of detritivorous species inhabiting the stream. This habitat has been improved by

rotational coppicing of alder and hazel along the river bank, however continued rotational coppicing will be required in the future to further enhance the stream habitat.

2.2.1.3 *Naturalness*

Most of the site has been extensively managed in the past and was once grazed rush pasture land, although the alder Carr to the north of the stream appears to be more natural in origin. This is thriving in a very waterlogged area of the site which would have been of limited use to the farmer. Since the site has been owned by Test Valley Borough Council, it has been managed for Nature Conservation and recreation, and during this time the area has had chance to develop semi-natural willow and alder dominated woodland throughout Tadburn Meadows.

2.2.1.4 *Fragility*

The trend is for seral succession to rankness, scrub and eventual woodland over much of the site. This means that constant management is necessary to retain the features of interest. Scrub encroachment and stands of scrub centrally is threatening the wet Meadow itself and must not be allowed to encroach any further. Where possible, much of the scrub and areas of bracken should be cut back to encourage increased development of the meadow area.

2.2.1.5 *Recorded History*

Until 1944, the area south-east of Tadburn stream was part of the Highwood Estate (see Appendix I, map 4). On the 31st August 1944, the Highwood Estate was sold at auction in various lots. Halterworth Farm (Lot 2) was sold to Edward John Coe of Bishopstoke, comprising approximately 101.3 acres. In November 1972, Halterworth Farm comprising 78 acres was sold to F. Goulden and Sons Ltd. In July 1980, approximately 21.4 acres, forming part of the Farm, were sold to Loyalhurst Ltd. Test Valley Borough Council acquired this land in January 1982 and in March 1983 sold 16.2 acres for development. The land remaining forms part of Tadburn Meadows and has been referred to in schedules as pasture land.

Until 1963, the area north-west of Tadburn stream was part of Little Woodley Farm comprising 33 acres. This in turn, was part of the Harefield Estate (see Appendix I, map 5). In 1963, 6 acres of this land were sold to Albert Brian Dalley of Eight Acres Farm. On the 13th July 1983 this land was sold to Test Valley Borough Council and now forms part of Tadburn Meadows.

2.2.1.6 *Position in Ecological Unit*

The site is part of the River Test Catchment. This site is an isolated unit surrounded by residential dwelling although another small fragment of wet meadowland remains adjacent to Halterworth Lane, north of the railway line and north east of Tadburn Meadows itself. The stream also flows from Emer Bog Nature Reserve which is also a Special Area of Conservation (SAC) (managed by the Hampshire and Isle of Wight Wildlife Trust) near North Baddesley.

2.2.1.7 *Potential Value*

The site has improved with on-going management. Species diversity has shown an increase in recent years particularly the wet meadowland has started to become more species rich with the reduction of rank species. The isolation of the site may limit any opportunities for re-colonisation from other unimproved sites in the area.

The site has been used as environmental educational resource with local schools attending environmental learning based activities during the summer term. Other public open day events hosted on this site, including Wildlife Discovery days and guided walks provide an educational opportunities for the wider community.

2.2.2 Ideal Management Objectives

- 1) To maintain and enhance the habitat diversity.
- 2) To conserve and enhance the species richness of the wet meadow.
- 3) To enhance the diversity of the woodland glades alongside the footpaths by restricted mowing.
- 4) To restore and enhance the alder and willow wet woodland in terms of increased diversity and introducing mixed age stands through coppicing.
- 5) To restore and enhance the long swards and scrub along edges of woodland areas especially the zone between the willow woodland and amenity grassland.
- 6) To maintain natural boundaries and restrict access into vulnerable areas.
- 7) To keep ditches fairly clear but also ensure that they do not become too free draining.
- 8) To encourage, provide and inform for public enjoyment including appropriate interpretation, circular walks, picnic areas and nature walks.
- 9) To protect the character and amenity value of Tadburn Meadows.
- 10) To control and improve existing public access for informal recreation.
- 11) To maintain a balance between recreational demands and conservation.
- 12) To encourage active participation of local people in caring and managing Tadburn Meadows.
- 13) To ensure proper organisation and co-ordination of volunteer tasks.
- 14) To encourage positive use of the site as an environmental education resource.
- 15) To inform local people and interested organisations about Tadburn Meadows and its long term management.
- 16) To continue and establish new monitoring programs at Tadburn Meadows through local volunteers.

2.3 Factors Influencing Management

2.3.1 Natural Trends

The main trend is for seral succession from rankness through scrub to woodland and eventually complete cover with associated loss of species albeit with the gain of others. The occurrence of dense woodland will eventually dry out the wetland areas due to increased absorption and transpiration. This could lead to the loss wet woodland habitat and associated ground flora species such as the rushes and sedges. Many of the trees at Tadburn Meadows are of even age, and lack age structure. Currently there is limited natural regeneration present to replace the mature trees, although coppicing of alder and willow trees could improve the habitat. Tadburn Meadows is managed on a limited budget and an increase in funds or a capital payment could assist tree works taking place.

2.3.2 Human-induced Trends

Excessive recreational use will disturb wildlife and could damage habitats. Litter, dog-fouling and the dumping of garden refuse around the perimeter could also be considered a potential problem.

2.3.3 External Factors

The wet woodland relies on regular flooding to provide the correct conditions for the present habitat. Any drying out at the site could prove detrimental. This could perhaps be controlled by ensuring that the artificial ditches are not too free draining.

Other problems include past fragmentation of the site from surrounding areas, due to housing-development. The LNR designation should help to protect the site in future years.

Also there is the possibility of pollution due to urban run-off, eg. drains from the surrounding housing estates. Plus the possibility of pesticide leaching from the railway line, due to their regular spraying practices, and the wet nature of the woodland.

Dog walking, a significant usage of the site, can also lead to disturbance especially within the stream and meadow areas where increased poaching of the river bank could occur, particularly with dogs off the lead.

2.3.4 Obligations

Before any trees are coppiced, those with Tree Preservation Orders (TPOs) should be defined (see Appendix I, Map 5). If these trees need to be coppiced then permission should be gained from the local planning authority. For felling which is likely to exceed 5 cubic metres in any one quarter a felling licence will be required from the Forestry Commission.

The perimeter of Tadburn Meadows should retain its woodland screen to act as a buffer and to provide privacy to the surrounding housing estates. Also any new conservation management proposals need to take into account that the site will still be maintained as an amenity area.

The line of trees immediately adjacent to the railway line in compartments **2,3,4,6 and 9** should be coppiced in rotation due to their proximity to the railway line. Most are fairly

mature alder or willow coppice. This work should be carried out by contractors as sensitively as possible, from October to March.

2.3.5 Legal Constraints

These include TPOs, any overhead cables, public rights of way and any management that could affect the adjacent railway line. Also main river access by the Environment Agency.

2.3.6 Resource Implications

Tadburn Meadows Local Nature Reserve is owned and managed by TVBC who fund the maintenance of the site, including the mowing, litter clearance etc. The work outlined in this plan includes proposals for work by both contractors and volunteers.

i) Management prescriptions to be carried out by contractors (see table 11)

This work is financed by TVBC, who currently fund all the management on the site. Potential grant funding should be considered to increase the habitat value of the site.

ii) Management prescriptions to be carried out by volunteers (see table 12)

This work is funded by TVBC, where costs are incurred. This includes removal of vegetation from scrub clearance work parties and rubbish from litter picking. The volunteers currently provide their own tools, supplemented by TVBC where required. It is proposed that TVBC will continue to support the volunteer programme.

2.4 Operational Objectives and Management Options

2.4.1 Rationale for Proposed Management Options

The main aim for Tadburn Meadows is to conserve and enhance the site for nature conservation and recreation. Tadburn Meadows is not only an important site locally but also nationally, as areas like this in recent years have come under increasing pressure from intensified agricultural practices and development. The need for preservation of these sites for wildlife, and for the enjoyment of the local residents cannot be overstated. Increasing public awareness of the site will help to ensure its long term protection.

To achieve this goal, Tadburn Meadows will be actively managed to benefit conservation and public recreation. Historic management has shaped the character of the wet woodland with techniques such as coppicing of the alder, a traditional method of wet woodland management that has its origins in prehistory. Coppicing has a major benefit to conservation because the periodic cutting of the stools allows light to reach the woodland floor and thereby encourages light demanding wild flowers to grow.

Non-native species present on the site, particularly Himalayan balsam, will be continually removed and monitored each year. Invasive species such as bracken and bramble, if left unmanaged, will outcompete more sensitive flora and shade out light demanding species leading to a loss of diversity.

2.4.2 Outline Objectives and Management Prescriptions

Long term aims for this site can be categorised into 4 Management Options:

- A – Active Conservation Management
- B – Monitoring and Research
- C – Education and Access
- D – Administration and Public Relations

2.4.2.1 The Conservation of Features

Table 3: Management options and outline prescriptions for the conservation of features.

Compartment Number	Feature	Management Option	Outline Prescription
1	Hedge	A	Strim areas of rank species on rotation in autumn.
2	Willow Scrub	A	Coppice 10% of trees on rotation every winter. Allow woodland edge development. Bramble control in winter.
3	Alder Woodland	A	Coppice (10% trees) on rotation in winter. Bramble and laurel control in winter.
4	Ditch	A	Retain surrounding trees except sycamore. Clear leaf litter from ditch when required.
	Stream	A & B	Maintain light levels through ongoing alder and hazel coppicing on rotation. Ongoing monitoring of condition through freshwater invertebrate surveys.
5	Stream banks	A & B	Control of scrub encroachment and invasion of Himalayan balsam.
6	Wet Alder/Willow Woodland	A & B	Non-intervention. Review every 10 years. Maintain water levels. Ongoing removal of Himalayan balsam and other non-natives.
7	Tree line along stream bank	A	Remove Himalayan balsam and any sycamore.
8	Ditch	A	Clear ditch (leaf litter)
9	Alder (Wet to Dry) woodland	A	Coppice 10% on rotation. Bramble control in winter.
10	Grassland	A	Mow once a year (late August), remove cuttings to encourage grassland species development. Retain successional species between meadow and woodland.
11	Stream banks	A & B & D	Tree safety works conducted as required. Monitor light levels reaching the stream and conduct full tree survey every 5 years.

Compartment Number	Feature	Management Option	Outline Prescription
12	Alder woodland	A, B & D	Remove Himalayan balsam and any sycamore. Introduce a coppicing regime, coppice small blocks on rotation to allow more light to reach the stream. Monitor understory and woodland density.
13	Grassland and Scrub	A	Mow 50 %of the grassland in late August. And the other half of the meadows the following year. Remove cuttings. Scrub clearance. Cut back scrub encroachment in autumn.
14a	Alder and willow	A	Coppice 10% annually on rotation, removal of non-natives, e.g. laurel, and control of scrub boundary to prevent encroachment onto neighbouring wet meadow habitat.
14b	Grassland	A	Cut and collect grassland once a year (late August), to allow grassland species development including cuckoo flower.
15	Bracken and scrub	A	Cut back re-growth of bracken and scrub during late August. Remove arising's where possible.
16	Alder and Willow	B	Retain trees as a barrier, unless tree safety works required. Brambles retained as a deterrent. Monitor woodland density, tree age for future coppicing schemes.
Whole site	Plant species	B	Monitor diversity of plant species including wildflower species such as cuckoo flower.
	Butterflies	B & D	Continue to involve and support local residents with butterfly transects continue to compile data for the UK Butterfly monitoring scheme.
	Dragonflies and Damselflies	B & D	Initiate transects to gather base line data. Involve local residents and other local naturalists.
	Aquatic invertebrates	B & D	Survey and record aquatic invertebrates from the annual school visits programme. Monitor long and short term trends.
	Birds	B & D	Conduct a Common Bird Census (CBC) with assistance from British Trust for Ornithology (BTO) and local residents. Record and note species seen by local residents and Countryside Officer.

Compartment Number	Feature	Management Option	Outline Prescription
Whole site	Mammals	B	Record and note species seen by local residents and Countryside Officer to Compile database.
	Other invertebrates	B	Survey area for invertebrates (e.g. during Wildlife Discovery Days)
	Public Access	C & D	Maintain permissive paths through site.
	School involvement	C	Involve local schools in projects on site. Create teachers pack to facilitate independent visits. Facilitate annual school visits programme (river sampling)
	Control of invasive species	A & B	Control where appropriate or possible
	Increase public awareness	D	Through interpretation boards, talks, local press and work parties.

2.4.2.2.1 Involvement with Other Parties

Good relations with all users should be maintained, including nature lovers, those partaking in informal recreation and local residents who may not visit the site but are concerned for its future. It is important to make people aware of any large scale management operations that are undertaken. This can be achieved by using the poster holders in the interpretation boards and putting press releases in the local paper.

2.4.2.2.2 Public Access

Public use should be monitored to ensure sufficient information is available to develop appropriate visitor management, especially in terms of developing ideas that can deal with vandalism that occurs at the site.

2.4.2.3 *The Provision of Facilities*

2.4.2.3.1 Paths

Permissive paths cross the site (Appendix I, Map 3), providing a circular walk around the site and links to other permissive/formal footpaths which lead to other amenities, such as the town centre and local schools. One formal foot path also crosses the site along the southern most boundary, which will need to be maintained for access.

2.4.2.3.2 Cycle Route

No formal cycle route has been established through Tadburn Meadows, however the permissive paths are built and maintained with cyclists in mind. Paths are therefore maintained at 2.4m wide, with the surface of the track finished with a fine limestone gravel.

2.4.2.3.3 General Litter and Dog Litter Bins

Both are present on site and general litter bins can also be used for dog litter. These are well maintained and regularly emptied. More emphasis should be placed upon the need for dog owners to dispose of their dog's excrement in the bins.

General litter picks are regularly carried out by the Environmental Services Team, more frequently in the summer due to increased usage of the site. More emphasis should be placed upon people disposing of their litter in the existing bins provided, with fines imposed for fly tipping where possible.

2.4.2.3.4 Informal Play Areas

The amenity grassland should be maintained as it is, although the width of the successional scrub zone between the pitch and adjacent woodland has been increased and enhanced using wildflower planting for the benefit of wildlife. The play area should be well maintained and regularly checked for safety and vandalism.

2.4.2.3.5 Interpretation

Information boards have been placed at the main entrances to the site. Interpretation boards at strategic points, for example by a coppiced area to explain the reason behind coppicing, could provide information as to the management objectives at Tadburn Meadows.

3. PRESCRIPTIONS

This section describes the management objectives in detail and ascribes specific prescriptions to achieve them. The reserve has been divided into compartments that largely relate to either habitats or areas requiring different management.

Map 7 shown in appendix I and section 2.4.1.1 splits up the site into designated areas or compartments, which are numbered for ease of identification. Each number represents a different compartment, and these numbers will be used in this prescription section to help pinpoint the exact location for each management proposal.

3.1 Compartment Principles and Prescriptions

In this section, management options applicable to each habitat type are specified, along with the various compartments they apply to.

Management Operation No.1: Alder/Willow Woodland

The aim of this management option is to introduce and maintain a long-term coppicing regime within the woodland areas. This will create a mixed age stand and decrease tree density allowing the development of a more diverse ground flora. The coppicing regime needs to be selective and designed so as to fulfil a number of roles from ecological benefit to public interest. Thus, a standard rotational coppicing regime throughout the whole site will not suffice. Any coppicing should occur on rotation, by only coppicing a small block of woodland, or selected trees, in any one year. It is suggested that coppicing of alder and willow should occur on a ten year rotation, to allow complete regeneration of coppiced

trees, although this should be monitored and amended depending on the speed and success of regeneration which may vary in each compartment.

Areas of woodland that should be coppiced are **2, 3, 9, 12b and 12c** (see map 7). Each of these areas (except **12c**) are too large to be coppiced at one time and are therefore divided into smaller block sizes designated by lower case letters, e.g. **2a** (see map 7). The exact way in which these areas are to be coppiced is described later. A screen of trees should be retained around the perimeter of the site to act as a barrier between Tadburn Meadows and the surrounding housing estates. Generally, only alder, willow and hazel should be coppiced.

The whole site should be fully surveyed every 5 years, unless otherwise specified, and any trees in need of remedial work in the interest of safety should be prioritised. It is suggested that all the trees along the railway fence line (cpts, **2,3,6 & 9**) should be surveyed and works carried out more regularly as required.

Any oak should be retained, except where it encroaches on grassland habitat (e.g. compartment **13**), which will fall under the management operation no. 2 for Wet meadow habitat. Ash dieback has been recorded on site, and has therefore compromised the integrity of ash species. The condition of these trees should be monitored and assessed annually, with subsequent health and safety works conducted where required.

Any mature trees that are covered in ivy should be retained where feasible as they have great habitat value. But it must be insured that they pose no risk to the public. For example close to paths, houses or the railway running alongside the site. In such cases, climbing plants will be severed at the base, not removed, to allow plant to die off naturally and therefore continue to provide habitat value.

Any sycamore trees present should be removed as this species is considered invasive and can eventually out-compete the other trees present. Also, any ornamentals, garden escapes or other inappropriate species present throughout the wooded areas should gradually be removed, and stumps painted with a glyphosate based herbicide. These include laurel, horse chestnut and Himalayan balsam. Much of this work could be carried out by local volunteers as many of these plants are only small trees or shrubs.

Area **6** should be largely non –intervention, apart from trees adjacent to the railway line, which will be surveyed and action taken as necessary. This piece of wet alder woodland located between the two drainage ditches on the northern side of the site is fairly diverse and characteristic of mature alder habitat. Any intervention may damage this locally rare piece of habitat and it therefore should be allowed to continue with its natural processes.

The mature alder trees along the ditches in areas **4** and **8** should also be retained unless some require work in the interest of safety. These trees provide a screen between the amenity area and the more extensive nature conservation area. The trees located on the northern stream bank (areas **5, 7** and **11**) should also be retained where possible.

Area **12**, along the southern bank of the stream, should be managed carefully. Which could be coppiced in year 1, as an experimental block, to determine whether the increased light levels reaching the stream benefits its ecology. If it is determined that there is no benefit then the trees should be allowed to regenerate and not coppiced again. If it is determined that coppicing does benefit the stream's ecology, then the whole non-intervention aspect of the management proposal along the stream banks, should be

reviewed. This could lead to the introduction of areas **12a,b,c** and **d** being added to the 10 year coppice rotation.

Areas **14a** and **16** should be maintained as they are where possible. In terms of conservation value, they consist mainly of alder/willow scrub, which can be found elsewhere on the site. These areas provide a valuable screen between the site and the adjacent housing estates. Health and safety works may be required adjacent to boundaries and permissive paths. As previous tree failures have indicated, these areas may benefit from a long term coppicing regime.

Coppicing regime

Coppicing ideally should be carried out between October and March. This ensures that there is minimal disturbance to wildlife present. Before any significant coppicing can commence a felling licence may be required from the Forestry Commission if areas of timber to be felled are larger than 5m² in any one calendar quarter. Also permission must be obtained from the Local Planning Authority before any trees are coppiced with Tree Preservation Orders placed on them (see map 5). The sections of alder and willow woodland outlined for coppicing in the previous section will be part of a 10 year rotation plan (see table 4 below).

Table 4: 10 year coppicing regime for willow/alder trees within Tadburn Meadows, indicating sections to be coppiced each year (Year 1 = 2019).

Year	Coppice Area (compartment)
1	7 & 11 (Safety works)
2	All trees adjacent to railway line (2,3,4,6&9) 3b and 12c
3	9c
4	2b
5	9a
6	12a
7	9b
8	3a
9	2a
10	3b

Hazel trees within these woodland sections should also be included on a rotational coppice scheme. Hazel coppice will be on a 7 year rotation, as per the table below (see table 5).

Table 5: 7 year coppicing regime for hazel trees within Tadburn Meadows, indicating sections to be coppiced each year (Year 1 = 2019).

Year	Coppice Area (compartment)
1	13
2	5
3	7
4	11
5	12c
6	12d
7	14
8	13
9	5
10	7

This regime willow/alder and hazel coppicing should be repeated every ten and seven years respectively (subject to speed of regeneration) which should allow complete regeneration of the coppiced trees. Such management will increase the diversity of the ground flora and thus the numbers of invertebrates present, by increasing light levels to the understorey. Immature alder carr also provides a potential niche for a variety of epiphytes and invertebrates that are not found on mature alder. Coppicing will also increase the longevity of the trees and introduce a mixed age stand.

A screen of trees between the wooded areas and the mown areas in areas **2, 3 and 9** could be retained between the site and the railway line.

The long term benefits of coppicing need to be emphasised to local people and amateur ornithologists, who may be concerned at the initial loss of woodland habitat. This could be done by issuing a press release in the local paper prior to the commencement of management works and general on site wardening. Interpretation posters could also be used at strategic points around the site, or using the interpretation boards located by the entrances to the site, to explain the reasons and long term benefits of coppicing.

Previously uncoppiced trees can be cut low to the ground, using standardised coppicing methods, leaving just a short stump to regenerate.

Following the coppicing of a block, the regenerating trees need to be managed correctly to ensure that they develop mature substantial trunks. This management can be carried out by local volunteers or contractors. Only two or three of the most dominant regenerating shoots should be retained, with the other spindly shoots should be removed.

The understorey of most of this woodland presently consists mainly of bramble. Once a block is coppiced the increased light levels will lead to an initial surge in growth of bramble, which could potentially dominate the understorey. This can be controlled on a yearly basis in late autumn, by bramble bashing by local volunteers to try and promote the development of a more diverse ground flora. All blocks should be managed in this way apart from areas **6, 12 and 16**. Bramble in these areas will provide an effective barrier

against any damage to sensitive areas, e.g. ground poaching by dogs on stream banks. Bramble may be controlled in these areas where they encroach on the path, and may be subject to more heavy control periodically.

Table 6: Summary of coppiced woodland management

Prescription	By Whom	When
Coppicing	Contractor/Countryside Officers/ Environmental Services team	Oct-March (see table 4 & 5)
Regeneration management of coppice	Volunteers/Contractors/ Environmental Services team	One or Two years after coppicing
Bramble control	Volunteers	Every year in autumn/winter
Removal of non-natives	Volunteers/ Environmental Services team (TVBC)	On a yearly basis in autumn or winter
Tree safety survey	Tree Officer	On-going
Unsafe tree management	Contractor/ Environmental Services team (TVBC)	As soon as possible

Potential uses of the cut wood

Coppiced material will be used to construct log and brash piles where appropriate, which would provide a valuable microhabitat. Larger trunks could be left in situ where safe to do so, as these will be difficult to remove, but still provide a valuable habitat as rotting deadwood. Where log piles are not feasible, coppiced material will be chipped and removed from site.

Management Operation No. 2: Wet Meadow

The piece of grassland found in areas **13** and **15** contains a diversity of flora and fauna and is therefore extremely valuable in terms of nature conservation. The assemblage of fauna species varies between the two meadows, mainly due to the different levels of moisture in the soil and the previous management strategies adopted in each section. Area **13** presently contains the most valuable segment of grassland and the management of this area will initially be different to area **15**.

Management of Area 13

To retain the meadow habitat, the nutrient quality of the soil needs to remain low. This favours desirable grassland species but is not so suitable for rank species such as bramble and scrub. To accomplish this, the dead or dying plant material needs to be removed at the end of each season. Thus, during the period of late July to early August the meadow needs to be cut, using an Allen-scythe or similar machine. The cut material must then be raked off and removed to retain the low nutrient level of the soil. Mowing should start in the centre of the meadow working outwards, to enable invertebrates move to the margins of the meadow. Cut and collection occurs once a year, with late August being the most desirable time as it will reduce the dominance of rank grasses.

Previous scrub management (e.g. willow and oak) has been conducted to extend the meadow, with these areas requiring ongoing maintenance to prevent scrub habitat encroaching. Further extension of the meadow habitats would be desirable in the future.

Scrub should be removed working out towards the perimeter, whilst still retaining a screen of trees between the site and the adjacent housing estate. This work should be carried out between October and March, outside of nesting bird season.

Some of the scrub clearance can be carried out by volunteers although the larger trees may need to be removed by contractors. Cut stumps should be treated to inhibit regeneration by painting a Glyphosate based herbicide onto the stumps. This in the long term should decrease the work load, as contractors or volunteers will have to return every few years to untreated coppice stools. (N.B. some re-treatment may be required in the following years.)

Management of Area 15

This area was once rough grassland, with bracken and scrub encroachment, as in area 13. In an attempt to return this area back to wet meadow habitat, the Tadburn Conservation Volunteers have knocked back the bracken and encroaching scrub. This management has proved effective, and has had a positive effect on this area. The bracken re-growth has been less vigorous than before, and has therefore allowed the reappearance of some desirable grassland species. To continue this positive trend, bracken management needs to continue along a similar vein.

It is advised that contractors beat, crush and roll the bracken, rather than cut it, in late June to early July (avoiding doing it on wet ground). After employing this method it is recommended that the bracken should be sprayed with a herbicide such as Asulox or equivalent by a contractor. These joint methods should be repeated until the bracken is completely eradicated, which should lead to the re-establishment of rough grassland.

Table 7: Summary of wet meadow management, Year 1 being 2019.

Prescription	By Whom	When
Cut (from inside, working out) and collect half of area 13	Environmental Services team (TVBC)	Yr1 and every other year, in late July to early August
Cut (from inside, out) and collect other half of area 13	Environmental Services team (TVBC)	Yr 2 and every other year, in late July to early August
Extend meadow by removing scrub out towards perimeter	Environmental Services team (TVBC)/volunteers	Every year, October to March
Stump treatment of cleared scrub	Environmental Services team (TVBC)	After clearing, October to March
Beat, crush and roll bracken in area 15	Environmental Services team (TVBC)	Yearly, late June to early July
Treat bracken with herbicide	Environmental Services team (TVBC)	Every two years after beating, crushing and rolling

Management Operation No. 3: Drainage Ditches

There are two ditches found in areas 4 and 8. This area of the site is wet throughout the year and it a potential flood risk. These ditches were therefore probably designed to minimise the amount of flooding in this area. Presently the ditches are silted up and water is therefore contained in semi-permanent pools within the alder woodland. Waterlogged soil must remain if the alder woodland is to thrive and any management procedure that

disrupts the integrity of the habitat could be catastrophic. Therefore, these ditches should be retained to ensure that water can flow into the stream during times of severe flooding and reduce the risk to the local people who use the site.

One management option is to use a leaky dam within the ditch to control the flow. These would usually remain closed, to ensure that the ground remains waterlogged but could be opened during periods of severe flooding. This is therefore a reversible flow control which may benefit the woodland habitat in the long term. Bramble will be monitored and controlled in order to reduce shading and obstruction of ditches.

Table 8: Summary of Drainage Ditch Management

Prescription	By Whom	When
Remove portion of silt from ditches	Volunteers	Autumn – how often?
Maintain leaky dam in each ditch	Environmental Services team (TVBC)/Volunteers	Late Summer
Monitor and control brambles	Volunteers/Environmental Services team (TVBC)	Autumn/winter

Management Operation No. 4: Areas mown for amenity

Area **10** located alongside the main footpath through the site and area **14b** have, in previous years, been managed for amenity purposes only. This has involved the regular mowing of these areas to retain a formal grassland appearance. This mowing regime has since been adjusted to a twice annual cut and collect regime in order to gradually increase the diversity of grassland species within this area, and provide more valuable habitat for a diversity of fauna.

Area **10** is managed by grounds maintenance staff within TVBC. The cut and collect mowing regime occurs twice annually, once during March or April and again in late September to early October. Removing the cuttings will ensure that the soil quality remains poor, thus preventing the encroachment of rank species such as nettles and brambles. It is also important to ensure that the areas are not cut during a very wet period with ride-on mowers, as the ground could be churned up and rutted. This will not benefit the integrity of the habitat.

Area **14b** should be cut and raked once a year during the period of late September to early October as the cuckoo flower, present in this compartment, flowers in early spring.

The paths present in both **10** and **14b** should still retain a margin of short grass, 1m wide, either side of them to maintain open access for visitors.

Table 9: Summary of Amenity Grassland management

Prescription	By Whom	When
Area 10 cut and collected	Environmental Services team	Once a year, March-April and late September – early October
Area 14b cut and collected	Environmental Services team	Once a year, late September to early October

Management Operation No. 5: Old Hedge

The management aim is to retain the current cover between the housing estate and the nature reserve. Periodic cutting back of the hedge to maintain shape and vigour will be required, which can be carried out in winter to minimise disturbance to wildlife.

Table 10: Summary of old hedge management

Prescription	By Whom	When
Cut back sides	Environmental Services team (TVBC)	Autumn and winter
Monitor trees	Countryside Officers	Year round

Management Operation No 6: Successional zone between wood and Amenity grass area.

This zone is located between the Amenity grass area (playing field) and the adjacent alder and willow woodland (areas **2** and **3**). It provides a useful habitat for invertebrates and contains some plant species usually associated with the successional stage between grassland and woodland. A wildflower planting scheme was implemented in March 2017. A combination of wildflower turf and seed were used to plant the area between compartment 2 and the playing field. This increased the species diversity of the successional zone, providing habitat particularly for pollinators. Following the success of this first planting scheme, a second project within compartment 3b was also completed in March 2018. This will provide a greater diversity of successional flora and therefore increase the number of invertebrates such as Arachnids (spiders) and Lepidoptera (butterflies and moths). To retain this successional habitat, it would be necessary to cut and collect arisings on a yearly basis in late September to early October.

Table 11: Summary of successional zone management

Prescription	By Whom	When
Cut and collect arising's and remove from site	Environmental Services team (TVBC)	Cut and collect once annually, during late September to early October

Management Operation No. 7: Stream management

The stream running through the centre of the site will be subject to a number of management aims through the course of this next 10 year management period. Previous revetment works will be monitored and maintained, with any further revetment works to be implemented as required. Ongoing monitoring of bank erosion, caused by people and dogs accessing the river, will therefore be required through regular site inspections.

There are 3 bridges along the length of the Tadburn stream encompassed within the boundaries of the Nature Reserve. All of these will be subject to annual inspections by Countryside Officers, as well as periodic inspections by an external (health and safety) structural surveyor (every 5 years).

Table 12: Summary of stream management

Prescription	By Whom	When
Monitor bank erosion and previous revetment works	Countryside Officers	Year round, regular inspections
Bridge inspections	Countryside Officers/External contractors	Annual (Contractors survey every 5 years)

3.2 Summary of Contractor Prescriptions

As a summary of the management prescriptions outlined in section 3.1, a compilation of works to be conducted by contractors (both internal and external to TVBC) is summarised below (see Table 13). N.B. These works may be conducted by volunteers if appropriate and where a volunteer event has been scheduled.

Table 13: Summary of prescriptions to be carried out by internal (Environmental Services department) and external contractors.

Prescription	By Whom	When
WOODLAND MANAGEMENT		
Coppicing	Contractor/ Countryside Officers/ Environmental Services team (TVBC)	Oct-March (see table 4 & 5)
Regeneration management of coppice	Volunteers/Contractors/ Environmental Services team (TVBC)	One or two years after coppicing
Removal of non-natives	Volunteers/ Environmental Services team (TVBC)	On a yearly basis in
Unsafe tree management	Contractor/ Environmental Services team (TVBC)	As soon as possible
WET MEADOW MANAGEMENT		
Cut (from inside, working out) and collect half of area 13	Environmental Services team (TVBC)	Yr1 and every other year, in
Cut (from inside, out) and collect other half of area 13	Environmental Services team (TVBC)	Yr 2 and every other year, in
Extend meadow by removing scrub out towards perimeter	Environmental Services team (TVBC)/volunteers	Every year, October to
Stump treatment of cleared scrub	Environmental Services team (TVBC)	After clearing, October to
Beat, crush and roll bracken in area 15	Environmental Services team (TVBC)	Yearly, late June to early July
Treat bracken with herbicide	Environmental Services team (TVBC)	Every two years after beating
DRAINAGE DITCH MANAGEMENT		
Maintain leaky dam in each ditch	Environmental Services team (TVBC)/Volunteers	Late Summer
Monitor and control brambles	Volunteers/Environmental Services team (TVBC)	Autumn/winter

AMENITY GRASSLAND MANAGEMENT		
Area 10 cut and collected	Environmental Services team (TVBC)	Once a year, March-April
Area 14b cut and collected	Environmental Services team (TVBC)	Once a year, late
OLD HEDGE MANAGEMENT		
Cut back sides	Environmental Services team (TVBC)	Autumn and winter
SUCCESSIONAL ZONE MANAGEMENT between football pitch and woodland (2&3)		
Cut and collect arising's and remove from site	Environmental Services team (TVBC)	Cut and collect once annually,
STREAM MANAGEMENT		
Bridge inspections	Countryside Officers/External contractors	Annual (Contractors

3.3 Summary of Volunteer Prescriptions

A summary of management prescriptions to be carried out by volunteers is outlined below (see Table 14). These works may be carried out by internal/external contractors in the absence of volunteers.

Table 14: Summary of Prescriptions to be carried out by Volunteers

Prescription	By Whom	When
WOODLAND MANAGEMENT		
Regeneration management of coppice	Volunteers/Contractors/ Environmental Services team (TVBC)	One or Two years after coppicing
Bramble control	Volunteers	Every year late
Removal of non-natives	Volunteers/ Environmental Services team (TVBC)	On a yearly basis in
WET MEADOW MANAGEMENT		
Extend meadow (area 13) by removing scrub out towards perimeter	Volunteers / Environmental Services team (TVBC)	Every year, October to
DRAINAGE DITCH MANAGEMENT		
Remove some silt from ditches (areas 4 & 8)	Volunteers	Autumn
Maintain leaky dam in each ditch	Volunteers / Environmental Services team (TVBC)	Late Summer

3.4 Summary of Compartment Prescriptions

3.4.1 Compartment Prescriptions

A summary of prescriptions applicable to each compartment is outlined below, as per the detailed description of works outlined within section 3.1.

Compartment 1:

- Monitor mature oak trees
- Maintain strip of rank grassland cutting and removing 1/3 of vegetation per year after brambles have fruited to reduce vigour.

Compartment 2a & 2b:

- Coppice alder (at a height of 6"-9") and recommence on a 10 year rotation. Count stools and divide by 20 to achieve yearly cut rate.
- Remove sycamore and other non-native plant species. Control the regrowth.
- Allow stand of old willow to collapse naturally where appropriate
- Leave line of trees by railway to act as a screen
- Maintain deadwood habitat
- Cut and collect wildflower meadow habitat once annually

Compartment 3a & 3b:

- Coppice alder as per compartment **2a & 2b**
- Remove sycamore and other non-native plant species . Control the regrowth.
- Allow stand of old willow to collapse naturally
- Leave line of trees by railway to act as a screen
- Dig ephemeral ponds after coppicing has taken place
- Allow ephemeral ponds to reach successional stage
- Cut and collect wildflower meadow habitat once annually

Compartment 4:

- Remove silt accordingly to allow gradual flow of water to stream
- Maintain leaky dams to control flow
- Monitor water levels annually in ditch to ensure it is kept open and reduce risk of the path flooding

Compartment 5:

- Retain current stand of mature trees.
- Coppice hazel on 7 year rotation to increase light level of stream, all brash to be removed from site.
- Survey all trees along this boundary and monitor, work to be carried out by TVBC Tree Officer.
- Monitor river bank against erosion by dogs entering and leaving the water.
- Install and maintain bank revetment where required.

Compartment 6:

- Survey and monitor trees close to railway line in the interest of public safety
- Remove non- native species (sycamore, horse chestnut, Himalayan balsam) and treat tree stumps by painting with roundup bioactive
- Survey and monitor trees close to footpath in the interest of public safety
- Treat whole area as non intervention allow to continue with natural process, monitor and review

Compartment 7:

- Retain and monitor current stand of mature trees in the interest of public safety.
- Select suitable hazel for coppicing to increase light levels on the stream, this can be achieved by looking for stools over hanging the stream and coppicing to allow more light or coppice 1 in 3 on a 7 year rotation.
- Install and maintain bank revetment where required.

Compartment 8:

- Remove silt accordingly to allow gradual flow of water to stream
- Maintain sluice gates
- Monitor water levels annually in ditch to ensure it is kept open and reduce risk of the path flooding

Compartment 9:

- Coppice alder (at a height of 6"- 9") and recommence 10 year rotation. Count stools and divide by 10 to achieve yearly cut rate.
- Remove sycamore and control regrowth
- Allow stand of old willow to collapse naturally where appropriate
- Removal of Himalayan balsam
- Leave line of trees by railway to act as a screen and monitor in the interest of public safety
- Maintain and monitor current water level
- Continue to dig new ephemeral ponds in this compartment and allow existing ponds to develop to successional stage

Compartment 10:

- Keep areas open by cutting and removing arising's once yearly, September to early October.
- Cut back any scrub overhanging open area

Compartment 11:

- Retain current tree stand and coppice hazel on rotation to increase light level in stream.
- Keep areas open by cutting and removing arisings once a year, late August
- Install and maintain bank revetment where required.

Compartment 12:

- Maintain trees near paths in the interest of public safety.
- Area 12b, 12c which is a mix of alder and willow should be coppiced to increase light levels on stream.
- Rotational cutting of bramble. Bramble within areas 12a – 12d should be cut on rotation to create a varying age structure of bramble and creating open ground allowing sensitive plants to colonise.

Compartment 13:

- Cut meadow and removing arisings once a year, during late August to reduce *Deschampia* coverage.
- Continue to increase size of meadow to benefit invertebrates, by removing hazel young oak, alder and willow. Treat stumps with a suitable glyphosate based weed killer such as round up bi-active
- Control any re-growth using volunteers.
- Construct deadwood refuges around edges of meadow for invertebrates where appropriate. If not appropriate, remove coppiced material from site.

Compartment 14a:

- Retain current stands of alder and willow, allow to collapse naturally.
- Survey for newts, record and monitor.
- Retain and enhance wet areas/ephemeral ponds. Creation of new ponds and allow succession of current ponds.
- Create hibernacula for newts using coppiced alder from other areas on site where appropriate.

Compartment 14b:

- Cut and collect to retain grassland area removing arisings once a year, between late September to early October, to maintain meadow habitat.
- Monitor progress and review.

Compartment 15:

- Control bracken by cutting in mid June and late July and remove material. Repeat for 3-4 years or until under control. Spray with herbicide when plant is green if required using (**Asulox**)
- Continue to increase size of meadow to benefit invertebrates, by cutting down hazel young oak, alder and willow. Treat stumps with a suitable glyphosate based weed killer such as round up bi-active.
- Control any re-growth using volunteers.

Compartment 16:

- Retain current stands of alder and willow, allow to collapse naturally.

3.4.2 Summary of Management and Monitoring Projects

Projects required to fulfil the compartment prescriptions (outlined above) are summarised in the tables below. These overarching projects are divided into management (table 15) and monitoring (table 16) projects, with each project further subdivided into the following categories:

- Administration (A)
- Records (R)
- Management (M)

Table 15: Summary of Management Projects

Project	Compartments	Group
Coppicing of Alder	2a ,2b, 3a,3b,9a, 9b, 12c	M & A
Remove non-native species	Whole site	M
Maintain ditches remove silt	4, 8	M
Remove sycamore and treat stumps	Whole site	M
Remove litter	Whole site	M & A
Retain current stand of mature trees	5,7,11,12a,12b,12d	M & A
Maintain meadows	13,15	M
Regeneration of heather	13b, 13c	M
Control bracken	15	M & R
Monitor tree line by railway	2a,2b,3a,3b,6,9a,9b,9c	M & A
Maintain leaky dams to managed water levels	4,8	M
Monitor river bank erosion and revetment works	5,7a,7b,11,12a,12b,12c,12d	M
Non intervention of willow	2a,2b,3a,3b,9,12a,12b,12d	A
Monitor tree line by footpath	5,6,9c,12a,12b,12c,12d	M,R, A

Table 16: Summary of Monitoring Projects

Project	Compartment	Group
Monitor vegetation change after coppicing	2a,2b,3a,3b,9a,9b,9c,	R
Survey birds	Whole site	R
Survey dragonflies / damselflies	Whole site	R
Survey lower plants (lichens)	Whole site	R
Survey invertebrates	Whole site	R
Monitor public use	Whole sites	R
Monitor dog exercising / fouling	Whole site	R
Survey grass species on mown areas	10,14b,13,15	R
Monitor school usage	Whole site	A, R
Monitor mammal species	Whole site	R
Regular fixed point photography	Whole site	R

3.4.3 Summary of Timings for Monitoring

Monitoring of species and habitats can only occur at certain times of year, which varies depending on the target species/habitat. Table 17 outlines the time of year monitoring surveys can take place for each habitat or group of species located on site.

Table 17: Timings of monitoring for various habitats and species within Tadburn Meadows.

HABITATS AND SPECIES	TIME TO SURVEY
Freshwater	May – September
Woodlands	March - July (spring vegetation: March - April)
Heathlands	June – September
Mosses & lichens	All year, but best after rain
Fungi	March - May, and September – November
Higher plants	April – November
Birds	March - June (breeding), October – March (overwintering)
Invertebrates	April - October (breeding), October – March (overwintering)
Bats	April - October (breeding), October – March (overwintering)

3.4.4 Work Parties

3.4.4.1 Contractors

Contractors will carry out the majority of the work involving the cutting of timber and operations on a large scale. Constraints will be put on contractors to use biodegradable chain saw oil, employ most environmentally proactive woodland and meadow management techniques and extra care when extracting taken when extracting timber.

The contractors must fulfil Test Valley's Health and Safety statutory requirements as stipulated by the Health and Safety Officer.

3.4.4.2 Volunteers

For smaller projects including coppicing, small scale tree felling, ephemeral pond creation, volunteer work parties will be arranged.

In 2004, 'The Tadburn Conservation Volunteers (TCV) group was inaugurated. This group is made up of local residents who assist in the forward planning and implementation of the Management Plan. TCV were originally set up in partnership with BTCV and are now a self sustaining group with a constitution.

3.5 Work Schedule

3.5.1 Work Programme

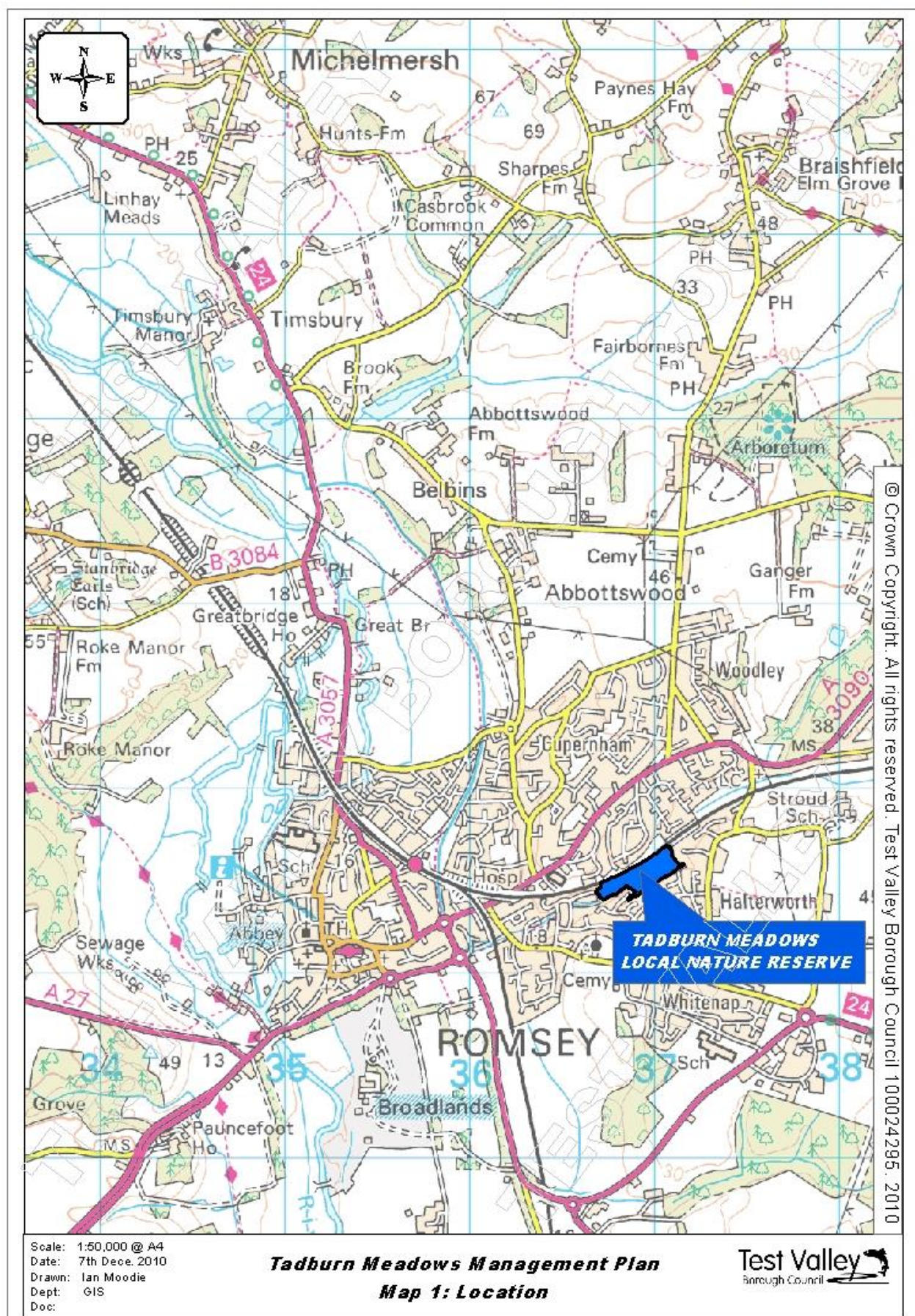
Table 18: 10 Year Work Schedule

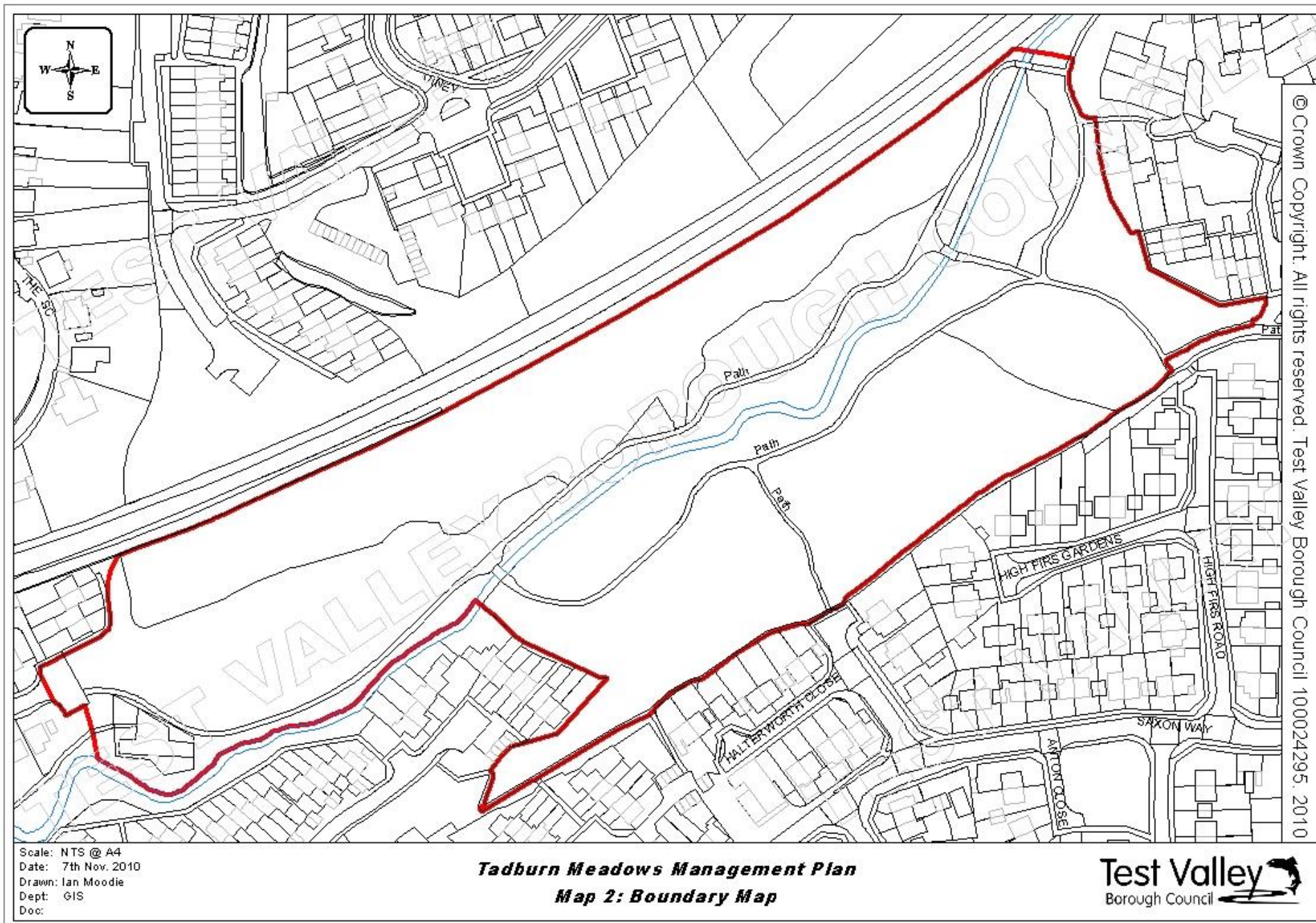
OBJECTIVE	PRESCRIPTION	COMPARTMENT	YEAR									
			1	2	3	4	5	6	7	8	9	10
Coppice alder/willow	Count stools and divide by 20 to achieve yearly cut rate between October and February	2,3,7,9,11,12	*	*	*	*	*	*	*	*	*	*
Remove Sycamore	Cut trees between October and January. Treat stumps with herbicides	Whole Site	*	*	*	*	*	*	*	*	*	*
Remove litter	Regular litter picking - use of byelaws and regulations for non-conformity	Whole site	*	*	*	*	*	*	*	*	*	*
Manage water in ditches	Monitor leaky dams to maintain water levels in peak or low flow	4,8	*	*	*	*	*	*	*	*	*	*
Maintain ditches	Remove leaf litter and silt build up to maintain gradual flow.	4,8		*		*		*		*		*
Maintain meadows	Cut and collect once a year late August Remove material from site.	13,15	*	*	*	*	*	*	*	*	*	*
Maintain strip of planted wildflower meadow	cut and remove material every year after brambles have fruited	1	*	*	*	*	*	*	*	*	*	*
Monitor mature oaks	Survey trees for health and vigour	1	*		*		*		*		*	
Non intervention of willow	Allow willow stands to collapse naturally	3a,3b,9	*	*	*	*	*	*	*	*	*	*

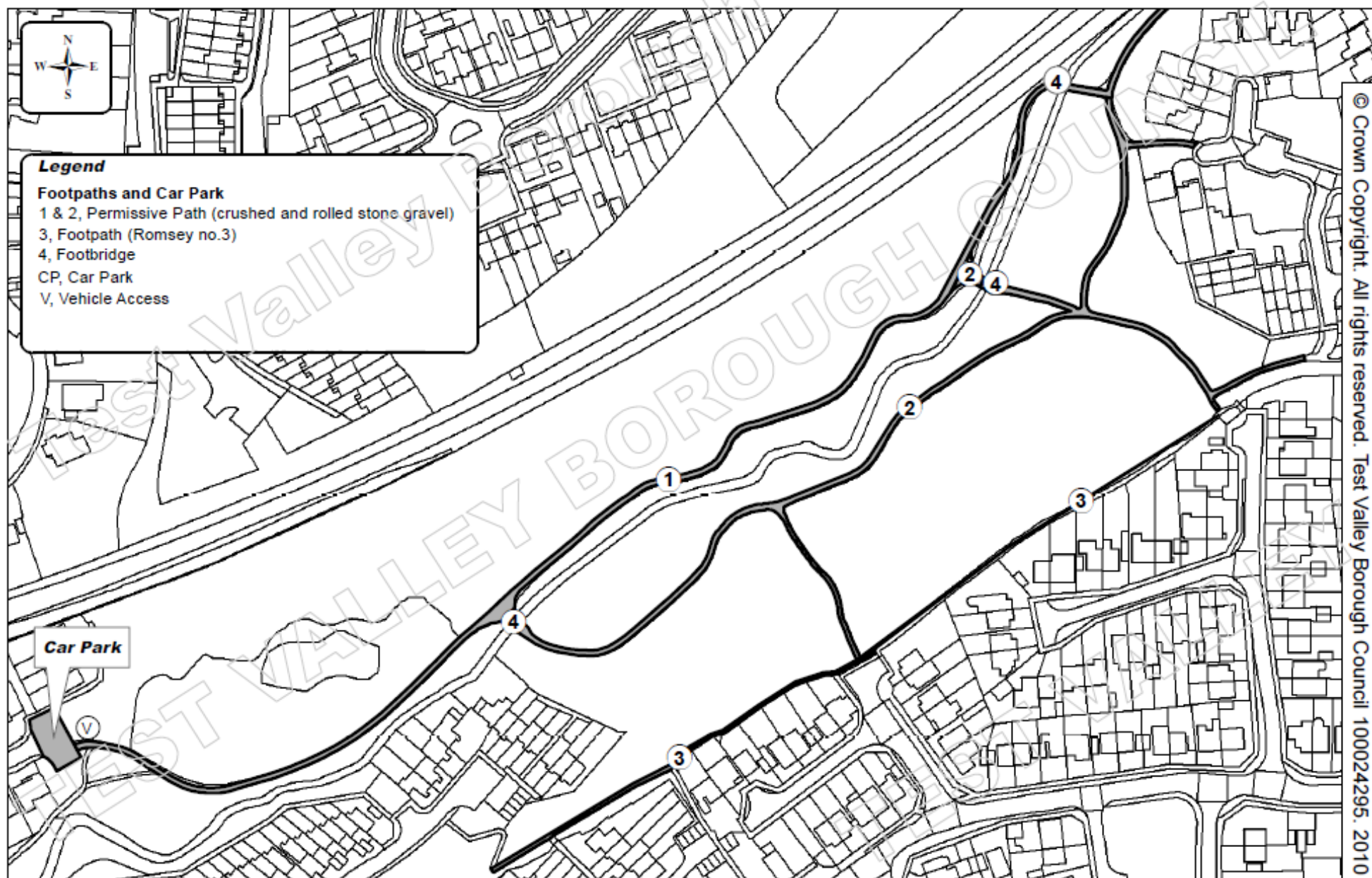
OBJECTIVE	PRESCRIPTION	COMPARTMENT	YEAR									
			1	2	3	4	5	6	7	8	9	10
Maintain screen of alder	Maintain and managed screen of alder along railway line trees to be survey every other year to reduce risk of failure over railway line	3a,3b,6,9	*		*		*		*		*	
Non-native species	Remove non-natives from site by cutting and treating stumps	Whole site	*	*	*	*	*	*	*	*	*	*
Retain current stand of mature trees	Monitor and manage mature trees survey	5	*		*		*		*		*	
Coppice hazel	Coppice 1 in 3 trees on 7 year rotation to increase light level on stream remove all brash Between October and January	5,7,11,12c,12d,13,14	*	*	*	*	*	*	*	*	*	*
Monitor river bank	Monitor river bank against erosion by dogs entering and leaving the water. Install/maintain bank revetment works as necessary	5	*	*	*	*	*	*	*	*	*	*
Monitor trees	Maintain and monitor trees close to footpaths and adjacent to boundaries in the interest of public safety	Whole site	*		*		*		*		*	
Non intervention area	Treat whole area as non intervention, continue to monitor area	6	*	*	*	*	*	*	*	*	*	*

OBJECTIVE	PRESCRIPTION	COMPARTMENT	YEAR									
			1	2	3	4	5	6	7	8	9	10
Maintain and enhance grass areas	Cut once a year late August. Remove material from site	10,14b	*	*	*	*	*	*	*	*	*	*
Maintain Scrub	Cut back any scrub to keep area open	10,11,13,14b,15	*	*	*	*	*	*	*	*	*	*
Maintain bramble	Rotationally cut bramble to create varying age structure and open group to allow development of sensitive plants	12a,12d	*	*	*	*	*	*	*	*	*	*
Retain current stand of trees	Maintain and retain current stand of willow and alder allow to decline naturally	12a,12b,12d,14a,16	*	*	*	*	*	*	*	*	*	*
Dead wood	Construct deadwood refuges/ hibernacula for invertebrates and newts around meadow areas.	13,14a	*	*	*	*	*	*	*	*	*	*
Control Bracken	Cut in mid June early July and remove material repeat 3-4 years monitor, if process is not working spray with asulox in late June repeat as necessary	15	*	*	*	*	*	*	*	*	*	*
Ponds	Continue to dig new ephemeral ponds and allow development to sucessional stage	3a,3b,9,14a	*	*	*	*	*	*	*	*	*	*
Monitor and review	Monitor and review management plan using survey data	Whole site	*				*					*

Appendix I **Maps**

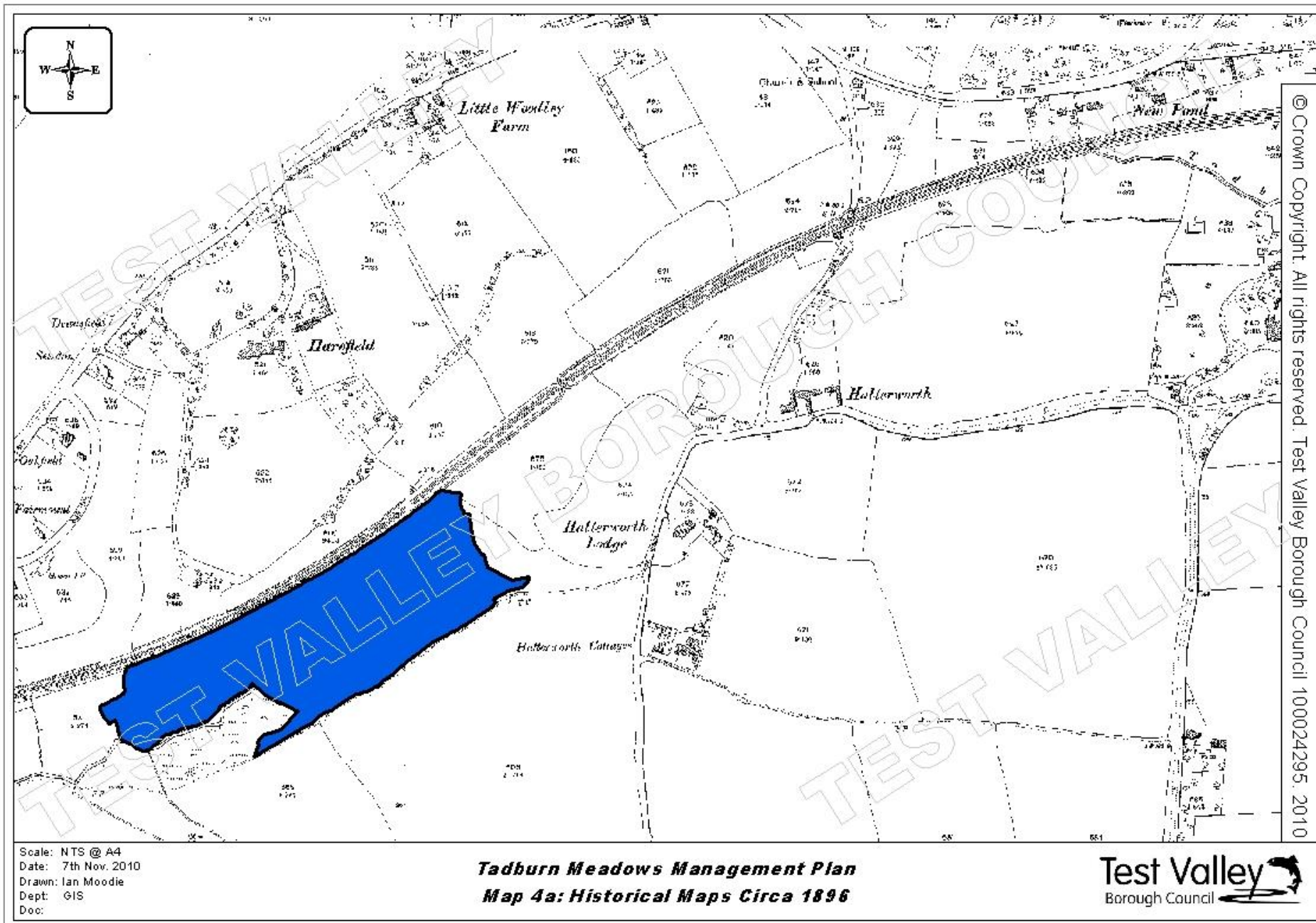


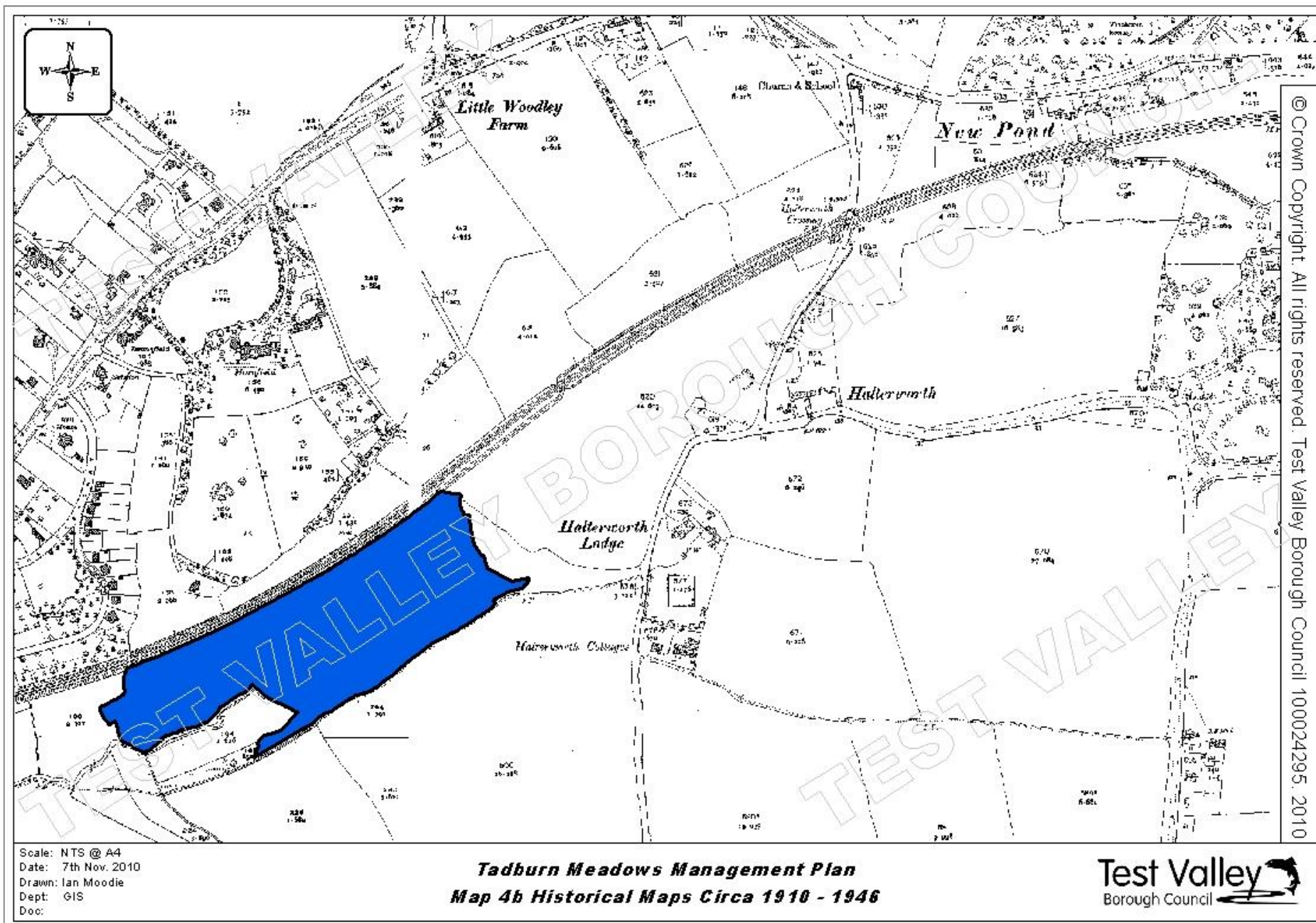


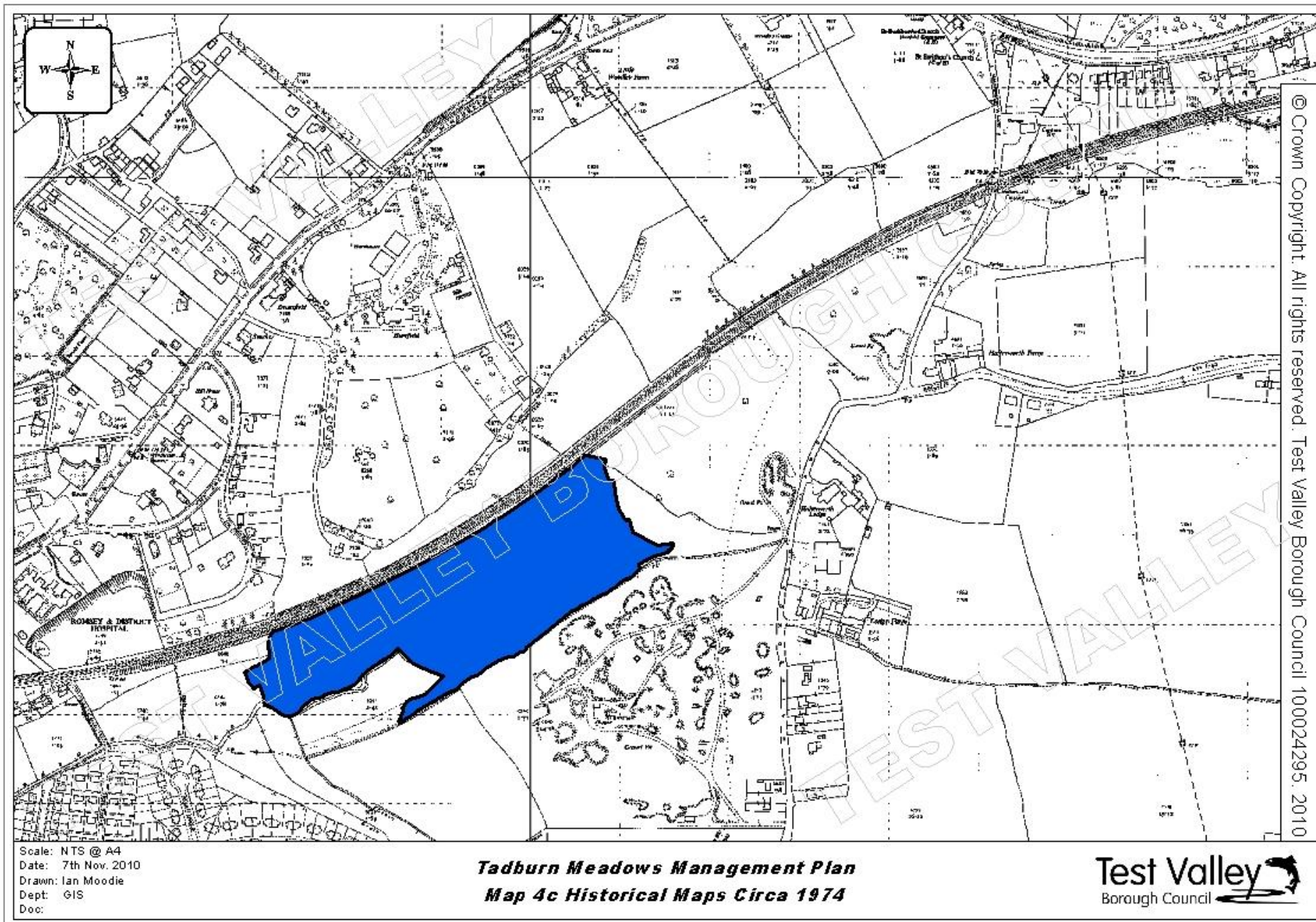


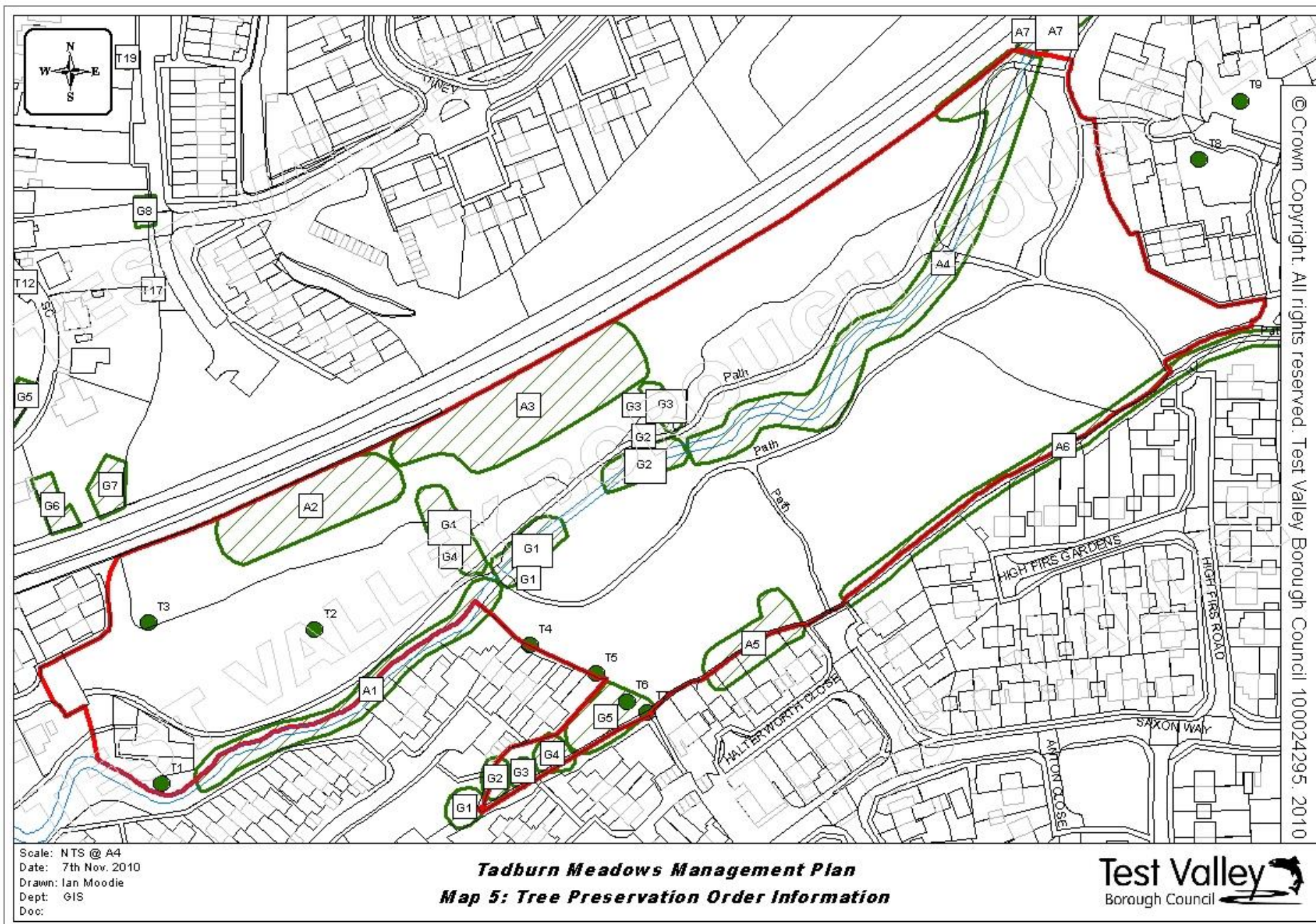
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 Date: 12 December 2019
 Drawn: Jen Quilty
 Dept: GIS
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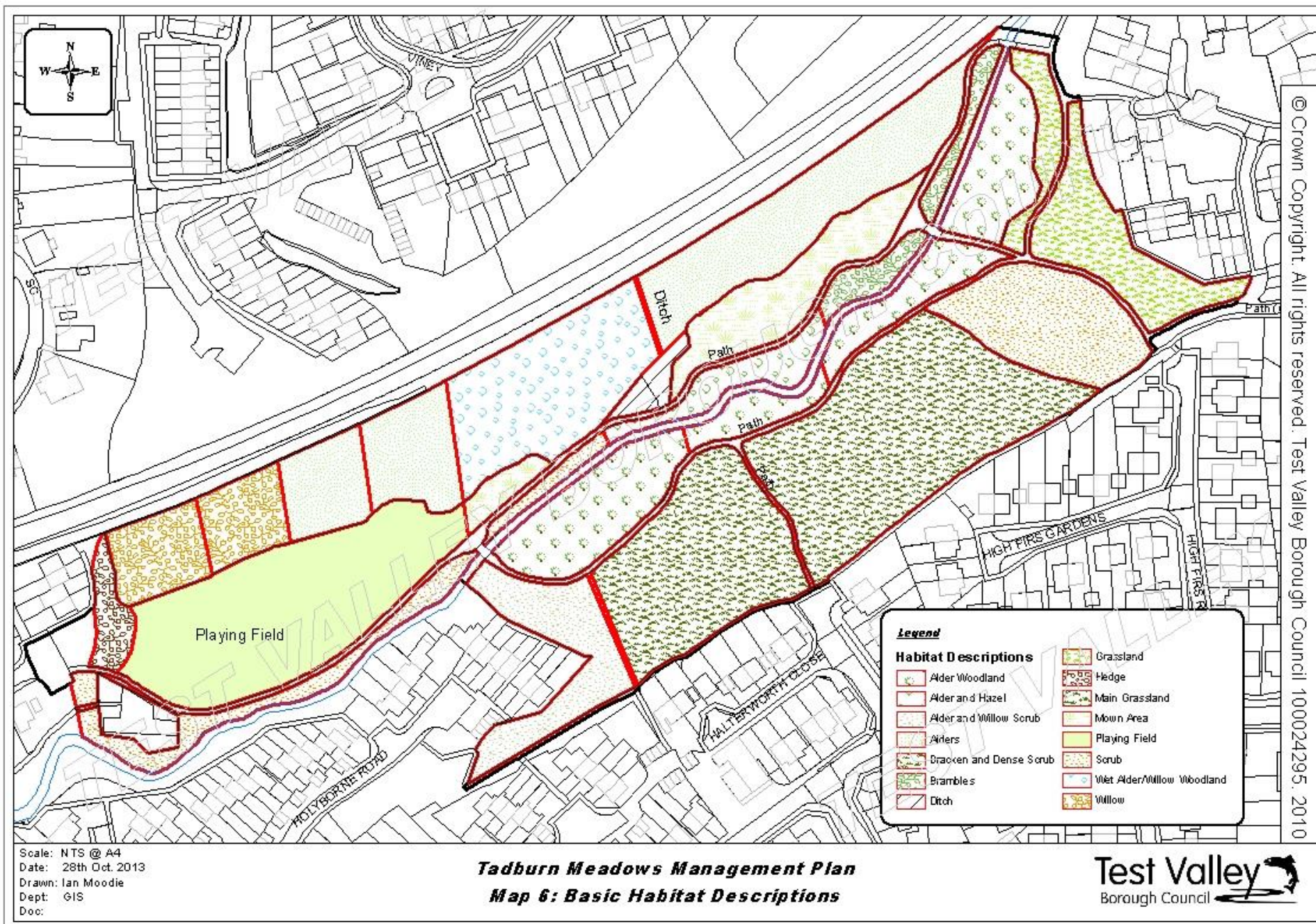
Tadburn Meadows Management Plan
Map 3: Footpaths and Car Park Location

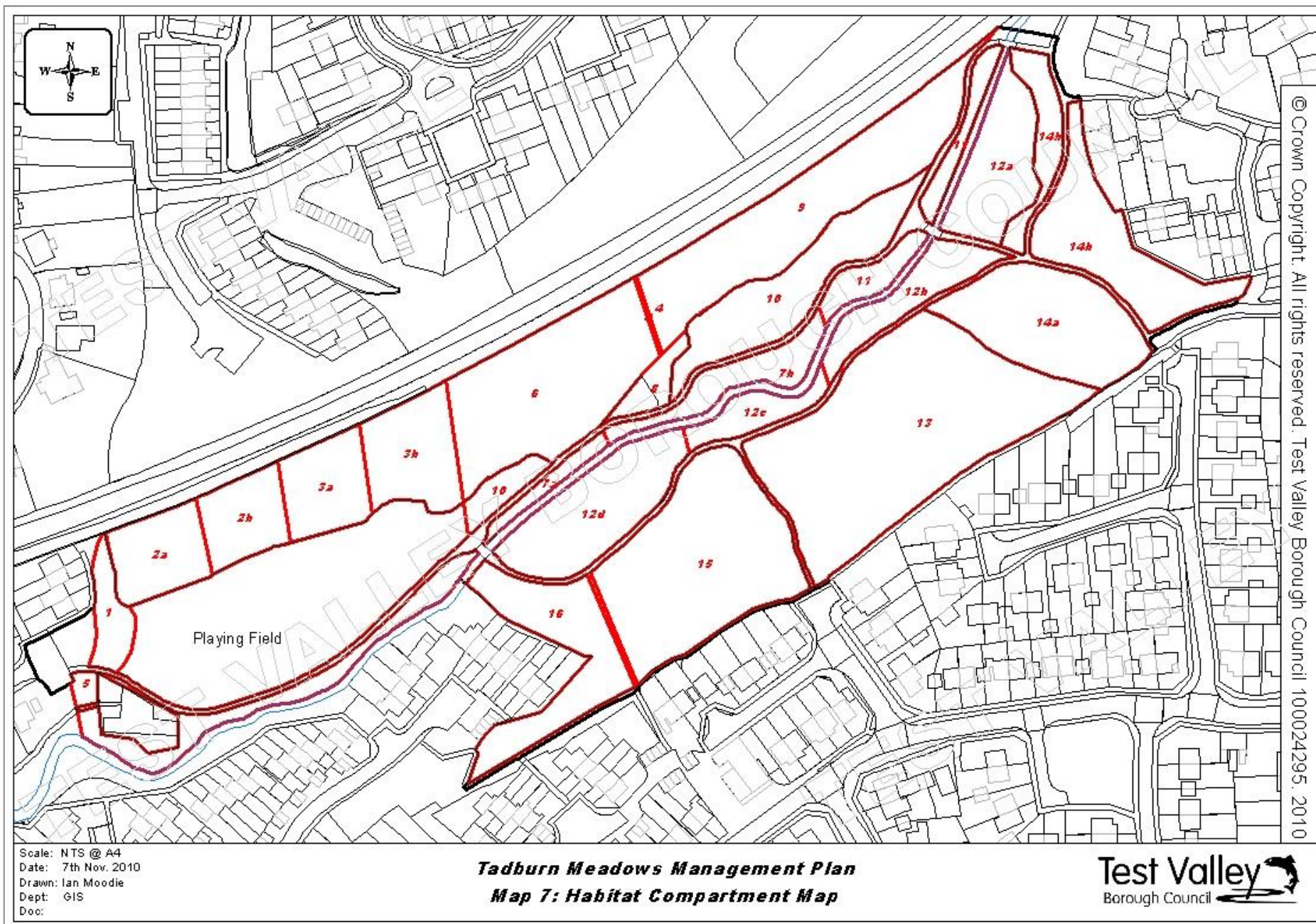












Appendix II

Floral Survey Data

Meadow Mania event 11th May 2019 – Floral survey results:

Surveys conducted by Tadburn Conservation Volunteers, under the supervision of Countryside Officers for Test Valley Borough Council.

Tree species identified:

- | | | |
|--------------|---------------------|------------------|
| • Alder | • Hazel | • Rowan |
| • Ash | • Holly | • Sallow |
| • Aspen | • Horse chestnut | • Silver birch |
| • Blackthorn | • Mountain ash | • Sweet chestnut |
| • Cherry | • Oak (penduncular) | • Sycamore |
| • Elder | • Plum | • Willow |
| • Hawthorn | • Redwood | • |

Other plant species identified:

- | | | |
|------------------------------|--------------------------|-----------------------|
| • Bluebells | • Hairy willow herb | • Pendular sedge |
| • Bracken | • Hard rush | • Plantain |
| • Bramble | • Hemlock water dropwort | • Primrose |
| • Branched burreed | • Hemlock waterweed | • Ramsons |
| • Broad-leaved willow herb | • Herb bennet | • Red champion |
| • Brooklime | • Herb robert | • Rosebay willow herb |
| • Burdock | • Hogweed | • Silverweed |
| • Celandine | • Horse tails | • Sorrel |
| • Cleavers | • Iris | • Speedwell |
| • Common chickweed | • Ivy | • St Johns Wort |
| • Common duckweed | • Jack by the hedge | • Stinging nettles |
| • Common valerian | • Lesser celandine | • Timothy |
| • Cow parsley | • Lesser spearwort | • Vetch |
| • Creeping buttercup | • Lesser stitchwort | • Water avens |
| • Cuckoo flower | • Lonicera | • Water mint |
| • Daisy | • Lords and ladies | • Wavy bittercress |
| • Dandelion | • Marguerite daisy | • Wild curry |
| • Dock | • Marsh marigold | • Wood aven |
| • Enchanters Nightshade | • Marsh thistle | • Wood speedwell |
| • Fern | • Meadow buttercup | • Yorkshire fog |
| • Great spearwort | • Meadow foxtail | |
| • Greater birds foot trefoil | • Meadow sweet | |
| • Greater plantain | • Nettle | |
| • Greater stitchwort | • Nightshade | |
| • Greater willow herb | • Ox eye daisy | |

TADBURN MEADOW

General description and management

A small rank, neutral and substantially unimproved meadow situation on a gently sloping and north-easterly facing valley side site next to the Tadburn stream, Romsey.

The site is managed by manual cutting.

Communities

(i) [MG9]: *Deschampsia cespitosa* grassland.

Rank with scrub encroaching locally

Canopy:- Locally frequent Grey Willow, Birch, Oak, Bramble, conifer and Ash.

Flora:- Dense rank Tufted Hair-grass with Yorkshire-fog, Meadow Foxtail, Meadowsweet, Oval Sedge. Greater Bird's-foot Trefoil, Rough Meadow-grass, Common Valerian and Purple Moor-grass.

TADBURN MEADOWS – PLANTS

Survey March – July 1996

Area No	Species
1	Ivy Nettle Bramble Lords & Ladies Dandelion Gallium sp. Geranium sp.
2	As above + Dock Lesser Celandine Honeysuckle
3	Bramble Laurel Holly Bracken Marsh Marigold Polygonum (Redshank) Dock Meadowsweet Lesser Celandine Dandelion Cleavers
4	Dock Nettles Bramble Lesser Celandine

5	Dock Nettles Bramble Lesser Celandine
6	Wild Carrot Galium sp. Dandelion Lords & Ladies Grass species Meadowsweet Nettles Thistle – marsh? Sorrel Marsh Marigold Bracken Dock Rosebay Willowherb Ranunculus sp.

13 cont	Nettle Geum Ladies Smock Common Spotted Orchid (5) Lesser Spearwort Fen Bedstraw Common Marsh Bedstraw
14a	Bramble Dandelion Lesser Celandine Holly Ivy Lords & Ladies Rosebay Willowherb
14b	Common Marsh Bedstraw
15	Bramble Bracken Ranunculus sp. Cleavers Horsetail Honeysuckle Dandelion Bluebell Lesser Celandine Rosebay Willowherb Cleavers Foxglove Geum Bistort

Tadburn Meadows Botanical Survey

April 2008

Simon Davey MA AMA MIEEM CBiol

1. Introduction

In spring 2008, Simon Davey Ecological Consultancy was commissioned by Boyce Jeffery of Test Valley District Council to undertake a botanical survey of Tadburn Meadow, Romsey and to make possible conservation suggestions for its management. The survey took place on a day when the weather was fine, and a comprehensive list of species that could be recorded in mid Spring was made. It is probable that certain higher plants were missed, and it suggested that a survey in July would rectify this.

The site consists of a meadow and woodland. The woodland is very damp in parts. It contains oak as well as several willow species as the main tree species. Alder, *Alnus glutinosa* is well established in the damper parts of the wood. A single tree that appears to be *Ulmus glabra* Wych Elm with a diameter of about half a metre is potentially important. *Ulmus glabra* English Elm regeneration is present also, though apparently it does not develop beyond a very early stage. Seeds of the *Ulmus glabra* were being produced in good quantity. To confirm the *Ulmus glabra* beyond doubt, its leaves would need to be examined, however an elm of this maturity is of importance whatever the species. The wood contains no sycamore, and regeneration is currently not a problem. However Cherry Laurel, *Prunus laurocerasus* is present in small quantity, and this should be removed as a matter of urgency. No *Rhododendron* was recorded, however an eye should be kept out for it, and if it does occur, immediate action to eradicate it should be taken.

The site contains patches of dense bramble. These will attract insects, and at their current level should be considered beneficial. However they should not be allowed to increase. The site is a patchwork of wet and dry habitat giving a considerable diversity. Currently the balance appears about right for a good biodiversity on the site. Of concern is the patchy, but dominant appearance of Himalayan Balsam *Impatiens glandulifera* seedlings. These are appearing on level ground away from the streams, and suggest that they are brought to the site during flooding. This is a notoriously difficult species to control, and the best that can be done is the removal of material as it matures to prevent seeds coming from plants growing on site.

2. General Ecological Observations

The site supports several ancient woodland indicator higher plants suggesting a degree of ecological continuity for the site. This is not matched by the lower plants. No bryophytes or lichens listed as indicators of ancient woodland were recorded. This suggests that a complete removal of the canopy must have taken place recently. The bryophyte flora is especially poor, however the presence of *Caloplaca obscurella* in the fertile state on one oak is of interest. The lack of *Hypogymnia physodes*, *Parmelia saxatilis* and *Usnea cornuta* on the oaks suggests a degree of eutrophication possibly due to local intensive farming. This is underlined by the presence on oak of nutrient demanding species such as *Physcia* species and especially *Hyperphyscia adglutinata*. The site contains considerable biodiversity as it is managed currently, and so long as the its current status is maintained with the few provisos given above, this would seem to be the best management for it.

3. Species recorded during the survey

In the following lists, an asterisk indicates a species that is present on the list of higher plants indicative of ancient woodland prepared by Richard Hornby and Francis Rose for the Nature Conservancy Council's Southern region.

Indicates a species grown in gardens, and some caution should be used before adding it to the list. However, the assemblage of ancient woodland species present here would suggest that these species can be added as genuine wild plants.

The various willow species present are very difficult to identify at this time of year, and a complete list will only be possible when the leaves are fully developed.

Higher Plants

*	<i>Adoxa moschatellina</i>	Moschatel
	<i>Alliaria petiolata</i>	Hedge Garlic
*	<i>Allium ursinum</i>	Ramsons
	<i>Alnus glutinosa</i>	Alder
*	<i>Anemone nemorosa</i>	Wood Anemone
	<i>Angelica sylvestris</i>	Wild Angelica
	<i>Anthriscus sylvestris</i>	Cow Parsley
	<i>Arum maculatum</i>	Lords and Ladies
	<i>Athyrium filix femina</i>	Lady Fern
	<i>Brachypodium sylvaticum</i>	Slender False Brome
	<i>Caltha palustris</i>	Marsh Marigold
	<i>Cardamine flexuosa</i>	Wavy Bittercress
	<i>Cardamine hirsuta</i>	Hairy Bittercress
	<i>Cardamine pratensis</i>	Lady's Smock
*	# <i>Carex pendula</i>	Pendulous Sedge
*	<i>Carex remota</i>	Remote Sedge
	<i>Carex riparia</i>	Greater Pond Sedge
*	<i>Chrysosplenium oppositifolium</i>	Opposite-leaved Golden Saxifrage
	<i>Cirsium palustre</i>	Marsh Thistle
*	<i>Conopodium majus</i>	Pignut
	<i>Corylus avellana</i>	Hazel
	<i>Crataegus monogyna</i>	Common Hawthorn
	<i>Crocus</i> sp.	Cultivated Crocus
	<i>Deschampsia cespitosa</i>	Tufted Hair-grass
	<i>Digitalis purpurea</i>	Foxglove
	<i>Dryopteris dilatata</i>	Common Buckler-fern
	<i>Epilobium hirsutum</i>	Great Hairy Willowherb
	<i>Equisetum palustre</i>	Marsh Horsetail
	<i>Filipendula ulmaria</i>	Meadowsweet
	<i>Fraxinus excelsior</i>	Ash
	<i>Galium aparine</i>	Goose-grass
	<i>Galium palustre</i>	Marsh Bedstraw
	<i>Geranium robertianum</i>	Herb Robert
	<i>Geum urbanum</i>	Wood Avens
	<i>Glechoma hederacea</i>	Ground Ivy
	<i>Glyceria fluitans</i>	Flote-grass
	<i>Glyceria maxima</i>	Reed Sweet-grass
	<i>Hedera helix</i>	Ivy
	<i>Heracleum sphondylium</i>	Hogweed
	<i>Holcus lanatus</i>	Yorkshire Fog

	<i>Hyacinthoides hispanica</i>	Spanish Bluebell
*	<i>Hyacinthoides non scriptus</i>	Bluebell
*	<i>#Hypericum androsaemum</i>	Tutsan
*	<i>Ilex aquifolium</i>	Holly
	<i>Impatiens glandulifera</i>	Himalayan Balsam
*	<i>#Iris foetidissima</i>	Stinking Iris (one plant)
	<i>Iris pseudacorus</i>	Yellow Flag Iris
	<i>Juncus effusus</i>	Soft Rush
	<i>Juncus inflexus</i>	Hard Rush
	<i>Lonicera periclymenum</i>	Honeysuckle
	<i>Narcissus</i> sp.	Cultivated Daffodils
	<i>Oenanthe crocata</i>	Hemlock Water Dropwort
	<i>Plantago lanceolata</i>	Ribwort Plantain
*	<i>Polytrichum setiferum</i>	Soft Shield-fern
	<i>Primula vulgaris</i>	Primrose
	<i>Prunus x fruticans</i>	Hybrid Blackthorn
	<i>Prunus laurocerasus</i>	Cherry Laurel
	<i>Quercus robur</i>	Pedunculate Oak
	<i>Ranunculus ficaria</i>	Lesser Celandine
	<i>Ranunculus repens</i>	Creeping Buttercup
*	<i>Ribes rubrum</i>	Red Currant (abundant)
*	<i>Rosa agrestis</i>	Field Rose
	<i>Rubus fruticosus</i> agg.	Bramble
	<i>Rubus idaeus</i>	Raspberry
	<i>Rumex acetosa</i>	Sorrel
	<i>Rumex crispus</i>	Curled Dock
	<i>Rumex obtusifolius</i>	Broad-leaved Dock
	<i>Salix x babylonica</i>	Weeping Willow
	<i>Salix cinerea</i>	Grey Willow
	<i>Salix fragilis</i>	Crack Willow
	<i>Sambucus nigra</i>	Elder
	<i>Scrophularia nodosa</i>	Figwort
	<i>Solanum dulcamara</i>	Bittersweet
	<i>Stachys sylvatica</i>	Hedge Woundwort
	<i>Stellaria holostea</i>	Greater Stitchwort
	<i>Taraxacum officinale</i> agg	Dandelion
	<i>Taxus baccata</i>	Yew
	<i>Ulmus procera</i>	English Elm
	<i>Urtica dioica</i>	Stinging Nettle
	<i>Valeriana officinalis</i>	Valerian
	<i>Veronica beccabunga</i>	Brooklime
	<i>Veronica chamaedrys</i>	Germander Speedwell
	<i>Veronica hederifolia</i>	Ivy-leaved Speedwell
*	<i>Veronica montana</i>	Wood Speedwell
*	<i>Viola reichenbachiana</i>	Wood Violet

The following species are restricted to the grassland in the meadow:-

<i>Bellis perennis</i>	Common Daisy
<i>Coronopus squamatus</i>	Swine-cress
<i>Geranium dissectum</i>	Cut-leaved Crane'sbill
<i>Leucanthemum vulgare</i>	Ox-eye Daisy
<i>Plantago major</i>	Rat'stail Plantain
<i>Poa annua</i>	Annual Meadow-grass

Polygonum aviculare
Prunella vulgaris
Trifolium pratense
Trifolium repens
Veronica filiformis
Veronica serpyllifolia

Common Knotgrass
Self-heal
Red Clover
Dutch Clover
Slender Speedwell
Thyme-leaved Speedwell

Bryophytes – Liverworts

Calypogeia muellerana
Frullania dilatata
Lunularia cruciata
Metzgeria furcata
Microlejeunea ulicina (on oak)

Bryophytes – Mosses

Atrichum undulatum
Brachythecium rutabulum
Calliergonella cuspidata
Campylopus introflexus (on dead wood)
Dicranoweisia cirrata (on dead wood)
Eurhynchium praelongum
Fissidens adiantoides
Mnium affine
Orthotrichum affine

Lichens

The majority of the following were recorded on oak except where stated.

Amandinea punctata
Caloplaca obscurella
Candelariella reflexa
Flavoparmelia caperata
Hyperphyscia adglutinata
Hypotrachyna revoluta
Lecanora albelli (on *Salix*)
Lecanora chlarotera
Lecidella elaeochroma
Lepraria incana (On alder)
Melanelia subaurifera
Parmelia sulcata
Parmotrema perlatum
Pertusaria amara
Phaeophyscia orbicularis
Phlyctis argena
Physcia adscendens
Physcia aipolia
Physcia tenella
Punctelia ulophylla
Ramalina farinacea
Xanthoria candelaria agg.
Xanthoria parietina

Fungi

Peziza species present on rotting magazines
Stereum hirsutum

4. Conclusions

Sixteen old woodland indicators is quite a reasonable score, and indicates a wood with some evidence of ecological continuity. In order to have real conservation value, that is to be considered as a Site of Nature Conservation Interest or as a local nature reserve, a score of twenty would be required. Certain species such as Wood Sedge, *Carex sylvatica* and *Oxalis acetosella* Wood Sorrel were strangely absent as were any mosses typical of mature woodland. Even *Thuidium tamariscinum* was not found, nor was the very common epiphytic moss *Isothecium myosuroides*. True bluebell seems to be confined to an area above the very wet meadow area, and this is also a little hard to explain. With only four more indicators to find, it seems quite possible that a score of twenty will be achieved with a survey later in the year.

As stated above, no drastic management would be required to improve biodiversity, however it is very important that alien species such as *Prunus laurocerasus* and *Impatiens glandulifera* are controlled and preferably eradicated. Personally, the matter of the garden species such as *Crocus*, *Narcissus* and *Hyacinthoides hispanicus* is virtually a matter of taste. Currently, the degree of regeneration is well within reasonable bounds as is the level of bramble. However both of these need checking carefully. An eye must be kept out for *Rhododendron ponticum* and if found, must be eradicated immediately.

Appendix III

Bird Survey Data

Meadow Mania event 11th May 2019 – Bird survey results:

Surveys conducted by Tadburn Conservation Volunteers, under the supervision of Countryside Officers for Test Valley Borough Council.

Bird species identified:

- Blackbird
- Blackcap
- Blue tit
- Chiffchaff
- Collared dove
- Crow
- Dunnock
- Goldcrest
- Great spotted woodpecker
- Great tit
- House Sparrow
- Jackdaw
- Magpie
- Robin
- Song thrush
- Starling
- Swift
- Tree creeper
- Willow/marsh tit
- Wood pigeon
- Wren

BIRD REPORT / TADBURN MEADOWS								
	1996		1997					
	NOV	DEC	JAN	FEB	MAR	APR	MAY	SEP
KINGFISHER					✓			
GREEN WOODPECKER		✓	Heard			Heard		
GREAT SPOTTED WOODPECKER	✓		✓	✓			✓Pair	✓
GREY WAGTAIL	✓	✓						✓
PIED WAGTAIL						✓		
DUNNOCK		✓						
FIELDFARE		✓						
SONG THRUSH		✓	✓		✓	✓		
REDWING		✓	✓	✓30+	✓			
MISTLE THRUSH	✓	✓	Heard			✓		
BLACK CAP						✓	✓	
CHIFF CHAFF						✓3	✓	✓
WILLOW WARBLER						✓	✓	
GOLD CREST	✓							
LONG TAILED TIT					✓		✓	
TREE CREEPER	✓	✓		✓				
JAY				✓				
BRAMBLING					✓F			
SISKIN	✓	✓		✓10	✓20			✓F
REDPOLL	✓	✓						
BULLFINCH				✓	✓		✓	
REED BUNTING		✓F						
GOLD FINCH	✓	✓	✓	✓	✓	✓	✓	✓
GREEN FINCH				✓	✓	✓	✓	✓
SNIFE		✓						

Birds seen all year round:- Blue tits, Wren, Robin, Blackbird, Rooks, Magpies, Starlings, Chaffinches, Mallard, Wood Pigeon, Collard Dove.

Appendix IV

Butterfly Survey Data

UK Butterfly Monitoring Scheme Results

Species list for Tadburn Meadows transect:

Species	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Small Skipper	0	0	0	2	0	0	1	7	3	2	1	10
Large Skipper	0	2	1	0	0	0	0	4	0	0	0	6
Dingy Skipper	0	0	0	0	5	0	0	0	0	0	0	0
Brimstone	1	1	3	0	0	4	4	2	0	3	3	7
Large White	32	28	96	42	18	35	30	20	24	28	71	48
Small White	10	41	39	13	12	13	24	19	27	25	57	55
Green-veined White	1	0	2	11	1	2	0	4	0	0	25	9
Orange Tip	4	0	14	5	4	2	3	16	1	3	6	20
Small Copper	1	0	1	1	0	0	0	0	0	0	1	1
Small Blue	0	0	2	0	0	0	0	0	0	0	1	0
Common Blue	2	3	13	2	0	0	0	1	0	4	7	0
Holly Blue	1	10	1	0	0	0	0	0	0	0	3	8
Red Admiral	2	1	3	2	3	2	0	0	4	9	2	6
Painted Lady	0	0	2	0	0	2	0	0	0	0	0	1
Small Tortoiseshell	0	2	3	1	0	5	0	0	0	1	1	0
Peacock	1	0	1	0	0	7	6	4	1	1	4	4
Comma	2	0	2	2	4	4	2	3	5	2	8	11
Silver-washed Fritillary	0	0	0	3	2	0	0	0	0	0	0	1
Speckled Wood	13	25	32	19	40	13	10	13	31	25	33	93
Gatekeeper / Hedge Brown	17	42	3	4	4	3	12	12	0	3	14	19
Meadow Brown	40	97	56	41	31	13	24	31	20	18	48	70
Small Heath	2	0	0	0	0	1	1	0	0	0	0	0
Ringlet	0	0	25	18	18	12	5	16	9	1	2	12
Total (Summary)	129	252	299	166	142	118	122	152	125	125	287	381

Species diversity:

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total no. of species	15	11	19	15	12	15	12	14	10	14	18	18

Appendix V

Invertebrate Survey Data

**INVERTEBRATE SURVEY OF
TADBURN LAKE
SOUTH HAMPSHIRE, 2008**



Araneus marmoreus var. pyramidatus

Dr. Jonty Denton FRES FLS MIEEM

September 2008

Prepared by;- Dr. Jonty Denton,

1. INTRODUCTION

The survey brief was to carry out a baseline invertebrate survey of the reserve woodlands, meadows stream and ponds.

2. METHODS AND SITE VISITS

It is impracticable to survey all the potential invertebrates, so specific groups of species, which are sufficiently well known as to provide meaningful comparisons to be made with other sites both locally and nationally. These species are also important as indicators of the quality of the site and the habitats present were targeted (see Brooks, 1993). This survey focused on the Nationally reviewed invertebrate groups, which have had status classifications assigned to each species based on the current and historic distributions (Ball, 1994). These include;- Mollusca (Slugs and snails), Arachnida (Spiders, Harvestmen & Pseudoscorpions), Isopoda (Woodlice), Thysanura (Bristletails), Ephemeroptera (Mayflies), Odonata (Dragon & Damselflies), Plecoptera (Stoneflies), Orthoptera (Grasshoppers & Crickets), Dictyoptera (Cockroaches) Dermaptera (Earwigs), Hemiptera- Heteroptera (True-bugs), Hemiptera - Homoptera (Hoppers), Psocoptera (Psocids), Neuroptera (Lace-wings), Mecoptera (Scorpion-flies), Lepidoptera (Butterflies & Moths), Trichoptera (Caddis flies), Diptera (True flies), Aculeate Hymenoptera (Ants, Bees & Wasps), Hymenoptera Symphyta (Sawflies), Coleoptera (Beetles). In addition some species from other less well known groups which have yet to have official statuses assigned to them were identified. These included, Parasitic Hymenoptera,

The main emphasis of the survey was to find as many rare and notable species as possible, within the reviewed groups.

The site was visited on the 26th March, 2nd May, 2nd, 5th, June, 1st July, 18th September 2008.

Terrestrial/ Arboreal Survey

All the terrestrial and arboreal habitat types present across the survey areas were sampled, using a variety of sampling methods. The methods employed included standard techniques of sweeping grasses, rushes, sedges, herbs and foliage, beating the foliage, and branches of trees and bushes, especially blossom bearing plants such as Hawthorn, Sloe over a beating tray (Kirby, 1992). Dead wood was examined by hand and bark removed to reveal bark dwelling (corticulous) species. Similarly leaves attacked by leaf mining caterpillars were removed and the occupants reared out in rearing jars and boxes..

A petrol powered suction sampler was employed to collect terrestrial invertebrates. Surface vegetation, tussocks, and ground litter were sampled and each collection emptied onto a large beating tray, where specimens of interest could be collected. The remainder could then be released unharmed.

3. STATUS CATEGORIES FOR RARE AND UNCOMMON TAXA

Nationally Scarce Category A - Notable A (Na)

Definition.

Taxa which do not fall within **RDB** categories but which are none-the-less uncommon in Great Britain and are thought to occur in 30 or fewer 10 km squares of the National Grid or, for less well recorded groups, within seven or fewer vice-counties.

Nationally Scarce Category B - Notable B (Nb)

Definition.

Taxa which do not fall within **RDB** categories but which are none-the-less uncommon in Great Britain and are thought to occur in between 31 and 100 10 km squares of the National Grid or, for less well recorded groups, within eight and twenty vice-counties.

RESULTS

The species recorded are listed in Appendix 1 (xls attachment). The rare and Nationally Scarce Taxa are listed below;-

Nationally Scarce taxa

ARANEAE (Spiders)

Nigma puella (Nationally Scarce A)

A small distinctive spider found on bushes and hedgerows. Very Local nationally with strongholds in Essex and South Hampshire.



***Philodromus albidus* (Nationally Scarce B)**

A small pale crab like spider which lives on the foliage of trees. It is widespread and frequent in Southern England, and no longer deserving of Notable status.

***Zilla diodia* (Nationally Scarce B))**

An orb weaver which lives in open woodland and glades. Local and restricted to Southern England and Wales.

HYMENOPTERA

Formicidae

***Lasius brunneus* (Nationally Scarce A) Bicolored Tree ant**

A two coloured ant which lives on trees both living and dead nesting in cavities in the trunks and branches. This is perhaps the most remarkable record from the site. The distribution of this ant is well known and it has long been a puzzle why it is absent from seemingly suitable areas such as the New Forest. Although it is frequent in NE Hampshire, this appears to be the first record from South Hampshire and the first from the south coast of England. Workers were found on several trees alongside the stream adjacent to the football pitch.



Apidae: Melittinae

Macropis europaea – Yellow Loosestrife Bee (Nationally Scarce A)

A medium sized black bee, which forages on the flowers of yellow loosestrife, nesting in soil on banks and slopes. Very local in southern England.

LEPIDOPTERA

Dentated Pug *Anticollax sparsata* (Geometridae) (Nationally Scarce A)

A small pug which develops on Yellow Loosestrife. Very local in Hampshire but listed as being fairly common in Chandlers Ford in 1999 (Goater & Norris, 2001)

COLEOPTERA (Beetles)

Nitidulidae

Epuraea distincta (Notable A)

A small yellowish nitidulid beetle with a distinctive dark pattern on it's wing cases. It feeds on soft bracket fungi *Daedaleopsis confragosa* on willows in bogs, fens and carr. It is very local occurring in Southern England and Wales. It occurs in fen sites a few miles to the south in North Hampshire, but according to Hyman & Parsons (1994) there are no previous Berkshire records.



Melandryidae

Abdera flexuosa (Notable B)

A distinctive orange marked false darkling beetle which develops in the bracket fungi *Inonotus radiatus* on alder and willow. Thinly scattered over much of Britain, but very scarce in the South-east.

Abdera flexuosa (Notable B)

A distinctive orange marked false darkling beetle which develops in the bracket fungi *Inonotus radiatus* on alder and willow. Thinly scattered over much of Britain, but very scarce in the South-east.

Curculionidae

Acalyptus carpini (Notable B)

A distinctive weevil covered in golden hairs. Feeds on sallows. This is very local in Hampshire becoming more frequent in the west.

ECOLOGICAL ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

WOODLANDS

Woodland edge habitats

Important species were found on the older sallows. The nationally Scarce Nitidulid beetle *Epuraea distincta* is associated with fungus which develops on moribund branches on older sallows. Allowing some trees to fall apart naturally will help, so coppicing trees in this condition could be counterproductive.

The south facing woodland edges supported scarce species including the spider *Nigma puella*, and the sawfly feeding weevil *Acalyptus carpini* was found on the sallows exposed to sunshine.

MEADOWS

The wet meadow areas are very rich for invertebrates cutting back marginal trees to extend these areas should continue. Leaving strips uncut each year as lifeboat areas for invertebrates is recommended. Wholesale mowing is deleterious for many species which cannot complete their life cycles. Key species include two which feed on Yellow Loosestrife (Dentated Pug and the bee *Macropis europaea*). Although not nationally Scarce the spider *Araneus marmoreus* is very localised in fen like areas.

AQUATIC HABITATS

Pools and carr

The recent wet years have produced very high water tables, which give the impression that the site is generally wetter than it may have been in previous 'normal' years. This may explain why the water beetle fauna in particular is so limited. Maintaining higher water levels in the fen areas may improve diversity.

The sedge fen areas could be enhanced by selective removal /coppicing of trees to improve light levels. This should be done on rotation.

Continued control of Himalayan balsam is essential.

Stream

The stream supported a rather disappointing assemblage, pollution in the past may have reduced diversity, but the fish population seems healthy.

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INVERTEBRATE SURVEY OF

TADBURN LAKE LNR,

ROMSEY

SOUTH HAMPSHIRE

NOVEMBER 2019

Dr. Jonty Denton

Summary

Monthly surveys of terrestrial invertebrates were carried out from April-September 2019.

Survey date/s: 26th April, 6th May, 11th July, 14th, 21st September

Species total: A total of 504 invertebrate taxa identified

Notable species and assemblages

The survey recorded **3 Favourable assemblages** of species strongly associated with scrub heath & moorland, rich flower resource and scrub edge

These assemblages included **13 species with a conservation designation**.

Species	English name	Family	Order	Conservation status
<i>Nigma puella</i>	A spider	Dictynidae	Araneae	NS
<i>Ero aphana</i>	A pirate spider	Mimetidae	Araneae	NS
<i>Agelastica alni</i>	Alder leaf beetle	Chrysomelidae	Coleoptera	DD;NR
<i>Lythraria salicariae</i>	A flea beetle	Chrysomelidae	Coleoptera	NS
<i>Acalyptus carpini</i>	A weevil	Curculionidae	Coleoptera	Nb
<i>Bagous lutulentus</i>	A weevil	Curculionidae	Coleoptera	Nb
<i>Variimorda villosa</i>	A mordellid beetle	Mordellidae	Coleoptera	NS
<i>Epuraea distincta</i>	A Nitidulid beetle	Nitidulidae	Coleoptera	NA
<i>Elodes minuta</i>	A marsh beetle	Scirtidae	Coleoptera	NS
<i>Pherbellia griseola</i>	A snail killing fly	Sciomyzidae	Diptera	Notable
<i>Lasius brunneus</i>	Bicolored tree ant	Formicidae	Hymenoptera	NA
<i>Macropis europaea</i>	Melittidae	Melittidae	Hymenoptera	[Na];Na
<i>Acronicta rumicis</i>	Knot Grass	Noctuidae	Lepidoptera	Section 41 Priority Species - research only

INTRODUCTION

The project brief was to provide baseline records for invertebrates across the reserve.

METHODOLOGY AND SITE VISITS

The main emphasis of the survey was to find as many rare and notable species as possible within the reviewed groups.

The site was visited specifically for invertebrate surveying on the following dates:-

Standard field techniques were employed to sample the invertebrate fauna across the site. These included sweeping vegetation with a wide mouthed sweep net, beating trees and bushes over a beating tray, and grubbing amongst tussocks and key host plant rosettes etc. In addition a petrol-powered suction sampler was used to sample ground dwelling invertebrates on the

Because it is impracticable to survey all the potential invertebrates within any given site, only specific groups of species were examined during fieldwork. These groups are sufficiently well known as to allow meaningful comparisons to be made with other sites, both locally and nationally. They are also important as indicators of the quality of a site and the habitats present (see Brooks 1993).

Groups covered during the survey were:

- Mollusca (slugs and snails)
- Arachnida (spiders, harvestmen & pseudoscorpions)
- Isopoda (woodlice)
- Thysanura (bristletails)
- Ephemeroptera (mayflies)
- Odonata (dragonflies & damselflies)
- Plecoptera (stoneflies)
- Orthoptera (grasshoppers & crickets)
- Dictyoptera (cockroaches)
- Dermaptera (earwigs)
- Hemiptera-Heteroptera (true-bugs)
- Hemiptera-Homoptera (hoppers)
- Neuroptera (lace-wings)
- Mecoptera (scorpion-flies)
- Lepidoptera (butterflies & moths)
- Trichoptera (caddis flies)
- Diptera (true flies)
- Aculeate Hymenoptera (ants, bees & wasps)
- Coleoptera (beetles)

Measuring the quality of other invertebrate fauna

The invertebrate assemblages present at the site during the survey are assessed using Natural England's Invertebrate Species-habitat Information System (ISIS – 2010 version), as defined in Webb & Lott (2006) and Drake *et al.* (2007). Further developments for the programme are discussed in Lott (2008).

The system was developed for Common Standards Monitoring (CSM) on Sites of Special Scientific Interest (SSSI) but other applications are possible at a range of geographic scales. Lott (2008) describes the essence of ISIS as a database that can be used to recognise invertebrate assemblage types in species lists and evaluate their value for nature conservation.

RESULTS

A total of **503** species of invertebrate were recorded. A full species list with UK statuses is given in Appendix 1. Of the 503 species, **13 species have a conservation designation**. These are summarised in Table 1.

Table 1. list of species with a conservation designation.

Species	English name	Family	Order	Conservation status
<i>Nigma puella</i>	A spider	Dictynidae	Araneae	NS
<i>Ero aphana</i>	A pirate spider	Mimetidae	Araneae	NS
<i>Agelastica alni</i>	Alder leaf beetle	Chrysomelidae	Coleoptera	DD;NR
<i>Lythraia salicariae</i>	A flea beetle	Chrysomelidae	Coleoptera	NS
<i>Acalyptus carpini</i>	A weevil	Curculionidae	Coleoptera	Nb
<i>Bagous lutulentus</i>	A weevil	Curculionidae	Coleoptera	Nb
<i>Variimorda villosa</i>	A mordellid beetle	Mordellidae	Coleoptera	NS
<i>Epuraea distincta</i>	A Nitidulid beetle	Nitidulidae	Coleoptera	NA
<i>Elodes minuta</i>	A marsh beetle	Scirtidae	Coleoptera	NS
<i>Pherbellia griseola</i>	A snail killing fly	Sciomyzidae	Diptera	Notable
<i>Lasius brunneus</i>	Bicolored tree ant	Formicidae	Hymenoptera	NA
<i>Macropis europaea</i>	Melittidae	Melittidae	Hymenoptera	[Na];Na
<i>Acronicta rumicis</i>	Knot Grass	Noctuidae	Lepidoptera	Section 41 Priority Species - research only

HABITAT ASSESSMENT- USING ISIS TO MEASURE SITE QUALITY

ISIS is a computer spreadsheet application for recognising invertebrate assemblage types in species lists collected at scales ranging from management compartment to landscape character area. The assemblage types are labelled in terms that relate to their favoured habitats in order to make them accessible to non-specialists. However, they are actually defined by lists of characteristic species that are generally found together in nature. Two levels are recognised in the classification. Broad assemblage types (BATs) are a comprehensive series of assemblage types that are characterised by more widespread species. They can be expressed in lists from a wide range of sites. Specific assemblage types (SATs) are characterised by ecologically restricted species and are generally only expressed in lists from sites with conservation value. Since 2008 there has also been a third category of assemblage types that cut across this classification. They are mainly defined by lists of species dependent on a particular environmental resource, such as flowers as a source of pollen and nectar. The assemblage type classification is given below. Textual descriptions of each assemblage type and its habitats have been prepared for incorporation into a web-based database. See Table 2.

Table 2. A break-down of the available ISIS assemblage types with number of species assigned to each assemblage.

Arboreal assemblage types	
A1 arboreal canopy (846)	
A2 wood decay (1118)	A211 heartwood decay (175)
	A212 bark & sapwood decay (503)
	A213 fungal fruiting bodies (89)
	A215 epiphyte fauna (20)
Field layer assemblage types	
	F001 scrub edge (179)
	F002 rich flower resource (241)
	F003 scrub-heath and moorland (344)
	F006 dung (99)
F1 unshaded early successional mosaic (1188)	F111 bare sand & chalk (440)
	F112 open short sward (200)
F2 grassland & scrub matrix (1910)	F221 montane & upland (101)
F3 shaded field & ground layer (480)	

The survey recorded **3 Favourable assemblages** of species strongly associated with scrub heath & moorland, rich flower resource and scrub edge (see Table 3).

Specific Assemblage Types (SAT)

SAT code	SAT name	No spp.	condition	% National pool of species	SQS
F001	scrub edge	23	fav	10	130
F002	Rich flower resource	14		6	100
F003	Scrub heath & moorland	11	fav	3	100
A212	Bark and sapwood decay	36	fav	7	108

SURVEY LIMITATIONS

The moth fauna is always under-represented when only diurnal surveys are employed. Light trapping surveys with 2-3 MV and actinic Robinson type traps would add hundreds of species of moth and additional night flying species (Ichneumonidae, Coleoptera etc.)

ECOLOGICAL ASSESSMENT

The seepages feeding into the stream support a . The horsetail feeding weevil *Bagous lutulentus* for which I am aware of only one other modern Hampshire record (Fleet Pond in 1997). The local Delpahcid hopper *Megamelodes quadrimaculatus* was also present.

HABITAT MANAGEMENT

FURTHER WORK

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APPENDICES

APPENDIX 1. SPECIES LIST, 2019

Species	Family	Order	Conservation status
<i>Gammarus pulex</i> sens. str.	Gammaridae	Amphipoda	common
<i>Amaurobius fenestralis</i>	Amaurobiidae	Araneae	common
<i>Anyphaena accentuata</i>	Anyphaenidae	Araneae	common
<i>Araneus diadematus</i>	Araneidae	Araneae	common
<i>Araneus marmoreus</i>	Araneidae	Araneae	common
<i>Araniella cucurbitina</i> sensu stricto	Araneidae	Araneae	common
<i>Mangora acalypha</i>	Araneidae	Araneae	common
<i>Nuctenea umbratica</i>	Araneidae	Araneae	common
<i>Zilla diodia</i>	Araneidae	Araneae	common
<i>Zygiella x-notata</i>	Araneidae	Araneae	common
<i>Clubiona comta</i>	Clubionidae	Araneae	common
<i>Clubiona reclusa</i>	Clubionidae	Araneae	common
<i>Clubiona terrestris</i>	Clubionidae	Araneae	common
<i>Dictyna uncinata</i>	Dictynidae	Araneae	common
<i>Nigma puella</i>	Dictynidae	Araneae	NS
<i>Harpactea hombergi</i>	Dysderidae	Araneae	common
<i>Bathypantes approximatus</i>	Linyphiidae	Araneae	common
<i>Bathypantes gracilis</i>	Linyphiidae	Araneae	common
<i>Erigone atra</i>	Linyphiidae	Araneae	common
<i>Gonatium rubens</i>	Linyphiidae	Araneae	common
<i>Hypomma bituberculatum</i>	Linyphiidae	Araneae	common
<i>Linyphia triangularis</i>	Linyphiidae	Araneae	common
<i>Neriere peltata</i>	Linyphiidae	Araneae	common
<i>Oedothorax gibbosus</i>	Linyphiidae	Araneae	common
<i>Tenuiphantes tenuis</i>	Linyphiidae	Araneae	common
<i>Pardosa amentata</i>	Lycosidae	Araneae	common
<i>Pardosa nigriceps</i>	Lycosidae	Araneae	common
<i>Pardosa pullata</i>	Lycosidae	Araneae	common
<i>Pirata piraticus</i>	Lycosidae	Araneae	common
<i>Ero apha</i>	Mimetidae	Araneae	NS
<i>Philodromus albidus</i>	Philodromidae	Araneae	common
<i>Philodromus aureolus</i>	Philodromidae	Araneae	common
<i>Philodromus cespitum</i>	Philodromidae	Araneae	common
<i>Philodromus dispar</i>	Philodromidae	Araneae	common
<i>Pisaura mirabilis</i>	Pisauridae	Araneae	common
<i>Euophrys frontalis</i>	Salticidae	Araneae	common
<i>Salticus scenicus</i>	Salticidae	Araneae	common
<i>Metellina menegi</i>	Tetragnathidae	Araneae	common
<i>Metellina merianae</i>	Tetragnathidae	Araneae	common
<i>Metellina segmentata</i>	Tetragnathidae	Araneae	common
<i>Tetragnatha extensa</i>	Tetragnathidae	Araneae	common
<i>Tetragnatha montana</i>	Tetragnathidae	Araneae	common
<i>Anelosimus vittatus</i>	Theridiidae	Araneae	common
<i>Theridion tinctum</i>	Theridiidae	Araneae	common

<i>Enoplognatha ovata sensu stricto</i>	Theridiidae	Araneae	common
<i>Neottiura bimaculata</i>	Theridiidae	Araneae	common
<i>Paidiscura pallens</i>	Theridiidae	Araneae	common
<i>Platnickina tincta</i>	Theridiidae	Araneae	common
<i>Robertus lividus</i>	Theridiidae	Araneae	common
<i>Steatoda bipunctata</i>	Theridiidae	Araneae	common
<i>Theridion mystaceum</i>	Theridiidae	Araneae	common
<i>Misumena vatia</i>	Thomisidae	Araneae	common
<i>Xysticus cristatus</i>	Thomisidae	Araneae	common
<i>Xysticus ulmi</i>	Thomisidae	Araneae	common
<i>Anobium fulvicorne</i>	Anobiidae	Coleoptera	common
<i>Ochina ptinoides</i>	Anobiidae	Coleoptera	common
<i>Ptilinus pectinicornis</i>	Anobiidae	Coleoptera	common
<i>Anthicus antherinus</i>	Anthicidae	Coleoptera	common
<i>Aphodius contaminatus</i>	Aphodiidae	Coleoptera	common
<i>Apion frumentarium</i>	Apionidae	Coleoptera	common
<i>Ischnopterapion modestum</i>	Apionidae	Coleoptera	common
<i>Protapion fulvipes</i>	Apionidae	Coleoptera	common
<i>Byturus tomentosus</i>	Byturidae	Coleoptera	common
<i>Cantharis cryptica</i>	Cantharidae	Coleoptera	common
<i>Cantharis nigra</i>	Cantharidae	Coleoptera	common
<i>Cantharis rustica</i>	Cantharidae	Coleoptera	common
<i>Malthinus flaveolus</i>	Cantharidae	Coleoptera	common
<i>Malthodes marginatus</i>	Cantharidae	Coleoptera	common
<i>Rhagonycha fulva</i>	Cantharidae	Coleoptera	common
<i>Rhagonycha lignosa</i>	Cantharidae	Coleoptera	common
<i>Rhagonycha limbata</i>	Cantharidae	Coleoptera	common
<i>Abax parallelepipedus</i>	Carabidae	Coleoptera	common
<i>Agonum fuliginosum</i>	Carabidae	Coleoptera	common
<i>Amara aenea</i>	Carabidae	Coleoptera	common
<i>Calodromius spilotus</i>	Carabidae	Coleoptera	common
<i>Demetrias atricapillus</i>	Carabidae	Coleoptera	common
<i>Leistus spinibarbis</i>	Carabidae	Coleoptera	common
<i>Nebria brevicollis</i>	Carabidae	Coleoptera	common
<i>Notiophilus substriatus</i>	Carabidae	Coleoptera	common
<i>Paradromius linearis</i>	Carabidae	Coleoptera	common
<i>Paranchus albipes</i>	Carabidae	Coleoptera	common
<i>Pterostichus madidus</i>	Carabidae	Coleoptera	common
<i>Pterostichus niger</i>	Carabidae	Coleoptera	common
<i>Trechus quadristriatus</i>	Carabidae	Coleoptera	common
<i>Clytus arietis</i>	Cerambycidae	Coleoptera	common
<i>Grammoptera ruficornis</i>	Cerambycidae	Coleoptera	common
<i>Rutpela maculata</i>	Cerambycidae	Coleoptera	common
<i>Agelastica alni</i>	Chrysomelidae	Coleoptera	DD;NR
<i>Altica lythri</i>	Chrysomelidae	Coleoptera	common
<i>Aphthona euphorbiae</i>	Chrysomelidae	Coleoptera	common
<i>Aphthona nonstriata</i>	Chrysomelidae	Coleoptera	common
<i>Bruchidius villosus</i>	Chrysomelidae	Coleoptera	common

<i>Cassida murraea</i>	Chrysomelidae	Coleoptera	common
<i>Cassida vibex</i>	Chrysomelidae	Coleoptera	common
<i>Crepidodera aurata</i>	Chrysomelidae	Coleoptera	common
<i>Crepidodera aurea</i>	Chrysomelidae	Coleoptera	common
<i>Epitrix pubescens</i>	Chrysomelidae	Coleoptera	common
<i>Galerucella pusilla</i>	Chrysomelidae	Coleoptera	common
<i>Gastrophysa polygoni</i>	Chrysomelidae	Coleoptera	common
<i>Gastrophysa viridula</i>	Chrysomelidae	Coleoptera	common
<i>Hippuriphila modeeri</i>	Chrysomelidae	Coleoptera	common
<i>Lochmaea caprea</i>	Chrysomelidae	Coleoptera	common
<i>Lochmaea crataegi</i>	Chrysomelidae	Coleoptera	common
<i>Longitarsus rubiginosus</i>	Chrysomelidae	Coleoptera	common
<i>Lythraia salicariae</i>	Chrysomelidae	Coleoptera	NS
<i>Plateumaris sericea</i>	Chrysomelidae	Coleoptera	common
<i>Psylliodes affinis</i>	Chrysomelidae	Coleoptera	common
<i>Cis boleti</i>	Ciidae	Coleoptera	common
<i>Ennearthron cornutum</i>	Ciidae	Coleoptera	common
<i>Adalia bipunctata</i>	Coccinellidae	Coleoptera	common
<i>Adalia decempunctata</i>	Coccinellidae	Coleoptera	common
<i>Coccinella septempunctata</i>	Coccinellidae	Coleoptera	common
<i>Halyzia sedecimguttata</i>	Coccinellidae	Coleoptera	common
<i>Harmonia axyridis</i>	Coccinellidae	Coleoptera	common
<i>Propylea quattuordecimpunctata</i>	Coccinellidae	Coleoptera	common
<i>Psyllobora vigintiduopunctata</i>	Coccinellidae	Coleoptera	common
<i>Rhyzobius litura</i>	Coccinellidae	Coleoptera	common
<i>Subcoccinella vigintiquatuorpunctata</i>	Coccinellidae	Coleoptera	common
<i>Acalyptus carpini</i>	Curculionidae	Coleoptera	Nb
<i>Anthonomus pedicularius</i>	Curculionidae	Coleoptera	common
<i>Anthonomus pomorum</i>	Curculionidae	Coleoptera	common
<i>Archarius pyrrhoceras</i>	Curculionidae	Coleoptera	common
<i>Archarius salicivorus</i>	Curculionidae	Coleoptera	common
<i>Bagous lutulentus</i>	Curculionidae	Coleoptera	Nb
<i>Ceutorhynchus obstrictus</i>	Curculionidae	Coleoptera	common
<i>Cionus tuberculosus</i>	Curculionidae	Coleoptera	common
<i>Coelositona cambricus</i>	Curculionidae	Coleoptera	common
<i>Datonychus melanostictus</i>	Curculionidae	Coleoptera	common
<i>Dorytomus taeniatus</i>	Curculionidae	Coleoptera	common
<i>Dryocoetes villosus</i>	Curculionidae	Coleoptera	common
<i>Hylesinus varius</i>	Curculionidae	Coleoptera	common
<i>Limnobaris dolorosa</i>	Curculionidae	Coleoptera	common
<i>Mecinus pascuorum</i>	Curculionidae	Coleoptera	common
<i>Nedyus quadrimaculatus</i>	Curculionidae	Coleoptera	common
<i>Otiorhynchus singularis</i>	Curculionidae	Coleoptera	common
<i>Phyllobius pomaceus</i>	Curculionidae	Coleoptera	common
<i>Phyllobius pyri</i>	Curculionidae	Coleoptera	common
<i>Phyllobius roboretanus</i>	Curculionidae	Coleoptera	common
<i>Polydrusus cervinus</i>	Curculionidae	Coleoptera	common
<i>Polydrusus pterygomalis</i>	Curculionidae	Coleoptera	common

<i>Rhamphus oxyacanthae</i>	Curculionidae	Coleoptera	common
<i>Scolytus intricatus</i>	Curculionidae	Coleoptera	common
<i>Sitona lineatus</i>	Curculionidae	Coleoptera	common
<i>Strophosoma melanogrammum</i>	Curculionidae	Coleoptera	common
<i>Tachyerges salicis</i>	Curculionidae	Coleoptera	common
<i>Dasytes aeratus</i>	Dasytidae	Coleoptera	common
<i>Agabus bipustulatus</i>	Dytiscidae	Coleoptera	common
<i>Hydroporus incognitus</i>	Dytiscidae	Coleoptera	common
<i>Hydroporus memnonius</i>	Dytiscidae	Coleoptera	common
<i>Hydroporus palustris</i>	Dytiscidae	Coleoptera	common
<i>Hydroporus planus</i>	Dytiscidae	Coleoptera	common
<i>Hydroporus pubescens</i>	Dytiscidae	Coleoptera	common
<i>Ilybius montanus</i>	Dytiscidae	Coleoptera	common
<i>Platambus maculatus</i>	Dytiscidae	Coleoptera	common
<i>Agriotes acuminatus</i>	Elateridae	Coleoptera	common
<i>Agriotes lineatus</i>	Elateridae	Coleoptera	common
<i>Athous haemorrhoidalis</i>	Elateridae	Coleoptera	common
<i>Denticollis linearis</i>	Elateridae	Coleoptera	common
<i>Elmis aenea</i>	Elmidae	Coleoptera	common
<i>Limnius volckmari</i>	Elmidae	Coleoptera	common
<i>Notaris acridulus</i>	Eirrhinidae	Coleoptera	common
<i>Anacaena globulus</i>	Hydrophilidae	Coleoptera	common
<i>Anacaena limbata</i>	Hydrophilidae	Coleoptera	common
<i>Anacaena lutescens</i>	Hydrophilidae	Coleoptera	common
<i>Helophorus aequalis</i>	Hydrophilidae	Coleoptera	common
<i>Helophorus brevipalpis</i>	Hydrophilidae	Coleoptera	common
<i>Helophorus grandis</i>	Hydrophilidae	Coleoptera	common
<i>Hydrobius fuscipes</i>	Hydrophilidae	Coleoptera	common
<i>Brachypterus glaber</i>	Kateretidae	Coleoptera	common
<i>Brachypterus urticae</i>	Kateretidae	Coleoptera	common
<i>Kateretes pusillus</i>	Kateretidae	Coleoptera	common
<i>Corticaria impressa</i>	Latridiidae	Coleoptera	common
<i>Corticarina minuta</i>	Latridiidae	Coleoptera	common
<i>Corticaria gibbosa</i>	Latridiidae	Coleoptera	common
<i>Enicmus brevicornis</i>	Latridiidae	Coleoptera	Notable
<i>Dorcus parallelipedus</i>	Lucanidae	Coleoptera	common
<i>Malachius bipustulatus</i>	Malachiidae	Coleoptera	common
<i>Mordellistena variegata</i>	Mordellidae	Coleoptera	NS
<i>Variimorda villosa</i>	Mordellidae	Coleoptera	NS
<i>Epuraea distincta</i>	Nitidulidae	Coleoptera	NA
<i>Epuraea melanocephala</i>	Nitidulidae	Coleoptera	common
<i>Meligethes aeneus</i>	Nitidulidae	Coleoptera	common
<i>Pria dulcamarae</i>	Nitidulidae	Coleoptera	common
<i>Oedemera lurida</i>	Oedemeridae	Coleoptera	common
<i>Oedemera nobilis</i>	Oedemeridae	Coleoptera	common
<i>Stilbus testaceus</i>	Phalacridae	Coleoptera	common
<i>Pyrochroa serraticornis</i>	Pyrochroidae	Coleoptera	common
<i>Neocoenorrhinus germanicus</i>	Rhynchitidae	Coleoptera	common

Cyphon coarctatus	Scirtidae	Coleoptera	common
Cyphon variabilis	Scirtidae	Coleoptera	common
Elodes minuta	Scirtidae	Coleoptera	NS
Elodes minuta sensu auctt. partim non (Linnaeus, 1767)	Scirtidae	Coleoptera	common
Anaspis fasciata	Scraptiidae	Coleoptera	common
Anaspis frontalis	Scraptiidae	Coleoptera	common
Anaspis lurida	Scraptiidae	Coleoptera	common
Anaspis maculata	Scraptiidae	Coleoptera	common
Anaspis pulicaria	Scraptiidae	Coleoptera	common
Anaspis regimbarti	Scraptiidae	Coleoptera	common
Anaspis rufilabris	Scraptiidae	Coleoptera	common
Silpha atrata	Silphidae	Coleoptera	common
Anotylus sculpturatus	Staphylinidae	Coleoptera	common
Anotylus tetracarınatus	Staphylinidae	Coleoptera	common
Anthobium unicolor	Staphylinidae	Coleoptera	common
Deinopsis erosa	Staphylinidae	Coleoptera	common
Drusilla canaliculata	Staphylinidae	Coleoptera	common
Gabrius splendidulus	Staphylinidae	Coleoptera	common
Lesteva sicula	Staphylinidae	Coleoptera	common
Ocypus olens	Staphylinidae	Coleoptera	common
Paederus riparius	Staphylinidae	Coleoptera	common
Philonthus carbonarius	Staphylinidae	Coleoptera	common
Philonthus decorus	Staphylinidae	Coleoptera	common
Quedius mesomelinus	Staphylinidae	Coleoptera	common
Stenus nitidiusculus	Staphylinidae	Coleoptera	common
Stenus ossium	Staphylinidae	Coleoptera	common
Tachyporus chrysomelinus	Staphylinidae	Coleoptera	common
Tachyporus dispar	Staphylinidae	Coleoptera	common
Tachyporus hypnorum	Staphylinidae	Coleoptera	common
Tachyporus nitidulus	Staphylinidae	Coleoptera	common
Xantholinus linearis	Staphylinidae	Coleoptera	common
Bitoma crenata	Zopheridae	Coleoptera	common
Forficula auricularia	Forficulidae	Dermaptera	common
Amauromyza labiatarum	Agromyzidae	Diptera	common
Aulagromyza hendeliana	Agromyzidae	Diptera	common
Phytomyza angelicae	Agromyzidae	Diptera	common
Phytomyza ilicis	Agromyzidae	Diptera	common
Phytomyza spondylii	Agromyzidae	Diptera	common
Sylvicola cinctus	Anisopodidae	Diptera	common
Dioctria atricapilla	Asilidae	Diptera	common
Bibio marci	Bibionidae	Diptera	common
Dilophus febrilis	Bibionidae	Diptera	common
Dasineura pustulans	Cecidomyiidae	Diptera	common
Iteomyia major	Cecidomyiidae	Diptera	common
Empis livida	Empididae	Diptera	common
Neolimonia dumetorum	Limoniidae	Diptera	common
Lonchoptera lutea	Lonchopteridae	Diptera	common

<i>Loxocera albiseta</i>	Psilidae	Diptera	common
<i>Chrysopilus cristatus</i>	Rhagionidae	Diptera	common
<i>Scathophaga stercoraria</i>	Scathophagidae	Diptera	common
<i>Limnia paludicola</i>	Sciomyzidae	Diptera	common
<i>Pherbellia griseola</i>	Sciomyzidae	Diptera	Notable
<i>Pherbellia schoenherri</i>	Sciomyzidae	Diptera	common
<i>Tetanocera ferruginea</i>	Sciomyzidae	Diptera	common
<i>Beris chalybata</i>	Stratiomyidae	Diptera	common
<i>Beris vallata</i>	Stratiomyidae	Diptera	common
<i>Chloromyia formosa</i>	Stratiomyidae	Diptera	common
<i>Pachygaster atra</i>	Stratiomyidae	Diptera	common
<i>Pachygaster leachii</i>	Stratiomyidae	Diptera	common
<i>Cheilosia albitarsis</i>	Syrphidae	Diptera	common
<i>Cheilosia albitarsis</i>	Syrphidae	Diptera	common
<i>Cheilosia pagana</i>	Syrphidae	Diptera	common
<i>Chrysogaster solstitialis</i>	Syrphidae	Diptera	common
<i>Chrysotoxum festivum</i>	Syrphidae	Diptera	common
<i>Epistrophe eligans</i>	Syrphidae	Diptera	common
<i>Episyrphus balteatus</i>	Syrphidae	Diptera	common
<i>Eristalis arbustorum</i>	Syrphidae	Diptera	common
<i>Eristalis pertinax</i>	Syrphidae	Diptera	common
<i>Eristalis tenax</i>	Syrphidae	Diptera	common
<i>Eumerus funeralis</i>	Syrphidae	Diptera	common
<i>Helophilus pendulus</i>	Syrphidae	Diptera	common
<i>Melanostoma mellinum</i>	Syrphidae	Diptera	common
<i>Melanostoma scalare</i>	Syrphidae	Diptera	common
<i>Merodon equestris</i>	Syrphidae	Diptera	common
<i>Platycheirus albimanus</i>	Syrphidae	Diptera	common
<i>Platycheirus rosarum</i>	Syrphidae	Diptera	common
<i>Sphaerophoria scripta</i>	Syrphidae	Diptera	common
<i>Syritta pipiens</i>	Syrphidae	Diptera	common
<i>Syrphus ribesii</i>	Syrphidae	Diptera	common
<i>Volucella inanis</i>	Syrphidae	Diptera	common
<i>Volucella pellucens</i>	Syrphidae	Diptera	common
<i>Xylota segnis</i>	Syrphidae	Diptera	common
<i>Eriothrix rufomaculata</i>	Tachinidae	Diptera	common
<i>Phasia pusilla</i>	Tachinidae	Diptera	common
<i>Tachina fera</i>	Tachinidae	Diptera	common
<i>Anomoia purmunda</i>	Tephritidae	Diptera	common
<i>Nephrotoma appendiculata</i>	Tipulidae	Diptera	common
<i>Tipula irrorata</i>	Tipulidae	Diptera	common
<i>Tipula lateralis</i>	Tipulidae	Diptera	common
<i>Tipula maxima</i>	Tipulidae	Diptera	common
<i>Tipula pagana</i>	Tipulidae	Diptera	common
<i>Tipula paludosa</i>	Tipulidae	Diptera	common
<i>Trichocera regelationis</i>	Trichoceridae	Diptera	common
<i>Impatiens capensis</i>	Balsaminaceae	Ericales	common
<i>Elasmotherus interstinctus</i>	Acanthosomatidae	Hemiptera	common

Elasmucha grisea	Acanthosomatidae	Hemiptera	common
Anthocoris confusus	Anthocoridae	Hemiptera	common
Anthocoris nemoralis	Anthocoridae	Hemiptera	common
Anthocoris nemorum	Anthocoridae	Hemiptera	common
Lyctocoris (Lyctocoris) campestris	Anthocoridae	Hemiptera	common
Orius (Heterorius) majusculus	Anthocoridae	Hemiptera	common
Aphrophora alni	Aphrophoridae	Hemiptera	common
Neophilaenus lineatus	Aphrophoridae	Hemiptera	common
Philaenus spumarius	Aphrophoridae	Hemiptera	common
Aneurus (Aneurodes) avenius	Aradidae	Hemiptera	common
Alebra albostriella	Cicadellidae	Hemiptera	common
Alebra wahlbergi	Cicadellidae	Hemiptera	common
Allygus mixtus	Cicadellidae	Hemiptera	common
Allygus modestus	Cicadellidae	Hemiptera	common
Arthaldeus pascuellus	Cicadellidae	Hemiptera	common
Eupteryx aurata	Cicadellidae	Hemiptera	common
Eupteryx urticae	Cicadellidae	Hemiptera	common
Eupteryx vittata	Cicadellidae	Hemiptera	common
Iassus lanius	Cicadellidae	Hemiptera	common
Kybos butleri	Cicadellidae	Hemiptera	common
Macropsis glandacea	Cicadellidae	Hemiptera	Nb
Zygina flammigera	Cicadellidae	Hemiptera	common
Zyginidia scutellaris	Cicadellidae	Hemiptera	common
Coreus marginatus	Coreidae	Hemiptera	common
Javesella pellucida	Delphacidae	Hemiptera	common
Megamelodes quadrimaculatus sensu lato	Delphacidae	Hemiptera	common
Muellerianella brevipennis	Delphacidae	Hemiptera	common
Gerris (Gerris) lacustris	Gerridae	Hemiptera	common
Hydrometra stagnorum	Hydrometridae	Hemiptera	common
Issus coleoptratus	Issidae	Hemiptera	common
Chilacis typhae	Lygaeidae	Hemiptera	common
Cymus glandicolor	Lygaeidae	Hemiptera	common
Drymus (Sylvadrymus) sylvaticus	Lygaeidae	Hemiptera	common
Heterogaster urticae	Lygaeidae	Hemiptera	common
Scolopostethus thomsoni	Lygaeidae	Hemiptera	common
Apolygus lucorum	Miridae	Hemiptera	common
Blepharidopterus angulatus	Miridae	Hemiptera	common
Campyloneura virgula	Miridae	Hemiptera	common
Capsus ater	Miridae	Hemiptera	common
Closterotomus norvegicus	Miridae	Hemiptera	common
Compsidolon (Coniortodes) salicellum	Miridae	Hemiptera	common
Cyllecoris histrionius	Miridae	Hemiptera	common
Deraeocoris (Deraeocoris) flavilinea	Miridae	Hemiptera	common
Deraeocoris (Deraeocoris) ruber	Miridae	Hemiptera	common
Deraeocoris (Knightocapsus) lutescens	Miridae	Hemiptera	common
Dicyphus (Brachyceroea) globulifer	Miridae	Hemiptera	common
Dicyphus (Dicyphus) epilobii	Miridae	Hemiptera	common

Dicyphus (Dicyphus) errans	Miridae	Hemiptera	common
Dicyphus (Dicyphus) stachydis	Miridae	Hemiptera	common
Dryophilocoris (Dryophilocoris) flavoquadrimaculatus	Miridae	Hemiptera	common
Grypocoris (Lophyromiris) stysi	Miridae	Hemiptera	common
Halticus luteicollis	Miridae	Hemiptera	common
Harpocera thoracica	Miridae	Hemiptera	common
Heterocordylus (Heterocordylus) tibialis	Miridae	Hemiptera	common
Heterotoma planicornis	Miridae	Hemiptera	common
Leptopterna dolabrata	Miridae	Hemiptera	common
Liocoris tripustulatus	Miridae	Hemiptera	common
Lygocoris (Lygocoris) pabulinus	Miridae	Hemiptera	common
Lygus rugulipennis	Miridae	Hemiptera	common
Mecomma (Mecomma) ambulans	Miridae	Hemiptera	common
Megacoelum infusum	Miridae	Hemiptera	common
Megalocoleus molliculus	Miridae	Hemiptera	common
Miridius quadrivirgatus	Miridae	Hemiptera	common
Miris striatus	Miridae	Hemiptera	common
Monalocoris (Monalocoris) filicis	Miridae	Hemiptera	common
Neolygus contaminatus	Miridae	Hemiptera	common
Notostira elongata	Miridae	Hemiptera	common
Orthops (Orthops) campestris	Miridae	Hemiptera	common
Orthotylus (Orthotylus) marginalis	Miridae	Hemiptera	common
Orthotylus (Pachylops) adenocarpi	Miridae	Hemiptera	common
Pantilius (Pantilius) tunicatus	Miridae	Hemiptera	common
Phylus (Phylus) coryli	Miridae	Hemiptera	common
Phylus (Phylus) melanocephalus	Miridae	Hemiptera	common
Pinalitus cervinus	Miridae	Hemiptera	common
Plagiognathus (Plagiognathus) arbustorum	Miridae	Hemiptera	common
Plagiognathus (Plagiognathus) chrysanthemi	Miridae	Hemiptera	common
Psallus (Hylopsallus) assimilis	Miridae	Hemiptera	common
Psallus (Hylopsallus) perrisi	Miridae	Hemiptera	common
Psallus (Mesopsallus) ambiguus	Miridae	Hemiptera	common
Psallus (Psallus) varians	Miridae	Hemiptera	common
Stenotus binotatus	Miridae	Hemiptera	common
Himacerus (Anaptus) major	Nabidae	Hemiptera	common
Himacerus (Aptus) mirmicoides	Nabidae	Hemiptera	common
Himacerus (Himacerus) apterus	Nabidae	Hemiptera	common
Nabis (Dolichonabis) limbatus	Nabidae	Hemiptera	common
Nabis (Nabis) ferus	Nabidae	Hemiptera	common
Nabis (Nabis) rugosus	Nabidae	Hemiptera	common
Nepa cinerea	Nepidae	Hemiptera	common
Notonecta (Notonecta) glauca	Notonectidae	Hemiptera	common
Eurydema (Eurydema) oleracea	Pentatomidae	Hemiptera	common
Palomena prasina	Pentatomidae	Hemiptera	common
Pentatoma rufipes	Pentatomidae	Hemiptera	common
Troilus luridus	Pentatomidae	Hemiptera	common

<i>Livia juncorum</i>	Psyllidae	Hemiptera	common
<i>Eurygaster testudinaria</i>	Scutelleridae	Hemiptera	common
<i>Derephysia (Derephysia) foliacea</i>	Tingidae	Hemiptera	common
<i>Physatocheila dumetorum</i>	Tingidae	Hemiptera	common
<i>Velia (Plesiovelia) caprai</i>	Veliidae	Hemiptera	common
<i>Andrena chrysosceles</i>	Andrenidae	Hymenoptera	common
<i>Andrena haemorrhoa</i>	Andrenidae	Hymenoptera	common
<i>Apis mellifera</i>	Apidae	Hymenoptera	common
<i>Bombus lucorum</i>	Apidae	Hymenoptera	common
<i>Bombus pascuorum</i>	Apidae	Hymenoptera	common
<i>Bombus pratorum</i>	Apidae	Hymenoptera	common
<i>Bombus vestalis</i>	Apidae	Hymenoptera	common
<i>Nomada flava</i>	Apidae	Hymenoptera	common
<i>Arge cyanocrocea</i>	Argidae	Hymenoptera	common
<i>Cephus pygmeus</i>	Cephidae	Hymenoptera	common
<i>Trypoxylon figulus</i>	Crabronidae	Hymenoptera	common
<i>Andricus quercuscalicis</i>	Cynipidae	Hymenoptera	common
<i>Andricus quercuscalicis</i> f. agamic	Cynipidae	Hymenoptera	common
<i>Biorhiza pallida</i> f. sexual	Cynipidae	Hymenoptera	common
<i>Cynips quercusfolii</i> f. agamic	Cynipidae	Hymenoptera	common
<i>Diplolepis nervosa</i>	Cynipidae	Hymenoptera	common
<i>Diplolepis rosae</i>	Cynipidae	Hymenoptera	common
<i>Neuroterus numismalis</i>	Cynipidae	Hymenoptera	common
<i>Neuroterus numismalis</i> f. sexual	Cynipidae	Hymenoptera	common
<i>Neuroterus quercusbaccarum</i> f. agamic	Cynipidae	Hymenoptera	common
<i>Formica fusca</i>	Formicidae	Hymenoptera	common
<i>Lasius brunneus</i>	Formicidae	Hymenoptera	NA
<i>Lasius flavus</i>	Formicidae	Hymenoptera	common
<i>Lasius fuliginosus</i>	Formicidae	Hymenoptera	common
<i>Lasius niger</i>	Formicidae	Hymenoptera	common
<i>Myrmica ruginodis</i>	Formicidae	Hymenoptera	common
<i>Myrmica scabrinodis</i>	Formicidae	Hymenoptera	common
<i>Temnothorax nylanderi</i>	Formicidae	Hymenoptera	common
<i>Amblyteles armatorius</i>	Ichneumonidae	Hymenoptera	common
<i>Megachile willughbiella</i>	Megachilidae	Hymenoptera	common
<i>Osmia (Osmia) bicornis</i>	Megachilidae	Hymenoptera	common
<i>Osmia bicornis</i>	Megachilidae	Hymenoptera	common
<i>Macropis europaea</i>	Melittidae	Hymenoptera	[Na];Na
<i>Vespa crabro</i>	Vespidae	Hymenoptera	common
<i>Vespula germanica</i>	Vespidae	Hymenoptera	common
<i>Vespula vulgaris</i>	Vespidae	Hymenoptera	common
<i>Sorex araneus</i>	Soricidae	Insectivora	common
<i>Talpa europaea</i>	Talpidae	Insectivora	common
<i>Armadillidium vulgare</i>	Armadillidiidae	Isopoda	common
<i>Oniscus asellus</i>	Oniscidae	Isopoda	common
<i>Philoscia muscorum</i>	Philosciidae	Isopoda	common
<i>Porcellio scaber</i>	Porcellionidae	Isopoda	common
<i>Agriphila tristella</i>	Crambidae	Lepidoptera	common

Evergestis forficaris	Crambidae	Lepidoptera	common
Nomophila noctuella	Crambidae	Lepidoptera	common
Pleuroptya ruralis	Crambidae	Lepidoptera	common
Anticollix sparsata	Geometridae	Lepidoptera	common
Campptogramma bilineata	Geometridae	Lepidoptera	common
Phyllonorycter coryli	Gracillariidae	Lepidoptera	common
Phyllonorycter klemannella	Gracillariidae	Lepidoptera	common
Thymelicus sylvestris	Hesperiidae	Lepidoptera	common
Celastrina argiolus	Lycaenidae	Lepidoptera	common
Micropterix calthella	Micropterigidae	Lepidoptera	common
Stigmella aceris	Nepticulidae	Lepidoptera	common
Stigmella anomalella	Nepticulidae	Lepidoptera	common
Stigmella aurella	Nepticulidae	Lepidoptera	common
Stigmella crataegella	Nepticulidae	Lepidoptera	common
Stigmella floslactella	Nepticulidae	Lepidoptera	common
Stigmella malella	Nepticulidae	Lepidoptera	common
Stigmella microtheriella	Nepticulidae	Lepidoptera	common
Stigmella perpygmaeella	Nepticulidae	Lepidoptera	common
Stigmella salicis	Nepticulidae	Lepidoptera	common
Stigmella tityrella	Nepticulidae	Lepidoptera	common
Acronicta rumicis	Noctuidae	Lepidoptera	Section 41 Priority Species - research only
Autographa gamma	Noctuidae	Lepidoptera	common
Colocasia coryli	Noctuidae	Lepidoptera	common
Notodonta dromedarius	Notodontidae	Lepidoptera	common
Phalera bucephala	Notodontidae	Lepidoptera	common
Aglais io	Nymphalidae	Lepidoptera	common
Maniola jurtina	Nymphalidae	Lepidoptera	common
Pararge aegeria	Nymphalidae	Lepidoptera	common
Pyronia tithonus	Nymphalidae	Lepidoptera	common
Vanessa atalanta	Nymphalidae	Lepidoptera	common
Anthocharis cardamines	Pieridae	Lepidoptera	common
Gonepteryx rhamni	Pieridae	Lepidoptera	common
Pieris brassicae	Pieridae	Lepidoptera	common
Pieris rapae	Pieridae	Lepidoptera	common
Sesia bembeciformis	Sesiidae	Lepidoptera	common
Laothoe populi	Sphingidae	Lepidoptera	common
Epiphyas postvittana	Tortricidae	Lepidoptera	common
Pandemis corylana	Tortricidae	Lepidoptera	common
Tortrix viridana	Tortricidae	Lepidoptera	common
Lithobius (Lithobius) forficatus	Lithobiidae	Lithobiomorpha	common
Lithobius (Lithobius) variegatus	Lithobiidae	Lithobiomorpha	common
Potamopyrgus antipodarum	Tateidae	Littorinimorpha	common
Panorpa communis	Panorpidae	Mecoptera	common
Chrysopa perla	Chrysopidae	Neuroptera	common
Chrysoperla carnea sensu stricto	Chrysopidae	Neuroptera	common
Nineta flava	Chrysopidae	Neuroptera	common
Aeshna cyanea	Aeshnidae	Odonata	common

Aeshna mixta	Aeshnidae	Odonata	common
Anax imperator	Aeshnidae	Odonata	common
Calopteryx splendens	Calopterygidae	Odonata	common
Enallagma cyathigerum	Coenagrionidae	Odonata	common
Nemastoma bimaculatum	Nemastomatidae	Opiliones	common
Dicranopalpus ramosus sensu lato (pre 2015)	Phalangiidae	Opiliones	common
Dicranopalpus ramosus sensu stricto (post 2015)	Phalangiidae	Opiliones	common
Mitopus morio	Phalangiidae	Opiliones	common
Paroligolophus agrestis	Phalangiidae	Opiliones	common
Phalangium opilio	Phalangiidae	Opiliones	common
Chorthippus brunneus	Acrididae	Orthoptera	common
Omocestus viridulus	Acrididae	Orthoptera	common
Conocephalus fuscus	Conocephalidae	Orthoptera	common
Meconema thalassinum	Meconematidae	Orthoptera	common
Leptophyes punctatissima	Phaneropteridae	Orthoptera	common
Pholidoptera griseoaptera	Tettigoniidae	Orthoptera	common
Nemoura cinerea	Nemouridae	Plecoptera	common
Deroceras (Deroceras) reticulatum	Agriolimacidae	Pulmonata	common
Arion (Arion) ater	Arionidae	Pulmonata	common
Cochlicopa cf. lubrica sensu Anderson 2008	Cochlicopidae	Pulmonata	common
Zonitoides (Zonitoides) nitidus	Gastrodontidae	Pulmonata	common
Cepaea (Cepaea) nemoralis	Helicidae	Pulmonata	common
Hygromia (Hygromia) cinctella	Hygromiidae	Pulmonata	common
Lehmannia marginata	Limacidae	Pulmonata	common
Limacus flavus	Limacidae	Pulmonata	common
Oxychilus (Oxychilus) cellarius	Oxychilidae	Pulmonata	common
Discus (Gonyodiscus) rotundatus	Patulidae	Pulmonata	common
Oxyloma (Oxyloma) elegans	Succineidae	Pulmonata	common
Succinea putris	Succineidae	Pulmonata	common
Alboglossiphonia heteroclita	Glossiphoniidae	Rhynchobdellida	common
Helobdella stagnalis	Glossiphoniidae	Rhynchobdellida	common
Drusus annulatus	Limnephilidae	Trichoptera	common
Sisyra fuscata	Sisyridae	Neuroptera	common

Appendix 3. Status categories for rare and Notable species

Red Data Book Category 1 (RDB 1) – Endangered

Definition.

Taxa in danger of extinction *in Great Britain* and whose survival is unlikely if the causal factors continue operating.

Included are those taxa whose numbers have been reduced to a critical level or whose habitats have been so dramatically reduced that they are deemed to be in immediate danger of extinction. Also included are *some* taxa that are *possibly* extinct.

Criteria.

Species which are known *or believed to occur* as only a single population within one 10 km square of the National Grid.

Species which only occur in habitats known to be especially vulnerable.

Species which have shown a rapid or continuous decline over the last twenty years and are now *estimated* to exist in five or fewer 10 km squares.

Species which are *possibly* extinct *but have been recorded this century* and if rediscovered would need protection.

Red Data Book Category 2 (RDB 2) - Vulnerable**Definition.**

Taxa *believed* likely to move into the endangered category in the near future if the causal factors continue operating.

Included are taxa of which most or all of the populations are decreasing because of *over-exploitation*, extensive destruction of habitat or other environmental disturbance; taxa with populations that have been seriously depleted and whose ultimate security is not yet assured; and taxa with populations that are still abundant but are under threat from serious adverse factors throughout their range.

Criteria.

Species declining throughout their range.

Species in vulnerable habitats.

Red Data Book Category 3 (RDB 3) – Rare**Definition.**

Taxa with small populations *in Great Britain* that are not at present endangered or vulnerable, but are at risk.

These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range.

Criterion.

Species which are estimated to exist in only fifteen or fewer 10 km squares. *This criterion may be relaxed where populations are likely to exist in over fifteen 10 km squares but occupy small areas of especially vulnerable habitat*

Nationally Scarce Category A - Notable A (Na)**Definition.**

Taxa which do not fall within **RDB** categories but which are none-the-less uncommon in Great Britain and are thought to occur in 30 or fewer 10 km squares of the National Grid or, for less well recorded groups, within seven or fewer vice-counties.

Nationally Scarce Category B - Notable B (Nb)

Definition.

Taxa which do not fall within **RDB** categories but which are none-the-less uncommon in Great Britain and are thought to occur in between 31 and 100 10 km squares of the National Grid or, for less well recorded groups, within eight and twenty vice-counties.

Nationally Scarce - Notable (N)**Definition.**

Taxa which do not fall within **RDB** categories but which are none-the-less uncommon in Great Britain and are thought to occur in between 16 to 100 10 km squares of the National Grid. Species within this category are often too poorly known for their status to be more precisely estimated.

Summary of the IUCN categories and criteria.

- **REGIONALLY EXTINCT (RE)**

A taxon is Extinct when there is no reasonable doubt that the last individual has died. In this review the last date for a record is set at fifty years before publication.

- **CRITICALLY ENDANGERED (CR)**

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered.

- **ENDANGERED (EN)**

A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered.

- **VULNERABLE (VU)**

A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable.

- **NEAR THREATENED (NT)**

A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

- **LEAST CONCERN (LC)**

A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

- **DATA DEFICIENT (DD)**

A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate.

- **NOT EVALUATED (NE)**

A taxon is Not Evaluated when it has not yet been evaluated against the criteria.

GB Rarity Status categories and criteria

- **Nationally Rare (NR)**

Native species which have not been recorded from more than 15 British hectads since 31st December 1979 and where there is reasonable confidence that exhaustive recording would not find them in more than 15 hectads. This category includes species which are probably extinct.

- **Nationally Scarce (NS)**

Native species which are not regarded as Nationally Rare AND which have not been recorded from more than 100 British hectads since 31st December 1979 and where there is reasonable confidence that exhaustive recording would not find them in more than 100 hectads.

Other species status terminology.

- **Local.** Species that are restricted in distribution either geographically or by habitat. Also used for species that are widespread but infrequently encountered, e.g. encountered in no more than 300 10km squares of the national Ordnance Survey grid since 1970. Or those species listed as such, based upon modern geographical data, by ISIS (2010) and/or relevant recording schemes.
- **Widely Scattered.** Generally distributed but at low densities.
- **Southern.** Mainly or completely confined to southern England and/or its westerly or easterly regions – as indicated.
- **Common.** Generally widespread throughout the UK.
- **Unknown.** Usually indicates a lack of available data for difficult taxa but may also imply recent taxonomic confusion.

Freshwater Invertebrate Surveys – Annual school visits programme

Results for Tadburn Meadows:

Species	2018	2019
Amber snail	*	
Bithynia		*
Blackfly larvae		/
Blood worm	*	*
Blue winged olive	*	*
Bullhead fish	*	*
Demoiselle	*	*
Diving beetle	*	*
Fish leech	*	*
Flattened mayfly nymph		/
Flatworm	*	
Freshwater shrimp	*	*
Gnat pupae		/
Hair worm	*	/
Halipus (diving beetle)		*
Hoghouse	*	
Hunting leech	*	*
Leaf cased caddisfly larvae		/
Lesser water boatmen	*	
Midge larvae	*	
Mosquito larvae		/
Non-biting midge larvae	*	*
Phantom midge larvae		*
Pond skater (adult/nymph)	*	*
River limpet		*
Signal crayfish	*	*
Sludge worm	*	
Stick cased caddisfly larvae	*	*
Stone cased caddisfly larvae	*	*
Stonefly nymph	*	*
Swimming caddisfly larvae		*
Swimming mayfly nymph	*	*
Water cricket	*	*
Water mite	*	*
Whirligig beetle	*	*
Water spider	*	
Worm		*

* indicates presence

/ indicates additional records from volunteer Discover Day

Appendix VI

Bat Survey Data

Results from the Annual Bat Survey – Tadburn Meadows transect

Total number of calls recorded for each bat species along Tadburn Meadows transect within each year:

Species	Year						
	2013	2014	2015	2016	2017	2018	2019
Common Pipistrelle	10	25	22	22	33	63	27
Soprano Pipistrelle	10	16	18	5	29	39	25
Noctule	1	0	0	0	2	3	2
Daubentons	0	1	0	0	1	0	1
Serotine	0	0	0	0	1	1	1

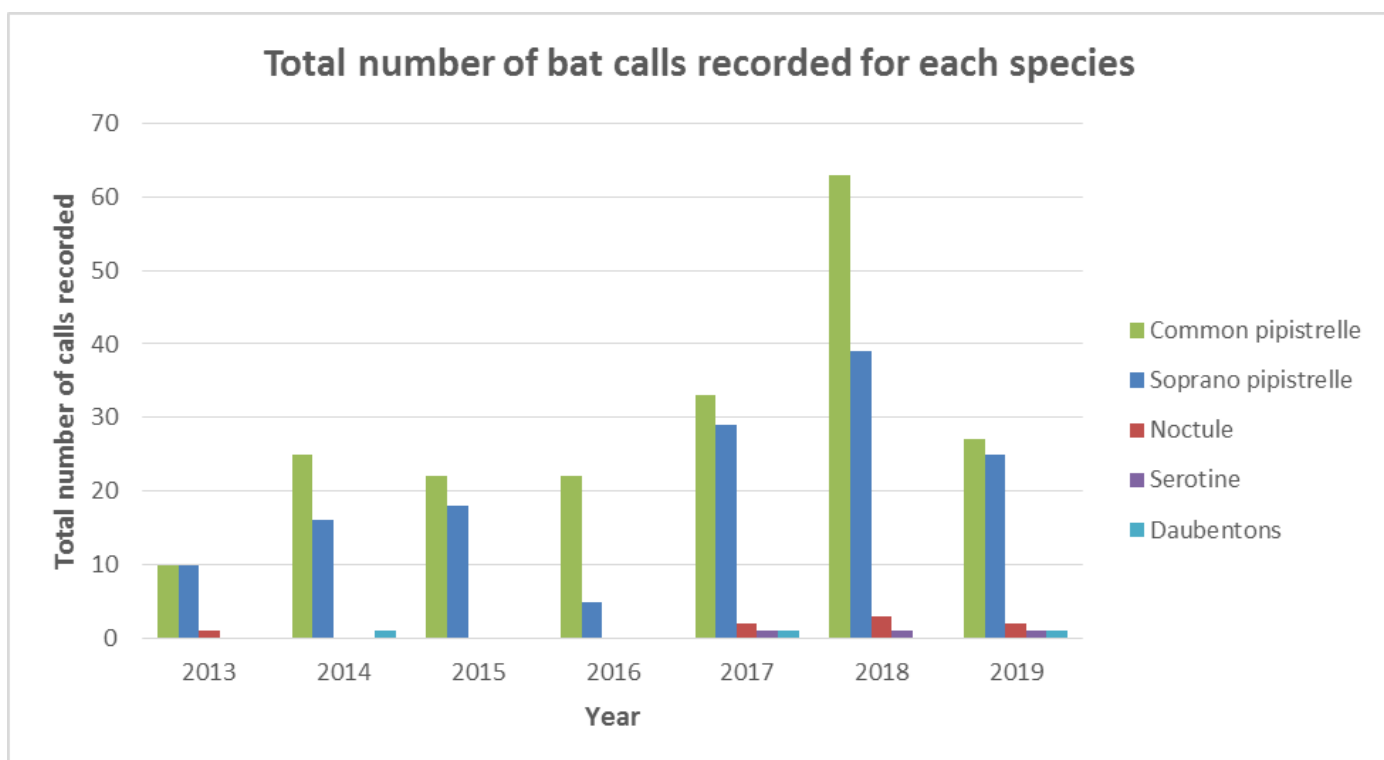


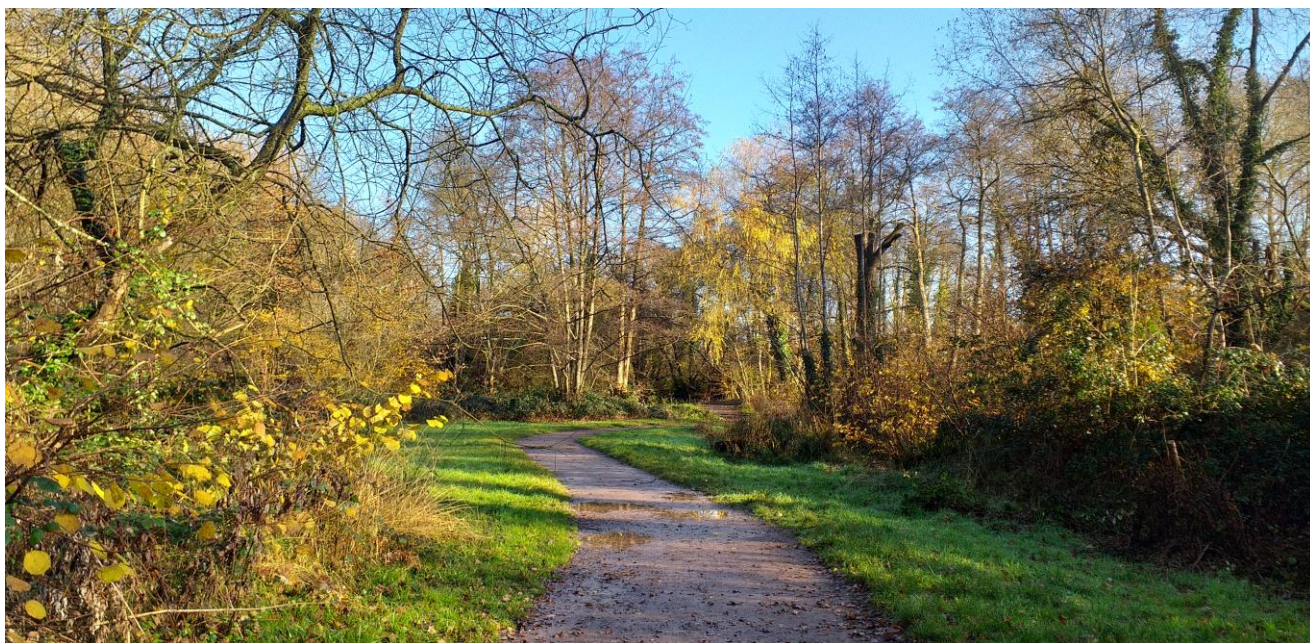
Figure 1: Total number of calls recorded for each bat species along Tadburn Meadows transect between 2013 and 2019, as per results outlined in table above.

Appendix VII

Tadburn Meadows Photographs



Wildflower turf meadow, installed 2017, photographs taken within 2019



Main path through the site



Meadow Mania event – Saturday 11th May 2019



Interpretation boards at entrances



River bank revetment works