WOODSTOCK TOWN COUNCIL

WOODSTOCK WATER MEADOWS MANAGEMENT PLAN (FINAL)

A report prepared by the BBOWT Land Advice Service

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Summary

Woodstock Water Meadows is a 5ha Local Wildlife Site in Oxfordshire.

Much of the site is lowland fen habitat, with areas of semi-improved grassland, wet woodland, and riverside vegetation. A number of 'runnels' cross the site, taking water from the River Glyme.

This plan recommends enhancing the open habitats (fen and grassland) by grazing and mowing; and increasing the structural diversity of the woodland through rotational coppicing.

Brief recommendations are also made for other aspects of site management, including public access, site safety and ecological monitoring.

In order to deliver this plan, a twice-yearly assessment of the extent and quality of the features should be undertaken to determine the summer and winter work schedules.

Introduction

Woodstock Town Council instructed Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust's Land Advice Service to produce a management plan for Woodstock Water Meadows in February 2022.

Features of interest on the site are identified, described and evaluated, and a vision for each is determined. A feature can be a tangible item, such as pond, or a less tangible concept, such as public safety.

After the vision is agreed with stakeholders, a 'prescription' is written which describes the actions required to meet the vision.

This plan has been produced to make management as simple as possible. There are relatively few actions, which can be repeated across the site until the targets for each feature are met.

Instead of identifying which areas should have work undertaken on them over the next five years, as the previous plan did, it is recommended that a simple work schedule should be produced twice a year so that effort from previous years and the available resources can be taken into consideration.

The colours of the headings in the Features section correspond to the Work Timetable and the Habitats Map.

Site description.

This section has been largely taken from the Wychwood Project's management plan for the site, dated May 2014, with revisions for updates and for clarity.

General description

The Meadows form low-lying ground approximately 5.2 hectares (12.8 acres) in extent between Old and New Woodstock in the valley of the River Glyme on the eastern boundary of the Blenheim Estate. The Meadows were granted to the town in a charter of King Henry VI dated 24th May 1453.

The River Glyme flows along the northern boundary of the Meadows along a channel that once fed a mill owned by the Blenheim Estate, at the western end of the site, after which it flows into Queen Pool in the grounds of Blenheim Palace. A second channel – The Cut - flows through the middle of the site and also feeds into Queen Pool at its western outflow. This secondary channel draws water from the Glyme, via an overspill syphon and weir at the eastern end of the site; and from a number of drainage 'runnels' (constructed in 1980) that cross the site. Water flows into these runnels from a catch-ditch that runs parallel to the Glyme which collects water from several leak points in the bank of the Glyme, particularly at the western end, and a pipe that takes water directly from the Glyme.

The 1882 OS map indicates that there were three channels – the main northern channel which fed the mill, a southern channel that appears to take water from a sub-channel of the Glyme (now lost to the housing of Brook Hill and the industrial estate) and a central channel – the current southern channel or 'Cut' - that is fed by secondary flows from local drainage channels. The Black Prince public house is located on the northern bank of the Glyme at the western end of the site. There are two depth gauges, by the Black Prince and the eastern weir. The drainage runnels divide the Meadows into a number of compartments.

Fences have been installed across the site to manage grazing. A livestock bridge previously linking Compartments 5 and 6 has been removed, leaving a ford.

To the south of the Meadows are 20th Century houses of Brook Hill and to the east, houses and flats of Glyme Close. Further to the north-east of the Meadows is a light industrial complex, beyond which is a more extensive area of wet woodland.

The site's use as a functioning 'water meadow' to an historians' definition (areas of land that used to be flooded deliberately, under carefully controlled conditions, the timing being at the discretion of the farmer or landowner) is difficult to establish. The 1847 tithe record lists the area as being 'meadow' whereas other areas of land are listed as 'water meadow'. The description 'water meadow' is often attributed to flood meadows or any areas of land adjacent to rivers, which may be the case for the Woodstock Water Meadows. This has little bearing on the future management of the site, but may inform interpretation and restoration efforts.

Site management

The Meadows are owned and managed by Woodstock Town Council. Management decisions are taken by a sub-committee of the Town Council which sets aside an annual budget for maintenance work on the Meadows. Practical maintenance work is undertaken by contractors engaged by the Town Council supported by local conservation groups including Woodstock Green Gym, Oxford Conservation Volunteers and, in previous years, The Conservation Volunteers (formerly BTCV).

Staff of West Oxfordshire District Council Environmental Services Department provide a regular site check service and deal with minor infrastructure issues. In previous years there has been an active 'Friends of Woodstock Water Meadows' group.

The meadows have a long history of being grazed. Photographs from the early 20th Century show sheep grazing short meadow grass close to the Black Prince. In recent years grazing by a small number of Dexter cattle was reintroduced in Compartments 4 – 6 with the intention of controlling the amount of Himalayan Balsam. Grazing is complicated by the relative remoteness, the need to check cattle daily and the difficulty of moving cattle from the site at short notice if required. The removal of a carcass proved very difficult due to the poor access.

Compartments 3 – 6 have been managed under an Environmental Stewardship agreement which ended in August 2005.

Public access

The Meadows are a popular local area, used by many people for quiet recreation. Public access is gained at four points and makes use of a network of paths supplemented by footbridges, stiles and kissing gates shown in Figure 6.

The main paths that run east-west parallel to the Glyme and The Cut, and north-south between compartments 1 and 2 are public rights of way (public footpaths).

The path alongside the Glyme forms part of a the Glyme Valley Way, a 16 mile walk between Chipping Norton and Woodstock, promoted by Oxfordshire County Council.

The Meadows regularly flood during periods of heavy rain and can remain flooded for a considerable time. There are warning signs at the main entrances.

Each year the Mock Mayor ceremony which involves various water-based activities takes place on the stretch of the Glyme above the Black Prince public house.

At the eastern end of the site, where Compartment 6 borders onto houses of Glyme Close there is potential encroachment of private gardens into the Meadows. The Town Council are taking steps to stop encroachments.

The Town Council licences fishing on the Meadows outside the closed season of 15th March to 15th June and subject to various restrictions on behaviour.

Site safety

The Town Council take the safety of visitors to the site very seriously. Following the tragic death of a child at the weir in 1998, a review of the site was conducted by ROSPA – the Royal Society for the Prevention of Accidents - and a range of fences, bridges and culvert grills installed. The Town Council inspect the condition of these features each year and make good as required.

A further review was undertaken by ROSPA in 2020.

Designations

The two main channels are designated as a Main River which requires permission to be sought from the Environment Agency before undertaking works which may affect the flow of water in these channels. The Meadows do not form part of a local authority conservation area, so there is no blanket protection of trees under this designation. There are no known sites of scheduled historic or archaeological interest. Blenheim Palace is a World Heritage Site and the lakes to the west of the Meadows are a 'Site of Special Scientific Interest' (SSSI).

The site is not within a statutory nature conservation designation, however the Meadows lie within the Glyme and Dorn Conservation Target Area (a local designation of areas of high biodiversity conservation potential) and the Meadows was designated a Local Wildlife Site (LWS) in 2014 for its Lowland Fen, wet woodland and floodplain grazing marsh.

The process to designate the site a Local Nature Reserve (LNR) is underway. An LNR designation can give the local authority landowners increased powers and imposes a duty to manage the land for nature conservation.

Overarching vision.

Woodstock Water Meadows will be a haven for wildlife, while continuing to be a pleasant place for quiet, informal recreation.

The site will be a safe place for people to visit and more of the area will be accessible to people with limited mobility.

The Water Meadows will be predominantly open fen and swamp habitats, with the extent of tree cover reduced. All habitats will have increased diversity, and non-native invasive plants and animals will be rare.

The management of the site will not increase the flood risk to properties, but it will help to decrease the risk of downstream flooding by holding an appropriate amount of water in extreme conditions. Management will aim to maintain a balance between reducing flood risk and enhancing biodiversity.

The site will be part of a wider 'nature recovery network', forming substantive links between adjacent and nearby habitats so that wildlife can recover and adapt to pressures like climate change.

The site will be protected from external impacts including encroachment, litter and pollution.

More detailed visions are given for each Feature identified, below.

Features

Phase One Visions are those that can be met within the existing available resources. Phase Two Visions are more ambitious and are likely to require a funded project for their delivery. There is an opportunity for Woodstock Water Meadows to be part of a 'Nature Recovery Network' project encompassing a large part of the River Glyme catchment above the Water Meadows, led by BBOWT and The Blenheim Estate

Phase Two Visions are not expanded in the 'Management Prescriptions' sections, as they will be considered as part of a larger project.

1. Lowland Fen

Evaluation

Fens are peatlands which receive a significant proportion of their water and nutrients from the soil, rather than just from rainfall. The acidity or alkalinity of that water is influenced by the soil and underlying rock so, in limestone areas such as Woodstock, the water is alkaline so plants that survive better in alkaline conditions are more likely to grow. Because of these conditions, fens can support a special mixture of plants not found elsewhere.

Many areas of Fen in the UK have been drained for agriculture or have changed to woodland, causing them to dry out and the plants and animals associated with them to become rare.

The areas of fen at Woodstock Water Meadows are considered to be 'swamp' as they are occasionally inundated and are dominated by tall vegetation. Plants like reed canary-grass and reed sweet-grass cover much of the area, with meadowsweet, creeping buttercup, hedge bindweed, amphibious bistort, water mint, great willowherb and marsh horsetail. Other plants associated with wetlands including brooklime, water forget-me-not, wild angelica, flag iris, gypsywort, bittersweet, purple loosestrife and common valerian can also be found. The non-native invasive, Himalayan Balsam, now dominates much of the area. This plant, introduced from Asia in the 1800s, is now common in many of our wetlands. Its seeds spread along rivers and streams and it out-competes other, often rarer, plants.

Fens can support lots of wildlife not found elsewhere, including rare insects and plants. Woodstock Meadows has historic records of Good King-Henry and Round-leaved mint, both on the 'red list' because of their scarcity, however these were not seen during the 2013 survey.

Historically, the whole of the Water Meadows is likely to have been covered in fen habitat, but significant areas have been lost to agricultural improvement to species-poor grassland, and through succession to wet woodland. Although wet woodland is an important habitat, the woodland at Woodstock Water Meadows is relatively recent and so supports less wildlife than older woodland. Maintenance and restoration of the open (treeless) fen habitat is therefore a higher priority.

Vision

The fen will be buzzing with wildlife and home to lots of plants indicative of good quality fen habitats. The areas shown as fen on the Vision Map will be predominantly open (free of trees and scrub) and will have a diverse mix of positive indicator plant species. The structure of the vegetation will also be varied, with short patches amongst the taller tussocks.

Phase One Targets:

- Open fen habitat will cover 30% of the site (1.7ha).
- The fen will be species-rich, having at least 3 positive indicator species (Meadowsweet, Amphibious Bistort, Water Mint, Brooklime, Water Forget-me-not, Flag Iris, Gypsywort, Purple Loosestrife and Common Valerian) per square metre.
- Negative indicator plant species (nettles, Himalayan Balsam, Creeping Thistle, Spear Thistle or docks) will cover less than 5% of the area.
- 90% of the fen will have 'tussocky' vegetation structure, with areas of short (<20cm) and tall (>60cm) tall vegetation.

Phase Two Targets:

- The same as for Phase One, but open fen habitat will cover 50% of the site (2.5ha).

Management Prescription

The fen can be restored and maintained by the removal of trees and scrub, and appropriate grazing.

To achieve the targets, trees and scrub should be removed on the areas of Fen shown in the Habitat Map.

Scrub and tree removal

- An annual restoration plan should identify which areas of scrub and trees should be removed each year.
- All scrub and tree work should take place from September to February to avoid disturbance to nesting birds. The beginning of this period is preferable because the site may be too wet later in the winter.
- Tree felling (trees over 8cm at a height of 1.3m) may require a felling licence from the Forestry Commission if you are felling over 5 cubic metres in one year.
- The Water Meadows lies within the Woodstock Conservation Area. This means that West Oxfordshire District Council need to be consulted before carrying out any tree works, as if every tree was protected by a Tree Preservation Order.
- Trees and scrub to be felled should be cut, using a bowsaw or chainsaw, to ground level. Stumps should be horizontal and as low as possible.
- All cut vegetation should, where possible, be removed from site. If it is left on site, it could increase flood risk, add to the nutrients and can form unsightly piles. The vegetation can be burnt on a bonfire (waste exemption required), taken away for firewood, or chipped and removed from site. Bonfire sites should be located on areas of low botanical value (in a previously shaded area, for example), be kept to a minimum and the same site used each year.
- Regrowth of scrub can be reduced by spot-treating the stumps using a suitable herbicide. This should be undertaken with care and not near a waterbody.

Grazing

- Grazing removes vigorous grasses, allowing other, often less common, plant species to germinate and thrive. The right level of grazing creates a varied structure to the vegetation, which can support much more wildlife. It can reduce the growth of scrub and tree species which might otherwise take over the Water Meadows. Over time, grazing can reduce the amount of nutrients in the soil – creating the ideal conditions for some less common plants.

In addition, dung is an important habitat for many fungi and invertebrates. It is a vital part of the food chain for an ecosystem.

- An ideal grazing regime would be a small number of 'traditional-breed' cattle (about 6) on site from late summer through to winter, or when the site becomes too wet and begins to get 'poached' (cut up by hooves). This will allow plants to flower and set seed and will help to remove excess grass.
- Cattle should not be allowed to wander freely between compartments, but should be kept in one compartment until they have grazed the sward down before being moved to the next compartment. Good quality fencing is essential.
- No supplementary food should be used, but when the cattle are hungry they can be moved to the next compartment of removed from site. A mineral block can be used.
- Trained volunteers can be employed to check livestock on a daily basis. Cattle need access to a reliable source of water (pasture pumps could be utilised) and secure fencing.
- Sourcing livestock will be a challenge. Previous graziers have dropped out because of the size and inaccessibility of the site, and because of movement restrictions due to bovine TB. A number of nearby landowners and farmers should be approached to source appropriate livestock and an annual payment may have to be made.

Mowing

- Mowing the vegetation is much less preferable to grazing, as it does not create the same diversity of vegetation structure and cannot reach all areas of the fenced compartment. It is, however, a viable alternative in the absence of sufficient grazing.
- Mowing can be undertaken in July or August, using a power scythe, brushcutters or traditional scythes. As much of each compartment as possible should be mown, including brambles and other scrub species.
- All cut material must be removed from site to avoid the build-up of dead plant material and the suppression of other plants. This can be baled and used for feeding livestock, or composted.

2. Wet woodland

Evaluation

Most of the wet woodland at Woodstock Water Meadows has grown up on the former fen areas because of a reduction in grazing or mowing. Tree seedlings are able to establish and spread across the fen, growing up to form stands of crack willow, alder and other trees which are able to grow in wet conditions. The ground flora includes a number of common species associated with damp woodland including Water Mint, Pendulous Sedge, Wild Angelica, Hemp-agrimony, Meadowsweet and Water Forget-me-not.

Some trees within the wet woodland, and some areas of woodland, have been planted, mostly with exotic tree species such as hybrid poplars and Italian Alders. These trees are less likely to support as much wildlife as native trees species. Some of them were probably planted to screen the houses on Brook Hill from the Water Meadow, but this has become less effective as the trees have grown up.

Good quality wet woodland can support high numbers of wildlife species. The humid conditions are good for mosses and ferns, and the dead wood is home to lots of insects like beetles and craneflies. Birds and mammals such as otters, will also make use of the wet woodland.

The wet woodland at Woodstock Water Meadows is an important feature, but it should not be allowed to expand to the expense of the fen habitat, and areas of it can be cleared to restore the fen. Clearance efforts should focus on the woodland that borders good quality fen habitat and stands of exotic tree species.

Further up the catchment, wet woodland can have an important role in flood prevention, as its complexity slows the flow of water across the site. At Woodstock Water Meadows, however, it is unlikely to have a significant impact and should be managed accordingly.

Over time, without intervention, areas of the wet woodland are likely to dry out because of a build-up of vegetation matter. This would be detrimental to the ecology of the site.

Vision

The wet woodland will be alive with bird song and home to a wide variety of plants and animals associated with the habitat. There will be a varied woodland structure with a few mature canopy trees above a coppiced understorey and diverse ground flora. There will be some standing deadwood and some fallen deadwood which will, as far as reasonable, be prevented from adding to the flood risk. Non-native invasive species will be rare.

Phase One Targets:

- Wet woodland habitat will cover 2.5ha (50%) of the site.
- At least three age classes of trees (small (tin can sized), medium (huggable), large (hide behind) and a pollarded veteran (with features like cracks, rot holes, dead branches and hollows) will be visible throughout the wood.
- One large piece of deadwood will be visible throughout the woodland
- As much cut timber as possible will be removed from site or secured so that it cannot add to the flood risk.
- Negative indicator plant species (nettles, Himalayan balsam) will cover less than 5% of the area.
- One tree, pollarded within the last 5 years, will be visible throughout the site.

Phase Two Targets:

- The same as for Phase One, but wet woodland habitat will cover 30% of the site (1.7ha).

Management Prescription

The wet woodland feature should be maintained by coppicing, pollarding and the removal of non-native invasive species.

Coppicing is cutting trees and scrub to ground level and then allowing them to regrow. Pollarding is similar, but the trees are cut at a higher level, normally out of the reach of livestock. Both practises encourage bushy growth and can increase the diversity of the vegetation structure.

- An annual maintenance plan should identify which areas of scrub and trees should be coppiced or pollarded each year. Areas which have not been coppiced or pollarded in recent years should be targeted.
- A plot approximately 20m x 20m should be identified each year and most of the trees coppiced or pollarded, leaving five trees in this plot to become ‘standards’.
- All scrub and tree work should take place from September to February to avoid disturbance to nesting birds. The beginning of this period is preferable because the site may be too wet later in the winter.

- Tree felling (trees over 8cm at a height of 1.3m) may require a felling licence from the Forestry Commission if you are felling over 5 cubic metres in one year.
- The Water Meadows lies within the Woodstock Conservation Area. This means that West Oxfordshire District Council need to be consulted before carrying out any tree works, as if every tree was protected by a Tree Preservation Order.
- Trees and scrub to be coppiced should be cut, using a bowsaw or chainsaw, to ground level. Stumps should be horizontal and as low as possible.
- As much cut vegetation as should be removed from site. If it is left on site, it increases flood risk, adds to the nutrients and can form unsightly piles. The 'lop and top' can be burnt on a bonfire (waste exemption required), while the logs can be taken away for firewood, or chipped and removed from site. Bonfire sites should be: located on areas of low botanical value (in a previously shaded area, for example), be kept to a minimum, and the same site used each year.
- Dead wood is an important habitat. Standing deadwood should be left unless it poses a hazard to visitors. Any cut timber that is left on site must be secured to ensure that it is unable to float away and increase the flood risk. This will be easier if cut trunks are left whole so that they jam up against other trees. As a last resort, timber can be 'tied down' using a series of timber stakes, fencing wire and staples.

3. Semi-improved grassland

Evaluation

Semi-improved grassland is land which has been 'improved' for agriculture by the addition of fertiliser and seeding of more productive grasses, making it less diverse botanically and less good for wildlife than 'unimproved' grassland. 'Semi-improved' grassland is, however, not a monoculture and it does retain some diversity in grass and flower species.

This feature is found in the drier compartments (5 and 6) to the east of the site.

The sward here is dominated by creeping bent (a grass) and creeping buttercup, with other coarse grasses like perennial rye-grass and Yorkshire fog and other plants like ground ivy, wood dock and creeping thistle. Reed canary-grass dominates in some of the wetter areas.

This habitat is the least valuable for wildlife at the Water Meadows, as it has little diversity in plant species and structure.

Semi-improved grassland can support some wildlife in the form of flowers as a nectar and pollen resource, and cover for small mammals which can tunnel under the tussocky sward.

This habitat can be improved for wildlife by increasing the cover of wild flowers and enhancing the structural diversity in the form of tussocks.

The areas of semi-improved grassland do provide an opportunity for visitors to stop and enjoy this quiet space, at a distance for the main road. This area could be used for small-scale events like community picnics and environmental education.

Phase One Targets:

- Semi-improved grassland will cover 0.7ha (13%)
- The cover of wildflowers and sedges will increase to 20%
- At least two species of wildflower will be present per square metre.

- Negative indicator plant species (nettles, creeping thistle, spear thistle, hogweed or docks) will cover less than 5% of the feature
- The vegetation will be short (<5cm and >20cm) on 80% of the feature from July – February each year.
- 20% of the feature will have longer (30cm – 50cm) vegetation throughout the year.

Phase Two Targets:

- The same as for Phase One and:
- Safe and easy access to this feature will be possible for all abilities and those with off road buggies and wheelchairs, at all time of the year.

Management Prescription

Without management intervention, the areas of semi-improved grassland will become more rank (dominated by coarse, tussocky grasses) and then eventually turn into scrub. This is less desirable because it will be less accessible for local people to use as a recreational resource.

To maintain its openness and accessibility, grazing or mowing would be appropriate.

Grazing is the most desirable management for this feature. An appropriate intensity of grazing can create a 'diverse sward structure' (a mixture of short and long vegetation, and some muddy patches) and stop the build up of 'thatch' (dead plant material which can inhibit the growth of less vigorous plants), both of which can lead to a more species-rich sward over time.

Grazing would ideally be in place after plants have flowered and set seed (August), and off again before too much 'poaching' (cutting up of the ground by livestock's hooves) occurs. This latter date is dependent on the weather and volume of available food.

Livestock should not be fed with supplementary hay or other feed. They should be removed before this is required. A mineral lick can be used, if required.

Up to four traditional breed cattle (such as Dexters or Galloways) can be used. The more cattle used, the shorter the time they will need to be on site.

The two semi-improved grassland paddocks should be grazed separately, ie the livestock should not be allowed to roam between the two, but should be kept in one compartment by a closed gate. This will allow the public to use the other compartment without disturbance from livestock and allow the vegetation in the ungrazed compartment to recover. The livestock should be moved from one compartment to the other when the vegetation is still tussocky, but about 80% of it is 5cm – 20cm tall.

If the vegetation is considered too long for public access before grazing is in place, then a portion of compartment 6 can be mown. This should be large enough to meet the normal requirements of visitors, but leaving at least a 3m strip unmown all the way round the compartment. See next section for a mowing prescription.

Mowing is less desirable than grazing as the 'arisings' (cut vegetation) will need to be removed and it does not produce the same diversity of sward structure as grazing.

If grazing is not available, mowing can be used. Mowing should take place after plants have flowered and set seed (August) except for areas required for public access (see above) which can be mown earlier and more frequently. All cut material should be removed to prevent a build-up of 'thatch'.

This should, ideally, be removed from site and composted, but could be heaped in a discreet corner if necessary. It must not be left on the ground, where it will supress less vigorous plant species.

Mowing can be undertaken by volunteers or contractors, using scythes, brushcutters, a self-propelled power scythe (like this one: https://www.tracmaster.co.uk/collections/bcs-crusader-power-scythes) or a cut and collect flail mower.

All cut material should be removed using hay rakes and pitch forks, ideally into a trailer for removal from site, or into a pile in a discrete corner if removal from site is not a possibility.

If an area of the compartment has been mown earlier in the year for public access, then the remainder of the compartment can be mown in August. To preserve a 'reservoir' for wildlife, 50% (in 5m – 10m stretches) of a 3m wide margin around each compartment can be left unmown each year. The uncut stretches should then be cut the following year and subsequent alternate years. This will discourage scrub and brambles from encroaching into the grassland.

4. Ponds

Evaluation

Ponds can be an important habitat feature, supporting lots of wildlife. However, 50% of ponds in the UK were lost in the 20th century, so many freshwater species reliant on ponds are threatened. Variety within a pond, between ponds, and over time, helps to support more wildlife. Ponds which dry out, partially or completely, can support a specific range of species, so this isn't necessarily a problem.

Ponds should have a variety of vegetation living in and around them, including floating, emergent submerged and bankside plants. All these different types of plants can provide resources for a host of wildlife. Trees adjacent to ponds can be beneficial, providing lots of useful resources for wildlife like rotting leaves for damselfly larvae to hide in, and willow roots where water beetles and mayflies live. Too much shade from trees can, however, stop other plants from growing.

Ponds and other wetlands are especially prone to infestation by non-native invasive plants because transport between sites is facilitated by normal waterflow and flooding and wetland plants can often reproduce quickly from tiny fragments of plant material. The highly invasive New Zealand pygmy weed is present in at least one of the ponds.

In order to create additional open water habitat for wildlife, rather than removing vegetation and silt from an existing pond, it is often better to create new ponds nearby. These can be small and shallow and prone to seasonal drying.

Two ponds were created by Pond Conservation (now Freshwater Habitats Trust) at Woodstock Water Meadows in 1996. These are now within the wet woodland in compartments 1 and 2a. Both are heavily shaded by adjacent willow trees and contain little vegetation apart from duckweed. Some coppicing and pollarding has been undertaken recently, presumably to try and reduce shading.

Vision

The two ponds on the Water Meadows will be restored to wildlife-rich habitats, with a wide variety of aquatic plants and animals. They will have a variety of floating, emergent, and submerged plants

growing in them. Dragonflies will chase their prey above the ponds, frogs will spawn in them, and they will have pond skaters and water boatmen skimming across their surface.

To increase variety, the two ponds will be managed in different ways. The pond to the west will be less shaded by adjacent trees, potentially allowing more aquatic vegetation to grow. The pond to the east will have more shading and therefore more features associated with woodland ponds.

Non-native invasive plants will be rare.

Phase One Targets:

- West pond:
    - The pond will have direct sunlight for at least 4 hours of the day during the summer.
    - Between 40% and 80% of the pond will have vegetation growing in it.
    - Between 60% and 20% of the pond will be open water.
    - There will be at least 5 aquatic species growing in the pond.
    - Emergent, floating and submerged plant species will all be represented.
    - Non-native invasive plants will be absent or have less than 5% cover.
- East pond
    - The pond will be shaded at all times of the year.
    - There will be at least one piece of large woody debris in the pond.
    - Between 80% and 90% of the pond will be open water.
    - Non-native invasive plants will be absent or have less than 5% cover.

Phase Two Targets:

- The same as for Phase One and:
- More ponds will be created across the site to provide an increased variety of wetland habitat.

Management Prescription

West Pond

This pond will benefit from the removal of some of the surrounding scrub and trees to increase the amount of light and allow more vegetation to colonise. All trees and scrub on the southern side of the pond within 10m should be coppiced annually and the cut material removed.

On the northern side of the pond, all scrub within 10m of the pond should be coppiced on a three-year rotation, ie one third of scrub and trees cut each year. This will increase the amount of light reaching the pond and encourage more plants to grow.

Plants should not be introduced to the ponds, ‘new’ plants should be allowed establish from the existing seedbank or find their way in naturally.

If the pond becomes more than 80% covered in vegetation, some can be removed.

This can be undertaken annually by pulling vegetation from the pond. The vegetation can be removed on a rotation, by clearing one eighth of the vegetation from the middle to the edge, like slices of pie. An adjacent ‘slice of pie’ can be cleared the following year.

Pull the vegetation by hand, or use a ‘crome’ (aka a drag fork) to pull the vegetation to the side of the pond and pile it close to the edge of the pond to allow pond wildlife to return to the pond. The pile of vegetation will, ideally, be removed from site for composting after a few weeks, or moved further away from the pond into the wooded area.

East Pond

This pond will require less management that the West Pond, and the surrounding area should be managed as the Wet Woodland feature. If there is no large woody debris in the pond then one nearby tree can be felled into the pond, ideally keeping it attached at the stump, or tying it down as described in the wet woodland feature.

Any non-native invasive plant species should removed with as much resources as are available.

5. Riverside vegetation

Evaluation

Where it is unshaded by bankside trees (approximately one third of its length in the Woodstock Water Meadows), the vegetation on the banks of the River Glyme is dominated by tall plants including Reed Sweet-grass, Great Willowherb, Nettle and Himalyam Balsam. The plants within the river channel itself include Water Crowfoot, Water-cress, Water Forget-me-not and Blue Water-speedwell.

The unshaded, vegetated stretches of the river are flower-rich and have a varied vegetation structure which supports wildlife such as hoverflies and nesting birds.

The other two thirds of the length of the River Glyme are shaded by adjacent Alder, Willow and other tree species. These sections tend to have less bankside vegetation, but the tree roots provide shelter for fish and help to stabilise the bank. Falling leaves and twigs provide food for detritovores which are, in turn, food for fish.

Large woody debris, in the form of fallen trees and large branches, can provide valuable underwater shelter and create complex water flows, increasing the diversity of the riverbed. It is important that such debris does not increase the flood risk by excessively blocking the flow or floating downstream and causing an obstruction elsewhere.

It is therefore desirable to maintain both open (treeless) stretches and tree-lined stretches of the river side.

Vision

The stretch of the River Glyme through the Woodstock Water Meadows will have lengths where tall, flower-rich bankside vegetation dominates. These areas will also have a healthy aquatic flora, with floating and emergent plants, including a healthy population of Ranunculus, which will cover between 50% and 70% of the riverbed in the open areas. On the banks there will be a small amount of dead vegetation among the live plants, but it will not be allowed to dominate.

Other lengths will have dense, scrubby tree cover, providing all the benefits described above but reducing the risk of falling and their root plates causing further damage to the bank.

There will be some interventions in the river to make the flow more complex and increase velocity in places. This will enhance biodiversity and will not increase the risk of flooding.

Phase One Targets:

- Maintain the open (treeless) habitats by annual cutting of vegetation on the bankside.
- Create and maintain dense, scrubby vegetation in the tree-lined areas by rotational coppicing.

Phase Two Targets:

- The same as for Phase One and:
- Ensure that the banks of the River Glyme are stabilised using 'soft' engineering measures.
- Utilise soft engineering to increase the amount of emergent and bankside vegetation in the open habitats and increase the flow velocity. These elements will need to be assessed and designed on an 'as needs' basis.

Management Prescription

In the open (treeless) stretches, the bankside vegetation can be managed by mowing on a rotation.

Using scythes, brushcutters or a power scythe, cut 50% of the tall, bankside vegetation in 10m-15m stretches. Cut the other 50% the following year and subsequently alternate.

Remove all cut vegetation as per the Semi-improved Grassland feature.

In the areas with more tree cover, coppice some of the trees on rotation, leaving some of the larger, more attractive trees to grow as standards. One out of ten trees can be cut each year to ground level and be allowed to regrow to provide dense, scrubby cover next to the river. The identified standard trees should be left uncut.

6. Runnels

Evaluation

The runnels are artificial channels which run across the Water Meadows, carrying water from the northern channel of the River Glyme to The Cut. These were purportedly created in the 1980s but, historically, there may have been shallower channels on a similar orientation across the site, allowing the flooding of the water meadows. Linear features are visible on the 1847 tithe maps, but these may be hedgerows or fences rather than water channels.

The runnels now carry running water of varying depth and width, mostly with significant amounts of shading from overhanging vegetation. The sides of the channels tend to be vertical and often free of vegetation. Signal Crayfish (a non-native invasive species) are known to be present and are likely to be burrowing into the sides of the channels, leading to the becoming destabilised.

Like the River Glyme, the runnels have both open (relatively unshaded and treeless) and more shaded sections with scrub and trees. Both offer different niches for wildlife, with the unshaded lengths supporting more aquatic vegetation, while the lengths with tree cover will support more birds, invertebrates and potentially mammals.

The runnels are unlikely to have a significant role in flood mitigation, regardless of their condition.

Vision

The runnels will provide varied habitats for a range of wildlife, both spatially and temporally. The runnels within the grazed compartments will tend to be more open and have lower adjacent vegetation, allowing more aquatic plants to thrive.

The runnels in the ungrazed sections will be more shaded by scrub of varying ages and heights. Lengths where the scrub has recently been coppiced will develop a more varied aquatic flora, while the lengths with older scrub will be more shaded and will provide cover for birds, invertebrates and mammals.

The runnels will be maintained so they convey water effectively across the site, and provide a variety of depths of water and flow velocities. This will also enhance their flood risk function.

Phase One Targets:

- 80% of the length of the runnels in the grazed compartments will be free of overshading trees.
- 20% of the length of the runnels in the ungrazed compartments will have trees and scrub that have been coppiced within the last year.
- Increase the complexity of the runnels by undertaking rotational dredging of the channels.

Phase Two Targets:

- The same as for Phase One and:
- Further clearance of bankside vegetation along runnels.

Management Prescription

To reduce the amount of shading in the grazed compartments, the vegetation along the runnels should be coppiced. Although grazing will slow the regrowth of scrub, it is likely that further coppicing will be required in subsequent years. About 20% of the scrub in these compartments can be left. If possible, this should compose of varied species rather than a single tree species.

In the ungrazed compartments, coppicing can also be undertaken along the runnels, but on a smaller scale. 20% of the scrub can be coppiced annually, leading to a 5-year rotation. Some standard trees can be left in situ.

Tree and scrub cutting should be undertaken as described in the wet woodland feature.

Dredging of the channels should be undertaken on a rotational basis, 'slubbing out' approximately 20% (70m) of the total runnel length across the site. To maintain diversity and reduce the 'catastrophic' impact of dredging, only one side of each stretch of runnel should be dredged in any one year. This equates to dredging one side of two of the runnels each year, or half of one side of four of the runnels each year. An un-dredged side of a ditch should not be dredged the year immediately after the opposite side has been dredged but should be allowed to recover for a year or more. Dredging should not deepen or widen the original channel, but merely remove accumulated silt and vegetation.

Dredging should take place in the late summer or early autumn, using a mini excavator. Spoil should be placed in a low bund parallel to the ditch, about 2m away. A waste exemption and flood risk exemption would be required for this activity.

7. Access

Evaluation

The Woodstock Water Meadows are considered 'open access' in that visitors have to freedom to wander across the site without impediment. However, there is no legal right of access under the Countryside and Rights of Way (CROW) Act, 2000.

In addition, three public footpaths cross the site, two running east to west across the north and south of the site and one linking the two, running north to south at the western end of the site. These footpaths link with public roads to the east and south and with The Shakespeare's Way long distance path and Blenheim Palace to the west.

Access infrastructure on the Water Meadows consists of footbridges across the various waterbodies, made up path surfaces, especially on the footpath adjacent to the Rive Glyme, a number of benches, and waymarkers and interpretation panels. Gates allow access into the grazed compartments.

Vision

The Water Meadows will be an attractive and enjoyable place to visit for most of the year. Visitors will feel welcome and will have a good understanding of the site's historical importance and value for wildlife.

The access infrastructure will be suitable for short circular walks by people with varying abilities.

Areas of the site will be available for quiet recreation activities such as picnics and occasional public events, but not to the detriment of wildlife conservation.

Phase One Targets:

- Undertake an access audit to help determine whether enhanced access provision is desirable.
- Ensure that existing infrastructure is in serviceable condition by, at least, annual audits and repairs.

Phase Two Targets:

- Deliver access enhancements, as determined by the access audit.

Management Prescription

The Town Council should determine whether parts of the site could be made more accessible for those with limited mobility, for example parents with buggies or those who need to make regular stops.

An access audit can then be undertaken to determine whether existing access provision is sufficient to meet the requirements of this target audience. This should include all elements of the 'access chain' and best practise guidance like that from the Sensory Trust.

Regular maintenance of the access routes should continue, especially in the summer months, for example mowing or strimming vegetation along all well-used paths.

8. Site safety

Evaluation

All access to the countryside comes with some risk. The owners of a property have a responsibility to reduce that risk to visitors using measures that would be considered 'reasonable'.

The presence of the river and other waterbodies increases the risk for people visiting and working on the site and, because of previous incidents, the owners are particularly mindful of reducing risks as much as possible.

ROSPA are employed to undertake a regular inspection of the site, focussing especially on the waterbodies. This is a very comprehensive regime, with a best practise methodology and reasonable advice.

The other hazard that might be considered significant is the presence of trees, especially Crack Willow. These are prone to break up or fall, potentially causing injury to people or property.

A local arboriculture company has been employed to undertake a hazardous tree survey of the site, last undertaken in 2020.

Other hazards not covered by these two surveys include the presence of cattle, barbed wire fences and other infrastructure which may cause harm if not properly maintained.

Vision

The Woodstock Water Meadows will be a safe place for people to visit, with reasonable measures undertaken to reduce the risk to visitors, without distracting from the site's naturalness and people's enjoyment.

The risk posed by hazards will be understood by those responsible for the site's management and mitigation of those hazards will be undertaken where reasonable.

Phase One Targets:

- A risk assessment of the whole site is undertaken annually, an action plan to mitigate the risks is produced, and the actions undertaken. Records are kept of all activity.

Management Prescription

A site risk assessment, based on guidance in BBOWT's 'Public Safety on Nature Reserves' Code of practise (or similar) will be produced and updated annually, or as required. This will incorporate the ROSPA inspection and the hazardous tree survey.

Risks identified in this assessment will be removed or reduced as required.

9. Site protection

Evaluation

One of the most important elements of land management is to ensure that a site is protected from external pressures.

Such pressures include encroachment (extending adjacent property onto the site) which can lead to adverse possession (change of ownership following a 10 year occupation), and flytipping.

Public sites everywhere are subject to neighbours extending their properties either with fences, or just by mowing and gardening parts. Users of the site can then feel excluded from these areas, and neighbours may claim adverse possession if unchallenged.

Flytipping is often undertaken by neighbours of a public site, dumping garden, or other, rubbish onto what they might consider to be waste land.

Vision

The Woodstock Water Meadows will not be subject to encroachment or flytipping. The neighbours of the site will appreciate its value and will respect its boundaries.

Phase One Targets:

- The site is registered with the Land Registry.
- Neighbours understand their responsibilities for not encroaching.
- Reduce antisocial behaviour such as flytipping.

Management Prescription

Work with an experienced lawyer to register the Water Meadows with the Land Registry.

Write to neighbouring landowners who have encroached on the site to advise them that the owner objects to the possession of the land. Legal advice should be sought to ensure appropriate wording, and records should be kept of all correspondence.

Promote the fact that the Town Council owns and cares for The Water Meadows on behalf of local people to reduce the incidence of antisocial behaviour. This could be through new interpretation (although there are plenty of existing information panels), guided walks or articles in the local press for example.

10. Ecological monitoring

Evaluation

Monitoring is the ongoing, structured surveying of wildlife and habitats to measure changes over time.

Monitoring is important to demonstrate that management interventions are being effective; to identify where resources are best used; and to engage local people with the site's wildlife.

Volunteers are very well suited to ecological survey and monitoring, and it is important that they are well trained and that the data they are collecting is useful.

Vision

The Town Council will have a good understanding of the species and habitats that are present at the Water Meadows. This will enable them to tailor habitat management to the needs of the wildlife that is present and potentially attract species that are absent. It will also demonstrate that the Town Council's resources are benefitting wildlife.

Volunteers will enjoy visiting the site to undertake structured surveying, and will provide their records in a useful format.

Phase One Targets:

- Produce a survey and monitoring strategy for the Water Meadows.
- Undertake appropriate surveying to gain a 'baseline' of data.
- Engage with volunteers to undertake surveying.
- Submit ecological records to the appropriate local environmental records centre.

Phase Two Targets:

- Identify opportunities and deliver 'citizen science' projects at the Water Meadows.

Management Prescription

BBOWT can help produce a monitoring strategy for the site involving 'rapid assessment monitoring' of key features. This is an established method of surveying which can provide data to feed back into the work programme for the following year.

Volunteers can use an app such as 'iRecord' to submit their data directly to the local records centre.

11. Flood risk reduction

Evaluation

It is inevitable that the Woodstock Water Meadows will flood from time to time. Woodstock is located at the lower reaches of the River Glyme and upstream of the A44, which receives large volumes of water from the catchment.

The management of this site can do little to influence the frequency and severity of the flooding, but some maintenance regimes may help to mitigate that risk.

This report is not a flood risk management plan, but advice has been provided by a hydrologist. If a more detailed flood risk management plan is required, further specialist advice should be sought.

Vision

Management will aim to maintain a balance between reducing flood risk and enhancing biodiversity. The management of Woodstock Water Meadows will not increase the risk of flooding but may help to alleviate the severity of flooding events.

There will be few items on the site likely to cause a blockage of the culverts under the A44.

The water bodies and structures will efficiently convey water across and from the site.

Phase One Targets:

- Cut timber will not increase the flood risk
- The grills to the culverts will be kept free of detritus

Phase Two Targets:

- Formal asset inspection of water control structures to ensure their suitability.
- Engage with activities upstream that are promoting Natural Flood Management approaches in the Glyme and Dorn catchments upstream.

Management Prescription

Any cut timber that is left on site must be secured to ensure that it is unable to float away and increase the flood risk. This will be easier if cut trunks are left whole so that they jam up against other trees. As a last resort, timber can be ‘tied down’ using a series of timber stakes, fencing wire and staples.

Training should be undertaken on the safe and effective maintenance of the grills at the culvert under the A44, and appropriate tools used. Training might be provided by the Environment Agency or other suitable training providers.

The grills should be inspected for excessive detritus monthly and on the announcement of a yellow rain warning in the area. Alerts can be received by email from the Met Office. Records of inspections and maintenance must be kept.

12. Work timetable

	Spring			Summer			Autumn			Winter		
	March	April	May	June	July	August	September	October	November	December	January	February
Create a work schedule												
Feature 1 – Lowland Fen												
Remove scrub and trees												
Graze compartments 4 and 5												
Or mow and remove the vegetation from compartments												
Feature 2 – Wet Woodland												
Coppice or pollard trees												
Feature 3 – Semi-improved grassland												
Graze compartment 6												
Mow and collect areas for public access												
Feature 4 - Ponds												
Coppice around West Pond												
Pull vegetation from ponds												
Fell a tree into East Pond												
Feature 5 – Riverside Vegetation					ff							
Mow the bankside vegetation												
Coppice bankside trees												
Feature 6- Runnels												
Coppice trees and scrub along runnels												
Feature 7 - Access												
Undertake an access audit												
Mow paths												
Feature 8 – Site Safety												
Undertake a site risk assessment												
Feature 9 – Site Protection												
Register with Land Registry												
Deal with encroachments												
Promote positive use of the site.												
Feature 10 – Ecological monitoring												
Produce a monitoring strategy												
Undertake ecological monitoring												
Feature 11 – Flood Risk Reduction												
Undertake training in the clearance of the A44 culvert grills												
Inspect the A44 culvert grills for detritus (monthly)												

13. Map showing compartments and ‘vision’ habitats.