

Cheddar Reservoir and Clay-pits Biodiversity Action Plan

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1.0 INTRODUCTION

1.1 Location

This Biodiversity Action Plan is concerned with Cheddar Reservoir, the clay pits with their associated woodland to the south of the reservoir, and small areas of farmland around the reservoir and pits. The site has a central grid reference of ST442 537 and is situated to the south of the village of Cheddar, between the southern edge of the Mendip Hills and the northern edge of the Somerset Levels, within the jurisdiction of Sedgemoor District Council, in Somerset. The reservoir covers approximately 105 hectares, with associated land covering a further 32 hectares (approximately).

1.2 Ownership

The freehold of the reservoir and associated land with which this Biodiversity Action Plan is concerned is owned by Bristol Water plc. An agricultural lease of the farmland is held by Mr P Athay. Fishing rights on the clay pits are leased to Cheddar Angling Club.

1.3 Land Use

The primary use of the reservoir is for drinking water supply. It is a designated Site of Special Scientific Interest (see 1.4 below). It is also an important recreational resource, with high levels of use by sailors, wind-surfers, birdwatchers and walkers. The farmland and the banks of the reservoir are grazed, primarily by sheep. The clay pits are intensively managed as a coarse fishery, with the exception of the northern pit, which is unmanaged.

1.4 Nature Conservation Importance

The reservoir itself down to the base of its grass banks, but not any other area, has been designated a Site of Special Scientific Interest (SSSI) by English Nature. This designation is wholly on account of the reservoir's bird interest. Two further areas have been designated County Wildlife Sites by Somerset Wildlife Trust (see map 1): the clay pits and a small area on the north-eastern edge of the reservoir, known as Holwell Lane Copse.

Bird records make up the vast bulk of the biological information relating to the site. Surveys carried out previously by Somerset Wildlife Trust and by Wessex Ecological Consultancy in connection with the preparation of this plan have revealed botanical and entomological interest. It should be noted that the only surveys to cover the whole site were those carried out by Wessex Ecological Consultancy in October and November 2005. Botanical and entomological information is therefore very incomplete.

1.5 Acknowledgements

Several people have provided information on which this plan is based, namely Chris Klee, James Packer and David Buckingham.

2 BIODIVERSITY AUDIT

2.1 Introduction

The purpose of this section is to identify the wildlife features for which the site is of importance in an international, national and regional context and to focus on the contribution which management of the site can make to national and local biodiversity policies. Habitats and species at the site which have been identified as priorities for nature conservation management are listed below under **Key Habitats** and **Key Species**. There then follows an **Evaluation** section that assesses the national, regional and local importance of the site's wildlife.

Various sources have been consulted in drawing up this section, notably the UK Biodiversity Action Plan. A BAP for Sedgemoor District Council is in the process of being drawn up, but lists of priority species and habitats and actions have not yet been completed.

2.2 Key Habitats

2.2.1 UK BAP Priority Habitats

Eutrophic Standing Water

The reservoir itself comes under this heading, as does the open water at the clay-pits.

The reservoir is entirely stone-lined and lacks any emergent or marginal vegetation, although in years of low water level significant areas of inundation vegetation develop on exposed mud. The main biodiversity interest is associated with open water.

Except in periods of drought Cheddar Reservoir is fed entirely by water emerging from subterranean sources in the Mendip Hills, which is silt-free and free of excess nutrients. This clear water allows extensive beds of submerged macrophytes to develop. Frequent species include Canadian pondweed (*Elodea canadensis*), hornwort (*Ceratophyllum demersum*), stonewort (*Chara vulgaris*), shining pondweed (*Potamogeton lucens*), small pondweed (*Potamogeton berchtoldii*) and the moss *Fontinalis antipyretica*. Other species present in smaller quantity include opposite-leaved pondweed (*Groenlandia densa*), soft hornwort (*Ceratophyllum submersum*) and fan-leaved water-crowfoot (*Ranunculus circinatus*).

In years of low rainfall areas of mud are exposed, and if these are dry for sufficiently long periods considerable areas of inundation vegetation develop. Fortunately, autumn 2005 provided an opportunity to survey this vegetation. The dominant plant species on these areas of mud are amphibious bistort (*Persicaria amphibia*), redshanks (*Persicaria maculosa*), red goosefoot (*Chenopodium rubrum*), marsh yellow-cress (*Rorippa palustris*), creeping yellow-cress (*Rorippa sylvestris*) and marsh cudweed (*Gnaphalium uliginosum*), with some dense patches of marestail (*Hippuris vulgaris*) and common spike-rush (*Eleocharis palustris*).

The substantial growths of submerged vegetation support large numbers of herbivorous wildfowl, particularly those able to dive to exploit the resource such as pochard and coot (see table 1). Coot in particular show a regular pattern of occurrence, with large numbers building up in the late autumn and winter as birds

move to Cheddar from Chew Valley and Blagdon Lakes. Other diving ducks, notably tufted duck, goldeneye and goosander, occur in smaller and fairly regular numbers. Numbers of surface-feeding ducks such as mallard and teal vary hugely from year to year. Large numbers are present in years of low water levels (cf. annual teal maxima of 1065 in 1996 and 35 in 2000). More details of wildfowl numbers are given under Key Species below.

The other area of eutrophic standing water is provided by two of the clay-pits. The most frequent submerged species here is Canadian pondweed, with smaller amounts of spiked water-milfoil (*Myriophyllum spicatum*) and hornwort. There are small patches of white water-lily (*Nymphaea alba*), which was presumably introduced here. The margins of the pools have a narrow fringe of emergent vegetation. The most frequent species is common reed (*Phragmites australis*), with species present in smaller quantity including greater pond sedge (*Carex riparia*), lesser pond sedge (*Carex acutiformis*), water plantain (*Alisma plantago-aquatica*) and branched bur-reed (*Sparganium erectum*).

The clay-pits are too small to be visited by large numbers of wildfowl, but moorhen breed and small numbers of surface-feeding duck such as mallard and teal visit. Odonata recorded here include hairy dragonfly (*Brachytron pratense*) and water vole and grass snake are also present.

Lowland Meadow

The definition of this habitat type used in the UK BAP encompasses all lowland species-rich grasslands on neutral soils. The grassy embankment around the southern and western sides of the reservoir falls under this heading. This grassland has developed on an artificially created site and therefore lacks species associated with ancient grassland, but it is not fertilised and therefore supports several plant species that have been excluded from the vast majority of agricultural grassland. The most frequent species of grass here (as far as could be judged in a late autumn survey) is crested dogstail (*Cynosurus cristatus*), with other grass species present in good quantity including perennial rye-grass (*Lolium perenne*), red fescue (*Festuca rubra*), cocksfoot (*Dactylis glomerata*), meadow barley (*Hordeum secalinum*), creeping bent (*Agrostis stolonifera*) and common bent (*Agrostis capillaris*). The distribution of herbs in the area is patchy, and wild carrot (*Daucus carota*), white clover (*Trifolium repens*), meadow vetchling (*Lathyrus pratensis*), burnet saxifrage (*Pimpinella saxifraga*), lady's bedstraw (*Galium verum*) and pale flax (*Linum bienne*) are all locally frequent. Species widely present throughout the sward include dandelion (*Taraxacum vulgare* agg), smooth hawkbeard (*Crepis capillaris*), meadow buttercup (*Ranunculus acris*), bird's-foot trefoil (*Lotus corniculatus*) and yarrow (*Achillea millefolium*).

Use of this habitat by birds is limited, but good numbers of meadow pipit and smaller numbers of pied wagtail and skylark are present in the autumn. There is no information on any invertebrate interest.

Coastal and Floodplain Grazing Marsh

The farmland around the reservoir is characteristic of the Somerset Levels and falls under this habitat heading. As with many areas of the Levels, especially those on clay

soils, the nature conservation interest of the fields is low, but the rhynes support communities of aquatic plants.

The fields are generally dominated by perennial rye-grass, with smaller quantities of creeping bent, cocksfoot and Yorkshire fog (*Holcus lanatus*). Slightly more diverse areas have additional species such as meadow barley, tufted hair-grass (*Deschampsia cespitosa*) and crested dogstail. Where drainage is impeded there are patches of hard rush (*Juncus inflexus*). Herb diversity is low, with the most frequent species being creeping bent (*Ranunculus repens*), dandelion, white clover and creeping thistle (*Cirsium arvense*). Species present in smaller quantity include common mouse-ear (*Cerastium fontanum*) and common sorrel (*Rumex acetosa*).

Most of the rhynes between the fields are heavily shaded by hedges and lack wetland vegetation, or have small patches of common reed and common duckweed (*Lemna minor*). The short lengths that are more open support additional species such as great pond sedge, lesser pond sedge, fool's water-cress (*Apium nodiflorum*), common water-starwort (*Callitriche stagnalis*) and reed sweet-grass (*Glyceria maxima*). Some of the larger rhynes on the edge of the site had been cleared out shortly before the survey was carried out. Inspection of the dredgings suggested that these rhynes have large quantities of Canadian pondweed and common water-starwort, with smaller amounts of brooklime (*Veronica beccabunga*) and water mint (*Mentha aquatica*).

Water vole burrows were seen along some of the larger rhynes and Odonata seen (very late in the season) included common darter (*Sympetrum striolatum*) and migrant hawker (*Aeshna mixta*).

Two small areas, which are not under active agricultural management, support more diverse vegetation. Both are shown on map 2. The smaller area, the sedge bed, is dominated by lesser pond sedge. Other species present in large quantities are hard rush, angelica (*Angelica sylvestris*) and meadow-sweet (*Filipendula ulmaria*). Other plant species present here include greater water-dock (*Rumex hydrolapathum*), purple loosestrife (*Lythrum salicaria*), meadow vetchling and lesser stitchwort (*Stellaria graminea*).

The other area is the County Wildlife Site named Holwell Lane Copse by SWT. Most of this area is dominated by tall red fescue and tufted fescue (*Festuca arundinacea*), with patches of lesser pond sedge, yellow flag (*Iris pseudacorus*) and common reed. Other frequent species here include meadow-sweet, Yorkshire fog and creeping bent. Locally frequent species include stinging nettle (*Urtica dioica*), purple loosestrife, greater bird's-foot trefoil (*Lotus pedunculatus*), fen bedstraw (*Galium uliginosum*) and water mint. A small spring in the area supports additional species including lesser water parsnip (*Berula erecta*), brookweed (*Samolus valerandii*) and glaucous sedge (*Carex flacca*). Wintering chiffchaff, firecrest and lesser-spotted woodpecker have all been seen in this area in recent years.

Wet Woodland

The northern part of the clay-pits supports a small area of wet woodland, which is unmanaged at present. This woodland is dominated by small goat willow (*Salix caprea*), with other shrub species including grey willow (*Salix cinerea*), pedunculate oak (*Quercus robur*), blackthorn (*Prunus spinosa*), ash (*Fraxinus excelsior*) and elder

(*Sambucus nigra*). Scattered within the woodland there are some larger pedunculate oak, goat willow and white willow (*Salix alba*) trees. The ground flora is dominated by ivy (*Hedera helix*), with other species including broad-buckler fern (*Dryopteris dilatata*), male fern (*Dryopteris filix-mas*) and angelica. Damper areas within the wood are dominated by lesser pond sedge and greater pond sedge. On the western edge of the area there is a small pond, which is now choked by common reed and lesser pond sedge, and is being invaded by willow saplings.

Woodland bird species recorded here include long-tailed tit, bullfinch, goldcrest and chiffchaff. Moorhen and cettis warbler were present on the small pond.

2.2.2 Other Habitats

Stone Banks

The reservoir is lined by stone banks. Vegetation cover is sparse apart from growths of plants from cracks between the stones. Frequent species here include yarrow, pellitory-of-the-wall (*Parietaria judaica*), biting stonecrop (*Sedum acre*) and red fescue. The wide range of species present includes several plants of species-rich grassland, including thyme-leaved sandwort (*Arenaria serpyllifolia*), wild carrot, lady's bedstraw, meadow vetchling, bird's-foot trefoil, burnet saxifrage and tufted vetch (*Vicia cracca*). Towards the lower parts of the walls species from the inundation vegetation, including round-fruited rush (*Juncus compressus*) and marsh yellow-cress, are present. Plants introduced with bird-seed well represented on the banks, with large populations of species such as canary-grass (*Phalaris canariensis*), rough bristle-grass (*Setaria verticillata*) and green bristle-grass (*Setaria viridis*) suggesting that some species have become naturalised.

The growth of seed-bearing plants on the banks attracts small flocks of seed-eating birds, including goldfinch, linnet and reed bunting, during the autumn and winter. Rarer species such as snow and Lapland bunting have been seen with these flocks. Small numbers of wheatear and rock pipit are regularly recorded on passage, and black redstart is a less frequent visitor.

Hedges

Ancient and species-rich hedgerows are a BAP priority habitat, but none of the hedges on the survey site qualifies under this category. Most of the hedges in the agricultural part of the site are dominated by hawthorn (*Crataegus mongyna*), with smaller quantities of ash and goat willow. Standard trees are scarce, but there are some semi-mature ash and one hedge (see map 2) has a mature black poplar (*Populus nigra ssp betulifolia*).

Field Trees

There are semi-mature to mature pedunculate oak trees in some of the fields, together with a smaller number of ash. There is one veteran pedunculate oak tree present, within the reservoir enclosure (see map 2). These trees support good growths of lichen, but species diversity is poor.

Plantation

There are small blocks of woodland adjacent to the northern edge of the reservoir enclosure. These are dominated by single-age stands of grey poplar (*Populus*

canescens) and scots pine (*Pinus sylvestris*) with very small quantities of other tree species, which include silver birch (*Betula pendula*), sycamore (*Acer pseudoplatanus*) and ash. Understorey in these plantations is limited to sparse patches of bramble (*Rubus fruticosus* agg). The ground flora of the plantations is dominated by ivy under shade, or by grass species where the canopy is more open. Other ground flora species include cuckoo pint (*Arum maculatum*), wood false-brome (*Brachypodium sylvaticum*) and wood dock (*Rumex sanguineus*).

2.3 Key Species

2.3.1 UK BAP Priority Species

Linnet

The British population of linnet has declined sharply due to changes in agricultural practices, in particular the loss of winter stubbles. Any habitat that provides an alternative food-source during the winter is therefore valuable, and the reservoir's stone banks attract small flocks of linnet.

Song Thrush

The British population of song thrush has declined steeply, probably due to habitat loss and increased molluscicide use, although there have been recent signs of a recovery. At Cheddar small numbers are present in the woods around the clay-pits and in the plantations north of the reservoir.

Reed Bunting

The British population of reed bunting has fallen due to habitat loss and changed agricultural practice. Small numbers of reed bunting breed around the clay-pits and winter around the reservoir.

Bullfinch

The reasons for the decline in the British bullfinch population are not fully understood, but they probably include habitat loss and declining insect populations. A pair of bullfinches was seen at the clay-pits.

Water Vole

Water voles are much less abundant than formerly, due to a combination of predation by mink and habitat degradation. The species is now legally protected, as well as being included in the UK BAP. Water vole burrows were seen at the southern end of the clay pits and in adjacent rhynes.

Greater Horseshoe Bat

The wider Cheddar area is of national significance for its greater horseshoe bat population. A cattle shed in a field to the north of the reservoir is used as a nocturnal roost and radio-tracking studies have shown that fields in this area, together with Holwell Copse, provide foraging habitat. It is reasonable to assume that the reservoir and its banks are also used on occasion.

Greater Water Parsnip

Greater water parsnip (*Sium latifolium*) always had a restricted distribution in Britain and has suffered long-term contraction due to wetland drainage and habitat

degradation and loss. The Somerset Levels was one of the last British strongholds of this species, and its only site in south-west England but its Somerset population has declined sharply over the last ten years. It was recorded at Holwell Lane Copse in 1994 but was not found during the surveys carried out for this plan. It may have been overlooked due to the timing of this survey, but in view of its recent decline it may have disappeared from the site.

2.3.2 Other Key Species

Wildfowl

The sole reason for Cheddar Reservoir's notification as a Site of Special Scientific Interest (SSSI) was its importance for wildfowl in autumn and winter. The SSSI citation lists the flock of pochard as being of national importance and the populations of a further seven species (gadwall, goldeneye, great-crested grebe, mallard, teal, shoveler and coot) as also being of particular significance. Table 1 shows population data for these, and another six regularly occurring species. The first column shows the figure given in the SSSI citation, which it explains are maxima recorded (the SSSI notification was made in 1984). The second column shows the mean annual maximum for the period 1994 to 2003 with the month when the population typically peaks, and the third column the maximum count made during that decade. The fourth column shows the threshold figure for national importance – Cheddar Reservoir does not approach international importance for any species. However, the UK as a whole is of international significance for its populations of two of these species – teal and wigeon.

The pattern of occurrence of diving species on one hand and surface-feeding species on the other differs substantially. Populations of the diving species – great-crested grebe, pochard, tufted duck, goldeneye, goosander and coot – are reasonably constant from year to year. The reservoir is of particular importance for pochard and coot, which feed on submerged plants, and for these species it is the most important site in Somerset. Numbers of the diving species peak in winter (December to February). The populations of the surface-feeding species fluctuate widely from year to year, by as much as two orders of magnitude. Large flocks are present in years when the water level drops and feeding conditions are favourable, such as 1995 and 2003, but numbers in years of high rainfall, such as 1999 and 2001, are extremely low. This pattern, with large numbers dependent on good feeding conditions on the reservoir, contradicts the statement in the SSSI citation that the lake is important as a roost site for birds which feed on the Somerset Levels – if this were so numbers would be far less variable. There is, however, a relationship with the Somerset Levels, with pochard in particular using the pools at Westhay Moor as a refuge when forced off Cheddar Reservoir by recreation; in the past Blagdon Lake was often used in a similar way. A relationship with the other Mendip reservoirs that has become less evident in recent years due to climate change is Cheddar's importance during periods of extremely cold weather. Due to its exposed nature Cheddar stays ice-free when Chew Valley and Blagdon Lakes freeze over and when this happens large numbers of birds from those lakes may find refuge at Cheddar.

Several other species occur regularly in smaller numbers. Worthy of particular note are great northern diver and greater scaup. Great northern diver has been annual since 1996, with four different birds recorded in both 1998 and 1999. This is an exceptional

record for an inland site. Small groups of greater scaup – the maximum count in the last decade is ten – regularly winter with the pochard flock. Rarely occurring species are of less conservation concern but are of great interest to birdwatchers. Species that have occurred over the last decade include slavonian, black-necked and red-necked grebes, whooper swan, smew and long-tailed duck.

Waders

The only wader species regularly attracted to the site in any numbers is common sandpiper, which is happy to use stone-lined banks. Numbers peak in spring, as shown in table 1, with a maximum count in the last decade of thirty.

The occurrence of other wader species is highly dependent on water levels in the late summer and early autumn. In years of low water levels numbers of several species can be high. In 1996, for example, there was an exceptional count of 120 little stints, with other counts including 29 black-tailed godwits and 25 curlew sandpipers.

Gulls and Terns

Cheddar Reservoir supports a significant gull roost, with typical numbers being 4500 black-headed gulls, 350 common gulls, 300 lesser black-backed gulls, 200 herring gulls and ten great black-backed gulls. This roost attracts small numbers of rare gull species, with Mediterranean gull and yellow-legged gull being recorded annually and less regular records of glaucous, Iceland, Franklin's and ring-billed gull.

Terns use the lake regularly in moderate numbers during their spring and autumn migrations. Common, arctic and black terns are recorded annually, and little and sandwich terns have each been recorded in several years during the last decade. Little gull often accompanies parties of terns, and rarities such as white-winged black tern have also been recorded.

Insects

There are very few records of insects, apart from Odonata at Cheddar Clay-pits, where the following species have been recorded, by SWT and during the surveys for this plan: migrant hawkler (*Aeshna mixta*), hairy dragonfly (*Brachytron pratense*), azure damselfly (*Coenagrion puella*), variable damselfly (*Coenagrion pulchellum*), common blue damselfly (*Enallagma cyathigerum*), blue-tailed damselfly (*Ischnura elegans*), broad-bodied chaser (*Libellula depressa*), four-spotted chaser (*Libellula quadrimaculata*), large red damselfly (*Pyrrhosoma nymphula*) and common darter (*Sympetrum striolatum*). Further survey would doubtless record more species.

Plants

With the exception of greater water parsnip (see above) no nationally rare or scarce species have been recorded at Cheddar Reservoir and Clay-pits, although soft hornwort is almost uncommon enough to qualify as nationally scarce. Twenty plants defined as County Notable Species by Somerset Environmental Records Centre (SERC) have been recorded. These are as follows:

Open water – hornwort, soft hornwort, opposite-leaved pondweed, small pondweed, shining pondweed and fan-leaved water-crowfoot.

Inundation community – trifold bur-marigold, marestail and round-fruited rush.

Stone banks – round-fruited rush.

Grass embankment – pale flax, strawberry clover and lesser pond sedge.

Sedge bed – greater water dock and lesser pond sedge.

Holwell Copse – upright water parsley, fen bedstraw, brookweed, lesser pond sedge, green-ribbed sedge and brown sedge.

Clay-pits – upright water parsley, hornwort, lesser pond sedge and common meadow-rue.

Farmland – lesser pond sedge and black poplar.

This list is likely to be incomplete and survey during the summer would probably add further species.

2.4 Evaluation

BAP Habitats

Cheddar Reservoir and Clay-pits has examples of four BAP priority habitats, This section provides an assessment of whether these are good, moderate or low quality examples of these habitat types, having regard for their importance in a national and county context, as follows:

Eutrophic Standing Water

In terms of extent, Cheddar Reservoir has one of the largest areas of this habitat type in Somerset and it is one of the most important wildfowl sites in Somerset. The species for which the reservoir is most important are pochard and coot. In five of the last ten years the numbers of pochard have been above the threshold for national importance, with peak counts in the decade well above this threshold. The 2003/04 Wetland Bird Survey Report lists Cheddar as the 22nd most important British site for this species. Coot populations have increased gradually (although the record count of 4000 was made in 1984) and have been well above the threshold figure for national importance every year in the past decade. The 2003/04 Wetland Bird Survey Report lists Cheddar as the 7th most important British site for this species. The decadal average for great-crested grebe is just below the threshold for national importance. Shoveler counts exceeded the threshold in three years, but in another three years did not exceed ten. Gadwall counts were above the threshold for national importance in one year in the decade, but on the other hand peaked at just ten in two other years. In a county context, Cheddar Reservoir is of significance in a Somerset species for all of the species listed above, plus wigeon, tufted duck, goldeneye and goosander. The reservoir has large populations of at least six species of aquatic plants, with a minimum of three in the inundation community and is of importance in a Somerset context for its aquatic plant communities.

Cheddar Reservoir is a good quality example of a eutrophic standing water body.

Cheddar Clay-pits is a very different example of the habitat type. Water bodies of this extent are much more common, and there are many examples of similarly-sized pools

throughout Somerset. The pools are not of significance for their bird populations. They do, however, support grass snake and water vole, both of which are scarce and declining species. They support four County Notable Species of plant, although the population size of these species is low. Hairy dragonfly is nationally scarce, although its range has expanded in recent years, and the overall diversity of Odonata is high. Cheddar Clay-pits is a moderate quality example of a eutrophic standing water body.

Lowland Meadows

The grassland on the embankments of Cheddar Reservoir lacks several species that would be expected in unimproved grassland on soils of this type, and therefore it cannot be defined as unimproved grassland. Several indicator species of unimproved grassland are present, however, namely: agrimony (*Agrimonia eupatoria*), wild carrot, lady's bedstraw, meadow vetchling, pale flax, bird's-foot trefoil, burnet saxifrage, strawberry clover, meadow barley and small cat's-tail (*Phleum bertolonii*). Two of these plants, pale flax and strawberry clover, are County Notable Species. The population of one of these, pale flax, is exceptionally large. The overall diversity and structure of the vegetation suggests that the embankments are likely to be of moderate value for invertebrates.

The species-rich grassland around the reservoir is of moderate quality.

Coastal and Floodplain Grazing Marsh

For the most part the area of this habitat type within the site has been intensively farmed, and the grassland is low in plant diversity. The rhynes are mostly shaded by species-poor hedges and lack wetland vegetation. There are short stretches of open rhyne, but the wetland vegetation within these does not appear exceptionally diverse. The presence of black poplar in one of the hedges is noteworthy. Water voles are present along some of the rhynes, however, and grass snakes probably also use the rhynes in view of their presence at the clay-pits.

The agriculturally managed coastal and floodplain grazing marsh is of low quality.

Two small areas of this habitat type are much more diverse. Holwell Copse includes a reasonable area of spring-line vegetation that supports a good diversity of County Notable Species. The sedge bed is less diverse, but it too supports populations of County Notable Species. The structure of the vegetation in both areas suggests that they are likely to be of high to moderate value for invertebrates. Holwell Copse is known to be of importance for birds, particularly during the winter. Both areas are examples of habitat types that have become much less frequent due to drainage and agricultural intensification.

Holwell Copse and the sedge bed are moderate quality examples of coastal and floodplain grazing marshes.

Wet Woodland

The area of wet woodland at the clay-pits is small compared to the larger areas elsewhere on the Somerset Levels, but a reasonable diversity of plant species is present, including two County Notable Species. The woodland supports threatened bird species such as bullfinch, and also a population of cettis warbler, which is a nationally rare but increasing breeding species. The area has been assessed by Somerset Wildlife Trust as being of nature conservation value in a county context. The woodland at the clay-pits is of moderate quality as an example of a wet woodland.

BAP Species

Linnet

The flock of linnets supported by the stone banks in most autumns is of importance in a local context.

Song Thrush, Reed Bunting and Bullfinch

The populations of these species at Cheddar Reservoir and Clay-pits are small in both a national and a local context and the site does not make a significant contribution to their conservation in a wider context, but it remains important that populations on any one site are conserved.

Water Vole

Water Vole has become so uncommon that any surviving population is of value in a county context.

Greater Horseshoe Bat

This species is rare in a national and European context and any habitat used for foraging is of high significance.

Greater Water-parsnip

The population of greater water-parsnip, both locally and nationally, is in steep decline and if it survives at Holwell Copse this would be of very high significance.

Other Habitats

The following other habitats are also of nature conservation importance:

Stone Banks

The stone banks are an artificial habitat, but they support some uncommon plant species. These include round-fruited rush, which is a County Notable Species, and several indicators of unimproved grassland such as thyme-leaved sandwort, wild carrot, burnet saxifrage and fern-grass. However, these banks are an integral part of the reservoir walls and, under the Reservoirs Act, have to be kept substantially free of all vegetation so as to maintain their structural stability.

Field Trees

The site has a reasonable resource of field trees, with one veteran specimen and several other mature trees. The lichen populations of these trees are unexceptional, probably due to fertiliser drift from agricultural operations, but they are probably of value for invertebrates and breeding birds.

Hedges

The hedges are not diverse in general, but the presence of a black poplar tree is notable. Otherwise, the hedges provide a habitat for breeding and wintering birds and for other animals.

2.5 Summary Table

Feature	Level of Interest	Features of Interest
Eutrophic Open Water (Cheddar Reservoir)	BAP Priority Habitat, High Quality Designated SSSI	Nationally important populations of pochard and coot; significant populations of other waterfowl and of aquatic and wetland plants
Eutrophic Open Water (Clay-pits)	BAP Priority Habitat; Moderate Quality	Nationally scarce dragonfly; water voles
Lowland Meadow	BAP Priority Habitat, Moderate Quality	Diverse flora; exceptionally large population of pale flax
Coastal and Floodplain Grazing Marsh (Farmland)	BAP Priority Habitat, Low Quality	Water vole in rhynes
Coastal and Floodplain Grazing Marsh (Holwell Copse and Sedge-bed)	BAP Priority Habitat, Moderate Quality	Diverse vegetation, several County Notable Species, invertebrate potential, foraging habitat for great horseshoe bat
Wet Woodland	BAP Priority Habitat, Moderate Quality	Diverse vegetation, several County Notable Species. Breeding cettis warbler
Linnet	BAP Priority Species, Moderate Population	Small flocks on stone banks in autumn and winter
Song thrush, reed bunting, bullfinch	BAP Priority Species, Small Populations	Not significant in county context
Water Vole	BAP Priority Species, Moderate Population	Significant in county context
Greater horseshoe bat	BAP Priority Species, Moderate Population (foraging only)	Significant in a national context
Greater water-parsnip	BAP Priority Species, not known if still present	Highly significant in national context if still extant
Stone banks	Unusual vegetation	County Notable Species, populations of unimproved grassland and wetland plants. Seed-eating birds
Field trees	One veteran and other mature trees	Potential for invertebrates and breeding birds
Hedges	Generally species-poor	Single black poplar, habitat for breeding birds

3 TRENDS AND LAND-USE

3.1 Management and Land-use

The reservoir was created for and continues to be managed as a source of drinking water. It is fed by water emerging in Cheddar Gorge from the Mendip Hills limestone. Bristol Water plc have a licence to pump water from the River Axe when reservoir levels are low – this option was last used in 1991 and was under consideration in 2005 until heavy rain in the autumn. In future a membrane treatment system might be constructed so that water from the Axe receives primary treatment before it is mixed with the cleaner water in the reservoir. Pumping might become more frequent due to heavy levels of demand in the supply area during the summer.

The reservoir is also used for recreational purposes. Sailing and wind-surfing take place several times a week, except in periods of low water levels, when access to the water is physically impossible and during periods of cold weather, when it is prohibited in order to prevent disturbance to the large numbers of water fowl that can be present in such conditions. Access for pedestrians to the reservoir perimeter is unrestricted. The reservoir is a coarse fishery, used by members of Cheddar Angling Club and by visiting anglers, who purchase day permits. All fishing is from the banks.

Plants are removed from the stone banks around the reservoir in order to prevent damage to the structure. Herbicide was used until recently, but manual methods are now employed.

The clay-pits are managed as a coarse fishery by Cheddar Angling Club. They do not manage the wet woodland in the northern part of the pits, but elsewhere they carry out vegetation maintenance, footpath clearance and small-scale landscaping works. The pits are stocked with fish, in particular carp. Emergent vegetation is controlled, and grass carp have been introduced in order to control submerged vegetation, which was previously removed manually.

Most of the other land in Bristol Water plc ownership is let to an agricultural tenant who grazes the land, including the southern and western parts of the reservoir banks, with sheep.

3.2 Trends

3.2.1 Introduction

The only group for which quantitative data are available is birds. Counts of waterfowl are published in Somerset Bird Reports and trends in population levels can therefore be identified. There is no comparable information for other species, or for habitats, but certain trends can be inferred from the current appearance of habitats and from discussion with local birdwatchers.

3.2.2 Wildfowl

The figures shown in appendix 1 shows one apparent major trend. The SSSI citation, written in 1984, states a maximum figure for pochard of 2000. In the past decade the pochard count has exceeded 1000 only once, and the average annual maximum is 569. English Nature raised this apparent decline as a major cause of concern when consulted for this plan. The historical data, however, suggest that pochard counts have

not been as high as the figure quoted in the citation. The Birds of Somerset, published in 1988, summarises pochard numbers at Cheddar Reservoir as follows: "*usually 500, sometimes up to 1000*" and quotes a maximum count in the period 1982 to '86 of 775 – very much in line with the current situation. Counts during the 1970s were also comparable to those made since 2000 – during that decade the maximum number recorded was 1000, in November and December 1975. It is only in the 1960s that pochard numbers were consistently higher than they are at present. In most years of that decade the annual maximum was over 1000, and the average of maxima for the period 1965-69 (for when data are available) was 1208.

Appendix 1 shows that numbers of other wildfowl species remain broadly in line with the figures quoted in the citation, within the huge fluctuations in numbers between years of high and low water levels. Goldeneye and coot have shown sustained increases in numbers over the decades.

There is an exception, however, to the pattern of stable waterfowl numbers described above. During the winter of 2005/06 numbers of most species were extremely low. Pochard numbers peaked at 50 and goldeneye at ten. This was probably caused by the rapid rise in water levels in the autumn, which left much of the weed crop inaccessible to most birds. Although surface-feeding duck numbers were high in the autumn, they fell rapidly as water levels rose. The only species unaffected by this trend was coot, whose numbers peaked at over 3000.

3.2.3 Other Birds

Analysis of data in the bird reports reveals few other trends in bird numbers. It is possible that flocks of seed-eating species such as linnet have become smaller, although the information available is insufficiently detailed to be sure of this. Other species, such as spotted flycatcher, have declined as part of a wider trend unconnected to conditions at Cheddar Reservoir and Clay-pits. Other species, such as cettis warbler, have increased for comparable reason.

3.2.4 Other Species

Survey information relating to other groups of animals and to plants is insufficiently detailed to identify any trends.

3.2.5 Habitats

There is no evidence for any habitat changes to the reservoir itself, but there are ongoing changes to several of the habitats around the lake.

Most of the coastal and floodplain grazing marsh is under agricultural management. Over a very long period intensified management of these fields has led to a loss of biological diversity, and the fields can now be described as being largely improved, with small patches of semi-improved grassland where drainage is impeded. Management of field boundaries has changed and hedges have been allowed to grow along most rhynes, shading the water and preventing growth of aquatic plants. This has had an adverse impact on biodiversity, since species-poor examples of a widespread habitat have replaced species-rich examples of a scarce habitat. The larger rhynes on the edge of the property are now managed more intensively by the Internal Drainage Board than they would have been historically. Whilst these rhynes continue to support aquatic plants, the communities are probably less diverse than formerly.

This management is sub-optimal for water voles, since virtually all vegetation is removed simultaneously. More recently a new agricultural tenant has carried out further intensification of management. Rushy areas have been topped, spoil from rhyes has been dumped in one wet area, gateways have been improved and several hedges have been trimmed. A new section of rhyne has been cleared, with the intention of draining a rushy patch. The attempted drainage has been unsuccessful, and wetland habitat has been created in the rhyne.

The sedge bed is accessible to grazing sheep, but they probably graze here seldom if ever, and there has probably been a trend for this vegetation to become more dense. Holwell Copse has been unmanaged for several years, and tall plant species have become dominant, probably to the exclusion of more diverse vegetation. There are also signs of scrub encroachment in this area, which if unchecked would lead to a substantial decline in biodiversity interest.

4 MANAGEMENT

4.1 Introduction

This section contains proposals for management of each BAP priority habitat type and species and for other key features where appropriate, preceded by the rationale for management and targets.

4.2 Eutrophic Open Water

4.2.1 Rationale

There is little that can be done to influence the management of the main reservoir within the constraints of its use for water supply and the needs of recreational users.

The reservoir's biodiversity interest is heavily dependent on water quality and level. The clear water in the lake means that large growths of aquatic plants can develop during the summer. These are of interest in their own right and as a food source for birds, particularly coot and pochard. Low water levels from the late summer to the early autumn allow large flocks of surface-feeding ducks to build up and waders to use the lake. These features are potentially at risk if water is pumped to the reservoir more frequently. Water quality in the Axe is lower than in the reservoir and the river water contains more suspended solids. Use of such water could threaten aquatic plant populations, but the planned primary treatment should avoid any such impacts. Pumping water into the reservoir would decrease its attractiveness to birds in years of low water levels. Maintenance of the water supply will necessarily take precedence over biodiversity interests, but the scale of any adverse impacts could be reduced if pumping is delayed as late in the winter as possible.

Disturbance on the reservoir caused by boats can be serious and frequently forces duck to leave the site temporarily. This probably depresses population sizes.

No water birds breed on the reservoir at present. It is unlikely to ever be a significant breeding site for most species.

Likewise, the use of the clay-pits as a coarse fishery allows few changes to their management. The overall value of the pits for wildlife would be greater if larger areas of both emergent and submerged vegetation were allowed to develop. In identifying targets here indicator species have been used – reed bunting and sedge warbler for emergent vegetation and hairy dragonfly for submerged vegetation. Establishing a compost heap, using vegetation cut on the site, would benefit grass snakes.

4.2.2 Targets

Maintain water bird populations at their present populations levels.

Ensure that hairy dragonfly remains as a breeding species at the clay-pits.

Maintain breeding populations of both reed bunting and sedge warbler at the clay-pits.

Ensure that grass snake maintains a population at the clay-pits.

4.2.3 Management Proposals

A1 When water is pumped to the reservoir from the Axe ensure that it is treated and that, within the constraints of water supply requirements, pumping takes place as late in the winter season as possible.

A2 Through negotiation with Cheddar Angling Club try to establish a fringe of emergent vegetation two metres wide along 30% of the edges of the clay-pits – locations to be determined by the needs of angling and topography – and a fringe 0.5 metres wide elsewhere, except where this would render angling problematic.

A3 Allow submerged vegetation to cover a minimum of 20% of the water area of the pits.

A4 Establish at least one large compost heap on the margins of the pits.

4.3 Lowland Meadow

4.3.1 Rationale

The grass banks form part of the structure of the reservoir's walls and under the Reservoirs Act the grass must be kept to a length of 500mm or less to allow early detection of leaks. If the grassland on the reservoir banks is to maintain its biodiversity interest it is vital that soil fertility remains low and that it continues to be under agricultural management. The intensity of sheep grazing seen in late 2005 is perfectly consistent with maintaining botanical diversity. A botanical survey during the early summer would be useful in further establishing management needs.

4.3.2 Targets

Ensure that the species-rich grassland remains as diverse and extensive as at present.

Ensure that the grassland continues to support a large population of pale flax.

4.3.3 Management Proposals

- B1 Continue to graze with sheep.
- B2 Do not use any fertilisers, herbicides or pesticides on the reservoir embankments.
- B3 Carry out a botanical survey of the grassed embankment during May or June.

4.4 Coastal and Floodplain Grazing Marsh

4.4.1 Rationale

The bulk of this area, which is farmed at present, should remain under agricultural management. It is consistent with this management, and not damaging ecologically, that the localised dominance of rushes should be reduced. This should be achieved, however, by topping the rushes rather than through use of chemicals or land drainage. The most potentially valuable habitats in the farmed area are the rhynes, but most of these are excessively shaded by hedges. Localities where there is a reasonable chance that hedge cutting would achieve biodiversity gains have been identified. The black poplar is a valuable feature and taking sets from this tree to plant in other hedgerows would be beneficial.

The sedge bed should remain broadly as at present, but would benefit from management to diversify vegetation structure, increasing habitat value for both plants and invertebrates.

The tall-herb and grassland vegetation at Holwell Copse requires management in order to prevent ongoing loss of biodiversity. This management should be rotational, so that areas of tall vegetation are always present as habitat for invertebrates.

4.4.2 Targets

Maintain the present biodiversity of the farmland.

Establish five sapling black poplars in the hedges.

Re-instate 380 metres of species-rich rhyne.

Improve biodiversity of species-rich areas.

4.4.3 Management Proposals

- C1 Manage rushy areas within pastures by topping only.
- C2 Carry out no further drainage or land-filling works.
- C3 Take ten cuttings from the black poplar and plant elsewhere in hedges.
- C4 Clear out the open rhyne shown on the enclosed map every three years.

C5 Cut the hedgerows shown on the enclosed map down to a height of 0.5 metres, and maintain at this height, in order to diversify rhynes.

C6 Every other year mow one third of the sedge bed, so that over a six year period each area is mown once. Carry out in the period August to October.

C7 Remove all shrubs and tree saplings encroaching on the grassland part of Holwell Copse.

C8 Every other year mow one third of the grassland part of Holwell Copse, so that over a six year period each area is mown once. Carry out in the period August to October.

4.5 Wet Woodland

4.5.1 Rationale

Most of the young trees within the wet woodland are of a similar age and are beginning to form a dense, even-aged stand. Small-scale group felling within the woodland would diversify the structure by creating areas of young regeneration. The pool in the northern corner of the area is being encroached upon by saplings. Its loss would destroy habitat for cettis warbler and other wetland species.

4.5.2 Targets

Create two areas of dense willow regeneration.

Maintain breeding population of cettis warbler.

4.5.3 Management Proposals

D1 Fell all willow saplings in an area five metres by five metres. Clear another area three years later.

D2 Pull out all saplings growing in the small pool.

D3 Clear plant material and silt from the northern half of the small pool. Leave the southern half unmanaged.

4.6 Water Vole

4.6.1 Rationale

Water voles are present around the clay-pits and along some of the larger rhynes. Management of these rhynes is not ideal for water voles, but is the responsibility of the internal drainage board.

4.6.2 Targets

Ensure that the clay-pits and rhyes continue to support a population of water voles.

4.6.3 Management Proposals

F1 Enhance emergent vegetation around clay-pits (see 4.2.3 above).

F2 Encourage drainage board to manage rhyes more sensitively.

F3 Re-instate lengths of open rhyne (see 4.4.3 above).

4.7 Greater Water-parsnip

4.7.1 Rationale

It is not at present clear whether greater water-parsnip is still present at Holwell Copse. If it is, or if there is a realistic chance of re-establishing it, then this would make a significant contribution to the plant's conservation.

4.7.2 Target

Clarify the current status of greater water parsnip

4.7.3 Management Proposals

G1 Carry out a survey in July to establish whether this species continues to be present, or if conditions remain broadly suitable for it.

G2 If either of these conditions is met, draw up and implement an appropriate action plan.

APPENDICES

Appendix 1 – Wildfowl counts and historical comparisons

Appendix 2 – Reservoir Plant Species Lists

Appendix 3 – Wetland Plant Species Lists

Appendix 4 – Farmland Plant Species Lists

Abbreviations used in plant species lists:

D – dominant

A – abundant

F – frequent

O – occasional

R – rare

L – locally

NS – Somerset notable species

A – Alien species

Appendix 1 - Wildfowl Counts

	Threshold Figure for National Importance	SSSI Citation Figure	Mean of Annual Maxima, 1994-2003	Maximum Count, 1994-2003
Mute swan	100	n/a	32 (November)	87 (November 2003)
Canada goose	n/a	n/a	126 (September)	284 (October 2003)
Wigeon	4060	n/a	219 (November)	881 (November 2003)
Gadwall	171	100	77 (December)	210 (January 1995)
Teal	1920	1000	362 (November)	1065 (October 1995)
Mallard	3520	1000	459 (November)	672 (October 1995)
Shoveler	148	100	49 (November)	130 (October 1995)
Pochard	595	2000	569 (December)	1023 (October 1994)
Tufted duck	901	n/a	115 (January)	201 (December 2003)
Goldeneye	249	60	38 (January)	54 (December 1994)
Goosander	160	n/a	38 (February)	67 (February 1997)
Great-crested grebe	159	100	92 (January)	146 (December 1996)
Coot	1730	2500	2718 (December)	3934 (January 2003)
Common sandpiper	n/a	n/a	18 (April)	30 (April 1995)
	Mean of Annual Maxima, 1970-79	Maximum Count, 1970-79	Mean of Annual Maxima, 1965-69	Maximum Count, 1965-69
Mute swan	32 (December)	50 (December 1973)	22 (November)	23 (November 1966)
Wigeon	351 (November)	580 (December 1973)	163 (January)	300 (January 1968)
Gadwall	76 (October)	216 (November 1977)		
Teal	744 (November)	1400 (November 1975&77)	218 (December)	600 (December 1969)
Mallard	587 (October)	780 (October 1977)	554 (December)	730 (October 1967)
Shoveler	122 (December)	239 (March 1976)	17 (December)	28 (November 1967)
Pochard	522 (December)	1000 (December 1975)	1208 (November)	1500 (November 1967)
Tufted duck	228 (January)	450 (January 1977)	90 (December)	230 (January 1969)
Goldeneye	27 (January)	44 (January 1979)	11 (January)	19 (February 1969)
Great-crested grebe	45 (January)	113 (January 1979)		
Coot	2458 (December)	3625 (December 1973)	1700 (December)	2300 (November 1968)

Cheddar Reservoir Plant Species Lists

Herbs		1	2	3	4	Status
Achillea millefolium	Yarrow	F			O	
Agrimonia eupatoria	Agrimony	R				
Arenaria serpyllifolia	Thyme-leaved sandwort	RLF				
Bellis perennis	Common daisy				R	
Bidens trifida	Trifid bur-marigold		R			
Callitriche stagnalis	Water starwort			R		
Capsella bursa-pastoris	Shepherd's-purse	R				
Cerastium fontanum	Common mouse-ear	O			O	
Ceratophyllum demersum	Hornwort			O		
Ceratophyllum submersum	Soft hornwort			R		NS
Chenopodium rubrum	Red goosefoot		O			
Cirsium arvense	Creeping thistle	O			O	
Cirsium vulgare	Spear thistle	R	R		R	
Convolvulus arvensis	Field bindweed				O	
Coriandrum sativum	Coriander	R				A
Crepis capillaris	Smooth hawksbeard	O			O	
Crepis vesicaria	Beaked hawksbeard	R				
Cymbalaria muralis	Ivy-leaved toadflax	R				
Daucus carota	Wild carrot	RLF			OLF	
Diplotaxis muralis	Annual wall-rocket	R				
Elodea canadensis	Canadian pondweed			F		A
Elodea nuttallii	Nuttall's pondweed			F		A
Epilobium hirsutum	Hairy willowherb	R				
Epilobium montanum	Broad-leaved willowherb	R				
Equisetum arvense	Field horsetail	R	R		R	
Equisetum fluviatile	Marsh horsetail			R		
Euphorbia helioscopia	Sun spurge	R				
Galium aparine	Goosegrass	R				
Galium mollugo	Hedge bedstraw	R				
Galium verum	Lady's bedstraw	RLF			OLF	
Geranium dissectum	Cut-leaved cranesbill				R	
Geranium robertianum	Herb robert	R				
Geranium rotundifolium	Round-leaved cranesbill	R				
Glechoma hederacea	Ground ivy	R			R	
Gnaphalium uliginosum	Marsh cudweed		O			
Guizotia abyssinica	Niger	R				A
Helianthus annuus	Sunflower	R				A
Heracleum sphondylium	Hogweed				R	
Hippuris vulgaris	Marestail		OLA			NS
Hypochaeris radicata	Common catsear	R			R	
Lamium amplexicaule	Henbit dead-nettle	R				
Lamium purpureum	Red dead-nettle	R				
Lathyrus pratensis	Meadow vetchling	R			OLF	
Leucanthemum vulgare	Ox-eye daisy	R				
Linum bienne	Pale flax				OLF	NS
Linum usitatissimum	Cultivated flax	R				A
Lotus corniculatus	Bird's-foot trefoil	R			O	
Lycopersicon esculentum	Tomato	R				A
Medicago lupulina	Black medick	O			R	
Mentha aquatica	Water mint	R	R			
Mentha arvensis	Corn mint	R				
Parietaria judaica	Pelitory-of-the-wall	F				
Periscaria amphibia	Amphibious bistort		OLF			
Periscaria lapathifolia	Pale persicaria		R			
Persicaria maculosa	Redshanks	R	O			
Pimpinella saxifraga	Burnet saxifrage	RLF			OLF	
Plantago lanceolata	Ribwort plantain	O				
Plantago major	Ratstail plantain	O	R		R	

1 - Stone Banks; 2 - Exposed Mud; 3 - Open Water; 4 - Grass Banks

Cheddar Reservoir Plant Species Lists

		1	2	3	4	Status
Potamogeton berchtoldii	Small pondweed			O		NS
Potamogeton crispus	Curled pondweed			R		
Potamogeton lucescens	Shining pondweed			O		NS
Potamogeton pectinatus	Fennel-leaved pondweed			R		
Potentilla anserina	Silverweed	OLF				
Potentilla reptans	Creeping cinquefoil	R			O	
Prunella vulgaris	Self-heal				R	
Pulicaria dysenterica	Common fleabane	R				
Ranunculus acris	Meadow buttercup				O	
Ranunculus aquatilis	Common water-crowfoot			R		
Ranunculus bulbosus	Bulbous buttercup				O	
Ranunculus circinatus	Fan-leaved water-crowfoot			R		NS
Ranunculus repens	Creeping buttercup	R			O	
Ranunculus sceleratus	Celery-leaved buttercup		R			
Rorippa palustris	Marsh yellow-cress	RLF	O			
Rorippa sylvestris	Creeping yellow-cress		O			
Rumex acetosa	Sorrel	R			R	
Rumex conglomeratus	Conglomerate dock	R				
Rumex crispus	Curled dock	O				
Sedum acre	Biting stonecrop	RLF				
Sedum album	White stonecrop	RLF				A
Senecio jacobaea	Common ragwort	R			R	
Senecio squalidus	Oxford ragwort	R				
Senecio vulgaris	Groundsel	R				
Sherardia arvensis	Field madder	R				
Sisymbrium officinale	Hedge mustard	R				
Solanum dulcamara	Woody nightshade	R				
Solanum nigrum	Black nightshade	O				
Sonchus asper	Prickly sow-thistle	O				
Sonchus oleraceus	Smooth sow-thistle	R				
Stellaria media	Chickweed	R				
Taraxacum vulgare agg	Dandelion	R			O	
Trifolium fragiferum	Strawberry clover				R	NS
Trifolium pratense	Red clover				O	
Trifolium repens	White clover	R			OLF	
Tussilago farfara	Coltsfoot	R				
Urtica dioica	Stinging nettle	R	R		R	
Verbena officinalis	Vervain	O				
Veronica catenata	Pink water-speedwell		R			
Vicia cracca	Tufted vetch	R				
Vicia pannonica	Hungarian vetch	R				A
Vicia sepium	Bush vetch				R	
Grasses, sedges & rushes						
Agrostis capillaris	Common bent				O	
Agrostis stolonifera	Creeping bent	R			O	
Anisantha sterilis	Barren brome	R				
Avena fatua	Wild oat	R				
Bromus hordaceus	Soft brome	R				
Carex acutiformis	Lesser pond sedge	R			R	
Carex divulsa	Grey sedge	R			R	
Carex hirta	Hairy sedge	R				
Carex spicata	Spiked sedge				R	
Catapodium rigidum	Fern-grass	RLF				
Cynosurus cristatus	Crested dogstail	R			F	
Dactylis glomerata	Cocksfoot	R			O	
Echinochloa crusgalli	Cockspur	R				A
Echinochloa utilis	Japanese millet	R				A

1 - Stone Banks; 2 - Exposed Mud; 3 - Open Water; 4 - Grass Banks

Cheddar Reservoir Plant Species Lists

		1	2	3	4	Status
<i>Eleocharis palustris</i>	Common spike-rush	R	RLF			
<i>Festuca arundinacea</i>	Tufted fescue				R	
<i>Festuca rubra</i>	Red fescue	RLF			O	
<i>Holcus lanatus</i>	Yorkshire fog	R				
<i>Hordeum murinum</i>	Wall barley	R				
<i>Hordeum secalinum</i>	Meadow barley				O	
<i>Juncus articulatus</i>	Jointed rush		R			
<i>Juncus compressus</i>	Round-fruited rush	R	R			NS
<i>Lolium perenne</i>	Perennial rye-grass	R			O	
<i>Panicum miliaceum</i>	Common millet	R				A
<i>Phalaris arundinacea</i>	Reed canary-grass	R	O			
<i>Phalaris canariensis</i>	Canary-grass	R				A
<i>Phleum bertolonii</i>	Small cat's-tail				R	
<i>Poa annua</i>	Annual meadow-grass	R				
<i>Setaria verticillata</i>	Rough bristle-grass	R				A
<i>Setaria viridis</i>	Green bristle-grass	R				A
Trees and Shrubs						
<i>Fraxinus excelsior</i>	Ash	R				
<i>Populus canescens</i>	Grey poplar	R				A
<i>Populus tremulus</i>	Aspen	R				
<i>Rubus fruticosus agg</i>	Bramble	R				
<i>Salix caprea</i>	Goat willow	R				
<i>Sambucus nigra</i>	Elder	R				

1 - Stone Banks; 2 - Exposed Mud; 3 - Open Water; 4 - Grass Banks

Wetland Plant Species Lists

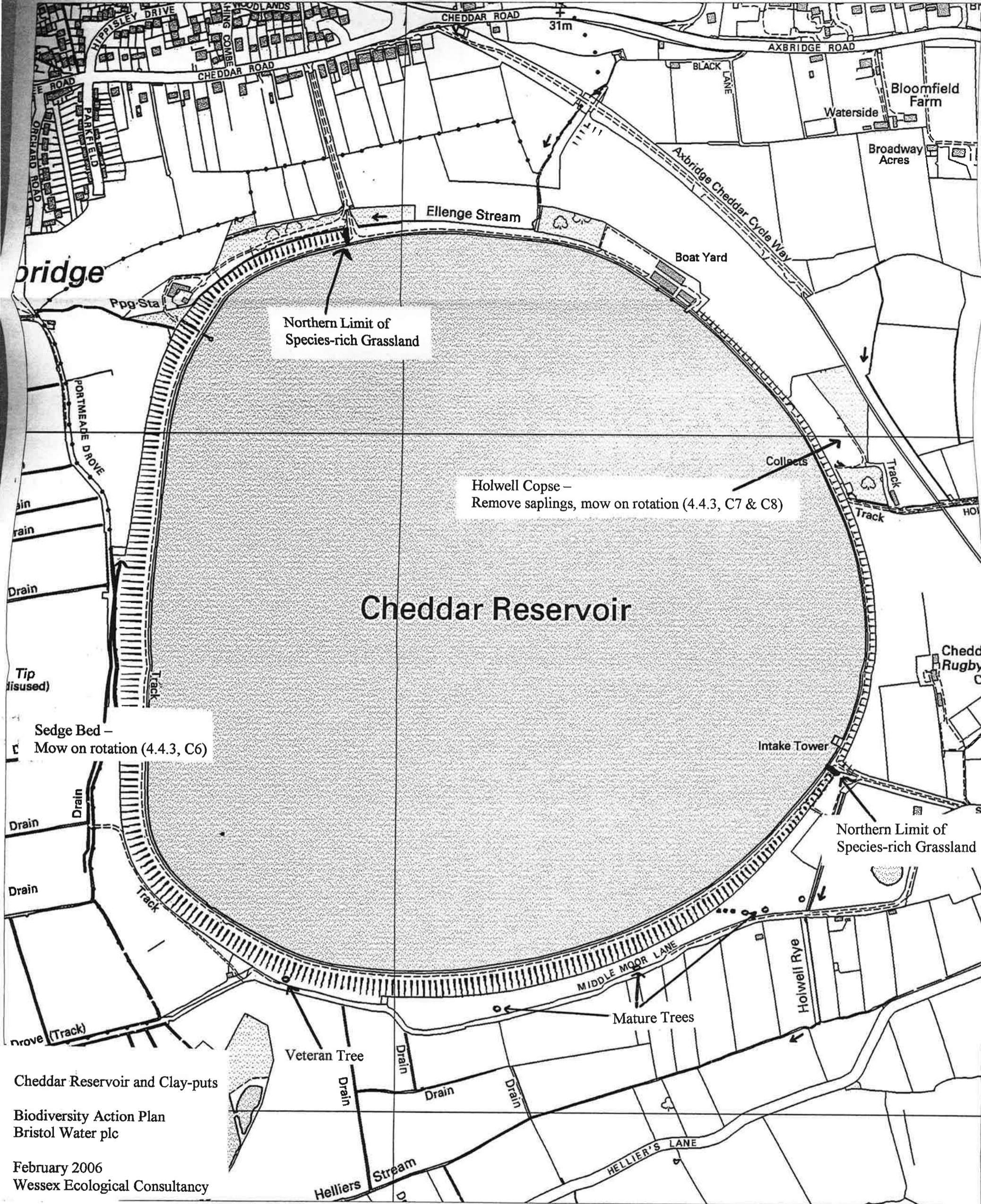
	Herbs	1	2	3
<i>Alisma plantago-aquatica</i>	Water plantain			R
<i>Angelica sylvestris</i>	Angelica	F	R	R
<i>Apium nodiflorum</i>	Fool's watercress	R	R	
<i>Berula erecta</i>	Upright water parsley		R	R
<i>Caltha palustris</i>	Marsh marigold			R
<i>Calystegia sepium</i>	Hedge bindweed		R	
<i>Cardamine pratensis</i>	Cuckoo flower		O	
<i>Cerastium fontanum</i>	Common mouse-ear		O	
<i>Ceratophyllum demersum</i>	Hornwort			R
<i>Cirsium arvense</i>	Creeping thistle		R	
<i>Cirsium palustre</i>	Marsh thistle	R	R	
<i>Dryopteris dilatata</i>	Broad buckler fern			O
<i>Dryopteris filix-mas</i>	Male fern			O
<i>Elodea canadensis</i>	Canadian pondweed			O
<i>Epilobium hirsutum</i>	Hairy willowherb	O	OLF	R
<i>Equisetum palustre</i>	Marsh horsetail	O		
<i>Eupatorium cannabinum</i>	Hemp agrimony	R	R	R
<i>Filipendula ulmaria</i>	Meadow-sweet	OLF	F	R
<i>Galium aparine</i>	Goosegrass		O	
<i>Galium uliginosum</i>	Fen bedstraw		RLF	
<i>Glechoma hederacea</i>	Ground ivy		R	
<i>Hedera helix</i>	Ivy			FLA
<i>Heracleum sphondylium</i>	Hogweed	R		
<i>Hypericum tetrapterum</i>	Square-stemmed St John's wort	R	RLF	
<i>Iris pseudacorus</i>	Yellow flag		R	
<i>Lathyrus pratensis</i>	Meadow vetchling	O	O	
<i>Lotus pedunculatus</i>	Greater bird's-foot trefoil		RLF	
<i>Lysimachia vulgaris</i>	Yellow loosestrife			R
<i>Lythrum salicaria</i>	Purple loosestrife	O	RLF	R
<i>Mentha aquatica</i>	Water mint		RLF	
<i>Nymphaea alba</i>	White water-lily			R
<i>Persicaria amphibia</i>	Amphibious bistort			R
<i>Plantago lanceolata</i>	Ribwort plantain		R	
<i>Polypodium interjectum</i>	Polypody			R
<i>Potentilla reptans</i>	Creeping cinquefoil		O	
<i>Pulicaria dysenterica</i>	Common fleabane		R	R
<i>Ranunculus acris</i>	Meadow buttercup		O	
<i>Ranunculus ficaria</i>	Lesser celandine		R	
<i>Ranunculus repens</i>	Creeping buttercup	R	R	
<i>Rumex acetosa</i>	Common sorrel	O	O	
<i>Rumex crispus</i>	Curled dock		R	
<i>Rumex hydrolapathum</i>	Great water dock	R		
<i>Rumex obtusifolius</i>	Broad-leaved dock	R	O	
<i>Samolus valerandii</i>	Brookweed		RLF	
<i>Scrophularia auriculata</i>	Water figwort	R	R	
<i>Solanum dulcamara</i>	Woody nightshade			R
<i>Stachys palustris</i>	Marsh woundwort	O		
<i>Stellaria graminea</i>	Lesser stitchwort	R		
<i>Symphytum officinale</i>	Comfrey	RLF		
<i>Thalictrum flavum</i>	Common meadow-rue			R
<i>Trifolium pratense</i>	Red clover		R	
<i>Urtica dioica</i>	Stinging nettle	O	OLF	O
<i>Valeriana dioica</i>	Marsh valerian		R	
<i>Veronica beccabunga</i>	Brooklime		R	R
<i>Veronica serpyllifolia</i>	Thyme-leaved speedwell			R
<i>Vicia cracca</i>	Tufted vetch	O	RLF	
<i>Vicia sepium</i>	Bush vetch		R	

Wetland Plant Species Lists

Grasses, sedges & rushes		1	2	3
<i>Agrostis stolonifera</i>	Creeping bent		F	
<i>Carex acutiformis</i>	Lesser pond sedge	A	F	O
<i>Carex binervis</i>	Green-ribbed sege		R	
<i>Carex disticha</i>	Brown sedge		R	
<i>Carex flacca</i>	Glaucous sedge		R	
<i>Carex riparia</i>	Greater pond sedge			O
<i>Cynosurus cristatus</i>	Crested dogstail		R	
<i>Dactylis glomerata</i>	Cocksfoot		R	
<i>Deschampsia cespitosa</i>	Tufted hair-grass	R	R	
<i>Festuca arundinacea</i>	Tufted fescue		F	
<i>Festuca rubra</i>	Red fescue		F	
<i>Glyceria maxima</i>	Reed sweet-grass	RLF		R
<i>Holcus lanatus</i>	Yorkshire fog	OLF	F	
<i>Juncus bufonius</i>	Toad rush		R	
<i>Juncus effusus</i>	Soft rush	O	O	
<i>Juncus inflexus</i>	Hard rush	F	O	
<i>Lolium perenne</i>	Perennial rye-grass		R	
<i>Phleum pratense</i>	Timothy		R	
<i>Phragmites australis</i>	Common reed		R	OLF
<i>Sparagnum erectum</i>	Branched bur-reed			R
<i>Typha latifolia</i>	Greater reedmace			R
Trees and shrubs				
<i>Bryonia dioica</i>	White bryony			R
<i>Cornus alba</i>	Ornamental dogwood		RLF	
<i>Cornus sanguinea</i>	Dogwood			R
<i>Corylus avellana</i>	Hazel		R	
<i>Crataegus monogyna</i>	Hawthorn		R	R
<i>Cypressus sp</i>	Cypress		R	
<i>Fraxinus excelsior</i>	Ash		R	R
<i>Prunus spinosa</i>	Blackthorn		R	R
<i>Quercus robur</i>	Pedunculate oak			R
<i>Rosa arvensis</i>	Field rose			R
<i>Rosa canina</i>	Dog rose		R	R
<i>Rubus fruticosus agg</i>	Bramble		RLF	RLF
<i>Salix alba</i>	White willow		R	R
<i>Salix caprea</i>	Goat willow		RLF	F
<i>Salix cinerea</i>	Grey sallow		R	R
<i>Salix fragilis</i>	Crack willow		R	R
<i>Sambucus nigra</i>	Elder			R

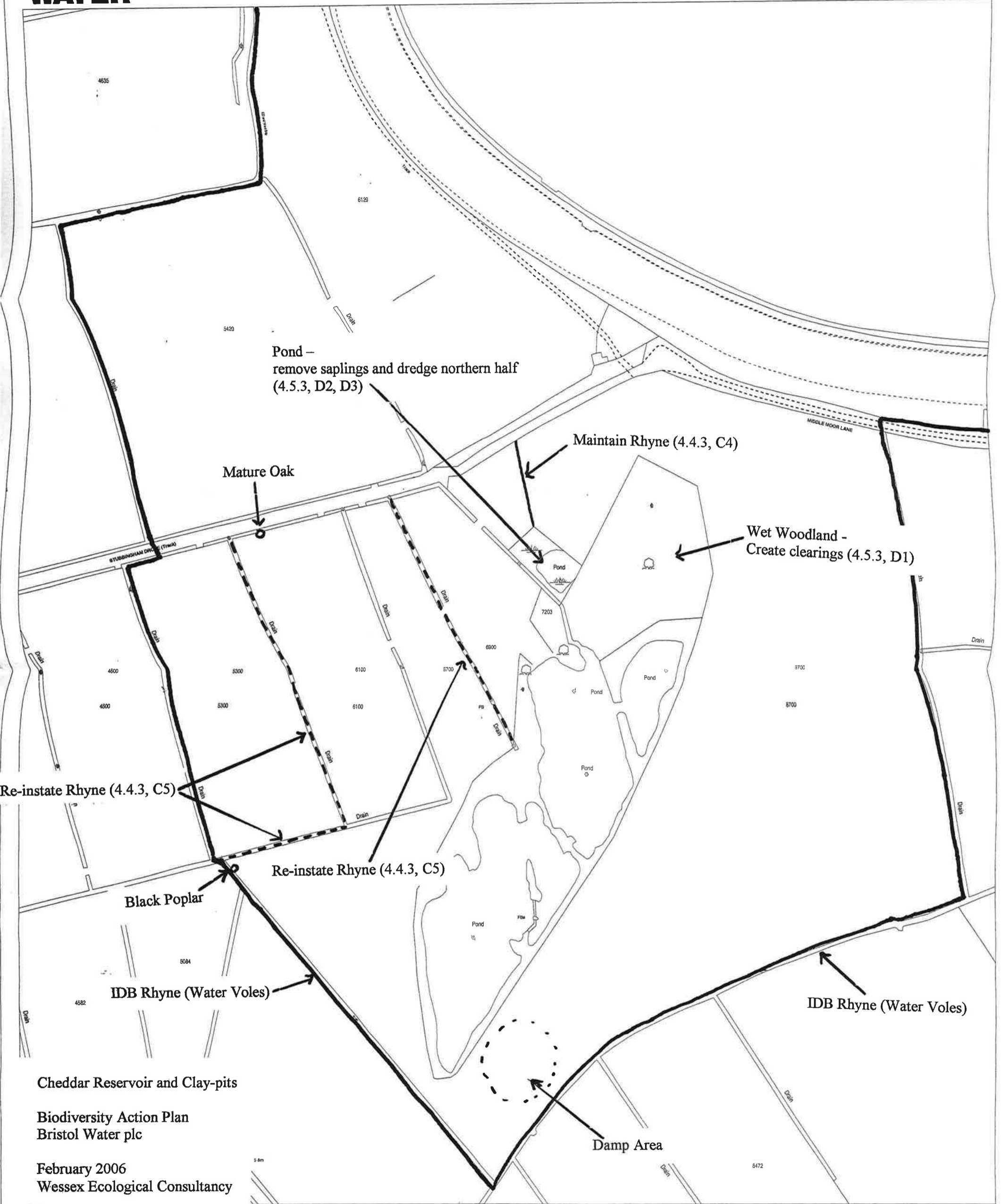
Farmland Plant Species Lists

Herbs	
<i>Achillea millefolium</i>	Yarrow
<i>Apium nodiflorum</i>	Fool's watercress
<i>Bellis perennis</i>	Common daisy
<i>Callitriche stagnalis</i>	Water starwort
<i>Cardamine pratensis</i>	Cuckoo flower
<i>Cerastium fontanum</i>	Common mouse-ear
<i>Cirsium arvense</i>	Creeping thistle
<i>Cirsium vulgare</i>	Spear thistle
<i>Crepis capillaris</i>	Smooth hawksbeard
<i>Daucus carota</i>	Wild carrot
<i>Elodea canadensis</i>	Canadian pondweed
<i>Filipendula ulmaria</i>	Meadowsweet
<i>Hypochaeris radicata</i>	Common catsear
<i>Lemna minor</i>	Common duckweed
<i>Mentha aquatica</i>	Water mint
<i>Plantago major</i>	Ratstail plantain
<i>Ranunculus repens</i>	Creeping buttercup
<i>Rorippa nasturtium-aquaticum</i>	Water-cress
<i>Rumex acetosa</i>	Common sorrel
<i>Taraxacum vulgare agg</i>	Dandelion
<i>Trifolium repens</i>	White clover
<i>Urtica dioica</i>	Stinging nettle
<i>Veronica beccabunga</i>	Brooklime
Grasses, Sedges & Rushes	
<i>Agrostis capillaris</i>	Common bent
<i>Agrostis stolonifera</i>	Creeping bent
<i>Carex acutiformis</i>	Lesser pond sedge
<i>Carex remota</i>	Remote sedge
<i>Carex riparia</i>	Greater pond sedge
<i>Cynosurus cristatus</i>	Crested dogstail
<i>Dactylis glomerata</i>	Cocksfoot
<i>Deschampsia cespitosa</i>	Tufted hair-grass
<i>Festuca rubra</i>	Red fescue
<i>Glyceria maxima</i>	Reed sweet-grass
<i>Glyceria sp</i>	Flote-grass
<i>Hordeum secalinum</i>	Meadow barley
<i>Juncus inflexus</i>	Hard rush
<i>Lolium perenne</i>	Perennial rye-grass
<i>Phleum pratense</i>	Timothy
<i>Phragmites australis</i>	Common reed
Trees & Shrubs	
<i>Crataegus monogyna</i>	Hawthorn
<i>Fraxinus excelsior</i>	Ash
<i>Prunus spinosa</i>	Blackthorn
<i>Quercus robur</i>	Pedunculate oak
<i>Rubus fruticosus agg</i>	Bramble
<i>Salix caprea</i>	Goat willow
<i>Salix cinerea</i>	Grey sallow
<i>Salix fragilis</i>	Crack willow
<i>Sambucus nigra</i>	Elder



Cheddar Reservoir and Clay-puts
 Biodiversity Action Plan
 Bristol Water plc
 February 2006
 Wessex Ecological Consultancy

<p>Stovey</p>	<p>COORDINATES AT THE CENTRE OF THE PLAN ARE 344146 153755</p>
<p>SCALE: 1:5067</p>	<p>DATE 04/06/2004</p>
<p>This plan is furnished as a general guide only and no warranty as to its correctness is given or implied. This plan must not be relied upon in the event of excavations or other works made in the vicinity of the Company's pipes or apparatus. Not all service pipes are shown on this plan.</p> <p>Based on the Ordnance Survey map with the permission of the Controller of Her Majesty's Stationery Office (c) Crown Copyright reserved License number: WV 298735 Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings Bristol Water plc P.O.Box 218 Bridgwater Road Bristol BS99 7AU Tel (0117) 9665881 FAX (0117) 9634576</p>	<p> N EXISTING WATER MAINS EXISTING VALVES EXISTING FIRE HYDRANTS PRIVATE MAINS EXISTING ABANDONED MAINS PROPOSED WATER MAINS PROPOSED VALVES PROPOSED FIRE HYDRANTS PROPOSED ABANDONED MAINS </p>



Cheddar Reservoir and Clay-pits

Biodiversity Action Plan
Bristol Water plc

February 2006
Wessex Ecological Consultancy

Cheddar_clay pits

SCALE: 1:1987

DATE 04/06/2004

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COORDINATES AT THE CENTRE OF THE PLAN
ARE 343699 153057

EXISTING WATER MAINS	
EXISTING VALVES	
EXISTING FIRE HYDRANTS	
PRIVATE MAINS	
EXISTING ABANDONED MAINS	
PROPOSED WATER MAINS	
PROPOSED VALVES	
PROPOSED FIRE HYDRANTS	
PROPOSED ABANDONED MAINS	