

WELSH HARP / BRENT RESERVOIR MANAGEMENT PLAN

**Barnet Council
Brent Council
Canal & River Trust**

Welsh Harp Joint Consultative Committee

Draft: 3 July 2012



For contacts please refer to officers of Barnet Council, Brent Council, or the Canal & River Trust (formerly British Waterways).

Grid reference near to centre of the Welsh Harp: TQ 215 870

Example post codes:

Welsh Harp Sailing Association / Birchen Grove Car Par: NW9 8SA

Welsh Harp Environmental Education Centre: NW9 8RY

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Organisation of the Management Plan

The Welsh Harp area is located around the Brent Reservoir and for the purposes of this Management Plan includes those open spaces surrounding the Reservoir. It extends to a green grid of recreational and other open spaces that radiate from the Welsh Harp.

This Management Plan is produced by three statutory organisations, the Canal & River Trust, the London Borough of Barnet and the London Borough of Brent who are the main land holders and land managers. Significant input is provided by the recreational, conservation, community groups and other organisations also represented on the Welsh Harp Joint Consultative Committee.

Ownership:

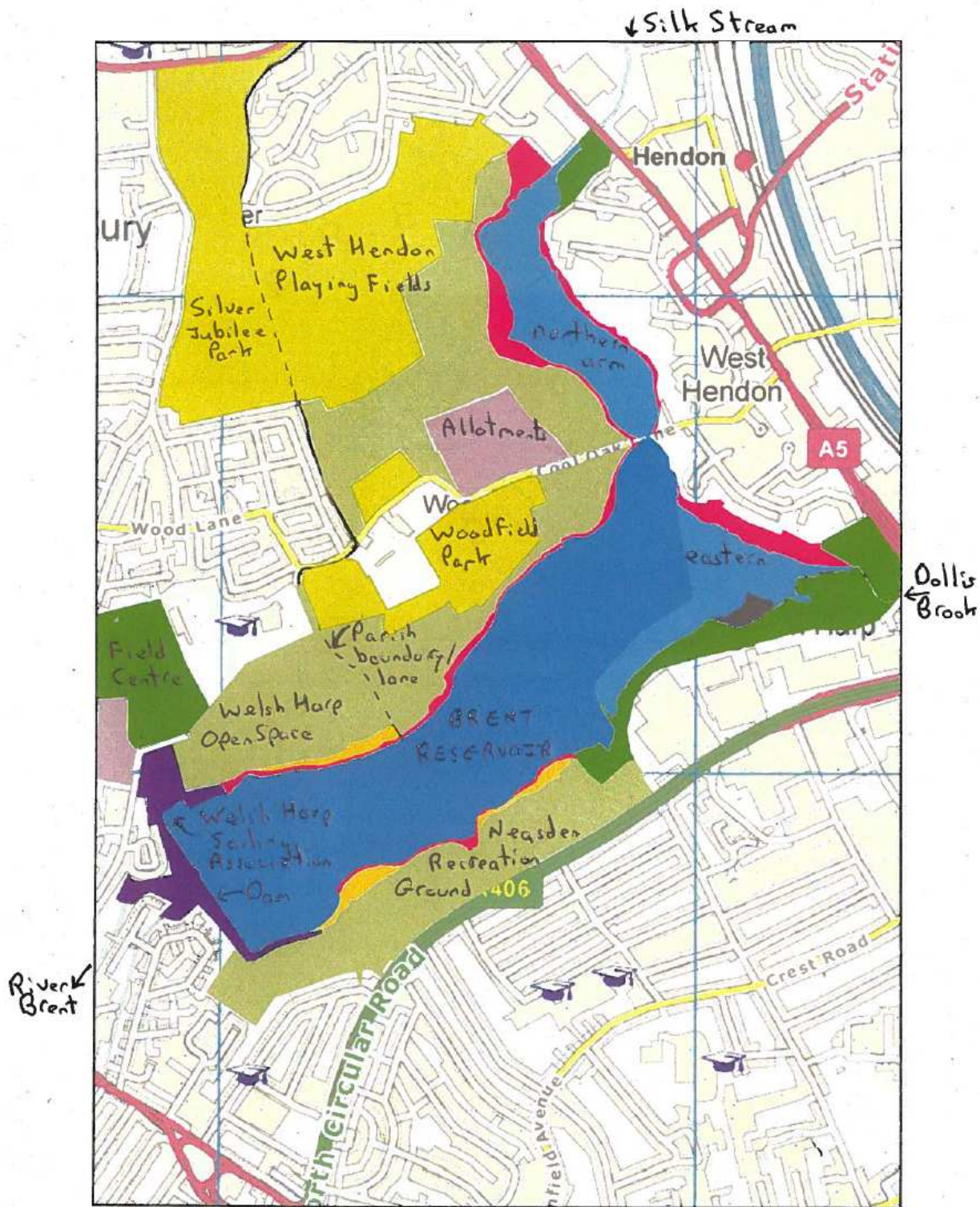
The Canal & River Trust own the reservoir and the immediately adjacent areas of land; while the London Boroughs of Barnet; and Brent own adjacent public open spaces. Each of the three organisations have statutory duties at the Welsh Harp and cooperate with regards to the management of the Welsh Harp. Often there is no demarcation of land ownership on the ground and the public are able to use the Welsh Harp as one site. There are numerous access points. Fencing and physical boundaries are provided as appropriate for safety reasons and to prevent unauthorised vehicular access. Some land is leased from the Canal & River Trust to the Welsh Harp Sailing Association (WHSA - the collective group for a number of separate clubs). The WHSA lease commencing in 1993 contains a break clause, such that after three years the Canal & River Trust may regain possession of the land after 12 months notice to quit. Land is also leased by the London Borough of Barnet to the North Circular Sailing Club.

The Management Plan includes the Brent Reservoir Site of Special Scientific Interest. In that respect the currently approved version of the Management Plan satisfies the requirements under the Countryside and Rights of Way Act 2000, in terms of assenting nature conservation works on this site.

Welsh Harp Joint Consultative Committee:

The Welsh Harp Joint Consultative Committee (WHJCC) acts as a co-ordinating body for the land owners, statutory bodies and other interest groups at the West Harp. The conservation, recreation and other interests need to be considered in forming solutions. The Committee meets approximately three times a year, with the chair rotated annually between the two local authorities. Members are advised by officers. Its terms of reference are: "to consider and co-ordinate all the interests of recreation, leisure, nature conservation and the statutory requirements of British Waterways (now the Canal & River Trust) and to make recommendations to the appropriate committees of Barnet and Brent Councils (including Barnet's Hendon Area Environmental Sub-Committee) on the future development of the Welsh Harp area". The Committee sections of Barnet and Brent Councils hold a list of the organisations represented on the WHJCC including recreational, wildlife and residents' organisations using and managing the Welsh Harp.

The Welsh Harp Conservation Group (WHCG) is a volunteer group dedicated to the maintenance and enhancement of the conservation interest of the Welsh Harp. Its members undertake work in the areas of greatest conservation value with support from the Boroughs and others. The Group also leads monthly walks focused on bird watching.



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22 March 2012

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Figure 1. The Welsh Harp / Brent Reservoir, some features, and the management zones referred to in this Management Plan. For the key: see below.



A management plan for the Welsh Harp was first produced in September 1994 by consultants on behalf of Barnet and Brent Councils. Significant investment was made between 1998 and 2004 following grants firstly from 'New Leaf' / Guinness from their 'Water of Life' initiative, and which led to a successful grant application to the Heritage Lottery Fund, implemented between 1998 and 2000. A more detailed Management Plan was produced in 2003 based on a map of sub-zones prepared for the 1994 plan. Since 2003 the Management Plan has had six revisions. That was however a lengthy document. The Welsh Harp Joint Consultative Committee has taken the view that the basis of the zones could be improved with an emphasis on physical, ecological and functional features to make a more compact and useable Management Plan.

The Management Plan is subject to approximately annual review by officers of the three organisations, and the review is submitted to the Welsh Harp Joint Consultative Committee for their comments and recommendation. Minor changes to the Management Plan and other actions are included in Committee Reports between the annual reviews.

This Management Plan outlines the short- to long-term management considered necessary to sustain the Welsh Harp: to increase and optimise the wildlife, recreation, landscape, flood-control, economic and other benefits of the reservoir. They are achievable over varying time-frames, though many are not affordable in the short term. It is a guide. The inclusion of any statement in this Management Plan does not necessarily imply that resources are immediately available to undertake that action. However, many actions will be programmed by their appropriate organisations; while others will form part of annual, medium-term and long-term action plans. There is evidence that the deposit of alluvium is continuing; and that at some stage in the future that the deposits will need to be removed to sustain the future of the water-body. That work is likely to require considerable financial resources.

The vision for the Welsh Harp is to:

‘Protect and enhance the special environment of the Welsh Harp for safe public access and enjoyment in a sustainable and sensitive manner for future generations.’

Management Objectives for the Welsh Harp Reservoir area as whole

- 1 To conserve and enhance the landscape and ecological diversity of the site
- 2 To provide for and encourage public enjoyment and understanding of the site and its heritage value
- 3 To improve access to the site – in particular for visitors with limited mobility
- 4 To involve existing users and the local community in the management and development of the site
- 5 To promote and pursue sustainable good practice
- 6 To promote appropriate recreation
- 7 To improve the value of the Reservoir in the river system and in its flood control function.

In terms of nature conservation and landscape enhancement, the main issues and challenges are:

- i) loss of habitats
- ii) reduction in species
- iii) damage to ecological heritage value
- iv) landscape: the Reservoir and its valley setting
- v) potential for habitat improvement
- vi) water pollution and water quality.

THE BRENT RESERVOIR AND WELSH HARP

The Welsh Harp or Brent Reservoir area covers and 170 hectares including open water, marshes, woodland, grasslands and other features less than 10 miles from the centre of London and only a few minutes from Wembley Stadium and Brent Cross Shopping Centre. It is designated a Site of Special Scientific Interest. It was declared a Local Nature Reserve in 2005. The Reservoir provides a habitat for wildlife and an attractive recreational centre. The zones upon which this Management Plan is based are illustrated on the attached map.

The Welsh Harp is surrounded by urban north-west London and in particular the residential areas of Kingsbury, West Hendon, Cricklewood and Neasden, which developed from villages particularly from the 1920s-1930s. The Staples Corner industrial estate backs onto the south-eastern edge of the reservoir at the junction of the Edgware Road and North Circular Road.

Geology

The underlying geology of the site is that of the London Clay, with Taplow Gravels around part of the edges of the Reservoir. The reservoir lies in a shallow sloping river valley; and is unusual in London in that the banks are not lined. The deepest part of the reservoir is about 30m AOD, at the dam outlet. The water level is generally maintained at 37.4m AOD. The highest point is at West Hendon off Cool Oak Lane where the ground rises to about 45m AOD.

The reservoir is fed from the Silk Stream to the north-east and the River Brent to the south-east. There are smaller inflows from drains and surface run-off streams. The

water leaves the reservoir from an outflow at the dam wall where it continues as the River Brent (and some via the Canal Feeder). In recent years some water extraction to the canal system has been resumed by the Canal & River Trust. The reservoir forms a major sub-system of the River Brent Flood Alleviation Scheme. Automatic sluices control the flow of water out, with manual override possible, while siphons, an overflow spillway, and outflanking are possible at times of successively more major flooding. Nowadays a flood warning system is in operation to provide warning for residential and commercial areas downstream of the reservoir. The overall capacity of the reservoir is estimated at 1.6 million cubic metres.

The soils of the Welsh Harp area have been mapped by Hollis (1995). The West Hendon Playing Fields were created on a capped tip created during 1960-75 and upper layers of the tip are contaminated with heavy metals. There are a number of other tip areas and landfill sites within the Welsh Harp area. Some were created during earlier dredging of the reservoir and may also be contaminated with heavy metals and oil.

The alluvium deposits in the Reservoir are considerable and are probably increasing. At some point the alluvium will need to be removed in-order to maintain water for water sports and for wildlife. Some alluvium was removed during works in the 1980s and 1990s, using methods that created a soup within a volume of water that could be pumped to bunds on the shore, from where the water could drain off. Though large quantities were removed, and made local improvements, the quantities involved were probably insignificant compared with the total of alluvium within the reservoir. Issues of land availability, regulation of waste disposal (including the level of contaminants) and the relatively high costs could make problematic, future use of this method. More efficient methods could entail significant engineering works, in-situ decanting of the water content, and disposal off-site.

History

An illustrative history of the Welsh Harp has been prepared by Hewlett (2012) and see also Hewlett (1985).

The Edgware Road, formerly the Roman road Watling Street, runs to the east of the Welsh Harp. Evidence of human activity comes from finds made during work on the reservoir. Items discovered include Bronze Age ceramic cremation urns, a 13th century cooking pot, an Edward I silver penny and an Elizabeth I silver shilling. Nearby, 13th century pottery and building materials have been uncovered from the banks of the River Brent and fragments of Roman pottery were found in the grounds of the Hendon Hospital to the north. An original section of Wood Lane survives as a green lane on the boundary of the two Boroughs. There is evidence of relic pasture in the fields of Woodfield Park.

Prior to its construction the area was predominantly rural and of permanent pasture. Construction of the reservoir commenced in about 1834 to supply water to the Regents, now the Grand Union Canal via a Canal Feeder (in effect a narrow canal). A dam was constructed across the River Brent, flooding the pastureland on either side of the Silk Stream and the River Brent, which flow into the reservoir. The construction work comprised “the formation of an embankment or head with weirs, sluices, retaining walls and basins across the river”. The work included building up sections of Cool Oak Lane so that the road would be above the water level. Construction was completed in 1837, though the dam was breached in 1842 and the first attendant's cottage built to allow the

water levels to be monitored. The dam was deepened in 1851 and extended between 1853-1854 when the dam wall was increased in height and extended thus enlarging the reservoir. This necessitated works to raise the level of the Edgware Road to avoid flooding. In 2005, British Waterways (now the Canal & River Trust) undertook works to extend the height of the dam wall on the southern flank, to extend the dam into Neasden Recreation Ground as a clay bund; and to reconstruct the face of the dam wall. Today the water area is about 50 hectares set within surrounding open spaces of about 120 hectares

Social and recreational history:

At the time the reservoir was built the area was sparsely populated. However, it soon became a popular place to visit and an important part of London's 'social scene'. This mainly arose due to the efforts of the owner of the local inn, 'The Old Welsh Harp' (where the reservoir's popular name comes from) who introduced pleasure gardens, a museum, a shooting enclosure, horse and greyhound racing, sailing, boating and fishing, plus a range of other amusements and amenities, including the Welsh Harp Concert Hall where many famous contemporary artists performed. The inn was built in the early 18th century where the River Brent is crossed by the Edgware Road. All of these attractions drew crowds of people from London. Indeed, the Midland Railway opened the Welsh Harp station in 1870 to cater for the thousands arriving on Bank Holidays to visit the reservoir and its attendant attractions. For example, in 1881 on Easter Monday, trains delivered some 5,000 day trippers to the Welsh Harp station during the morning alone.

With the onset of urbanisation of the countryside around the reservoir, the recreational attractions of the area declined. The railway station closed in 1903 and the North Circular Road was built south of the reservoir in 1926, heralding much new housing and industrial development nearby. By 1945, some 60% of the surrounding area was urbanised. In 1971, the Old Welsh Harp Inn was demolished to make way for the Staples Corner fly-over at the start of the M1 motorway. The Reservoir hosted European Championships for rowing in the 1940s and 1950s; and annual Welsh Harp Regattas in the 1960s and 1970s.

Water, flood control and pollution

The level at which the water is maintained is subject to a long-standing agreement between the predecessor body to the Canal & River Trust and the Middlesex County Council (the predecessor land drainage body to the Environment Agency who now control this aspect). The agreed level is 3'6½" below cill level or c. 37.4m Above Ordnance Datum (AOD). See the Water Level Management Plan (Andrews 1997).

The reservoir itself is subject to a number of legal statutes, including:

The Water Framework Directive; The Reservoirs Act 1975 (which requires periodic inspection of the structure by Canal & River Trust); The Water Resources Act 1991 – under which the Environment Agency (EA) have permissive powers to undertake maintenance and improvement works for the purposes of flood alleviation; Thames Water Land Drainage Byelaws 1981 – which together with the Water Resources Act require all works within the reservoir and 8m landward to have the prior consent of the Environment Agency; and The Land Drainage Act 1991.

The amount of silt (actually: alluvium) and pollution entering the reservoir and the quality of the water are causes for concern. Alluvium has been accumulating over many years,

brought down by feeder rivers and water courses. Sailing suffers from the shallow water, particularly when the water level has been artificially reduced for safety reasons.

Although the Canal & River Trust own the reservoir and control the flow of water out via sluices at the dam, the area now forms an important element of the River Brent flood alleviation system which is the responsibility of the Environment Agency. The Environment Agency maintains rubbish and debris traps where the Silk Stream and River Brent flow into the reservoir. The Environment Agency maintain debris traps and a Hoyle boom at the river inflows. The trap on the Silk Stream is cleared automatically as access is poor. The trap on the River Brent is cleared by hand.

Urban run-off accounts for 60% of the Silk Stream's flow which as a result is contaminated with heavy metals and other pollutants. There are problems with oil and sewage pollution from locations up-stream.

In recent years potentially hazardous blue-green algal blooms have developed which require recreational and other users of the water to be particularly careful. The sailing clubs have issued written instructions to water users and installed outside showers. There have also been problems with mats of floating weed communities, also considered to be due to eutrophication (excess nutrient pollution in the water) which causes growth particularly when sunlight is high.

Landscape

The Welsh Harp provides a contrast with the surrounding urban area. The visual amenity is available not only to those who visit the site, but to a limited extent to those who pass it and those who live nearby. The main arm of the Reservoir is of a gradually sloping river valley, with the land rising from the Reservoir on either side. The vegetation of the habitats and their wildlife contributes to the amenity value of the site. The rather 'wild' character of some areas adds to the visual interest, creating a different feeling to a more traditional, highly managed urban park. A landscape appraisal was undertaken as part of the site survey for the first management plan (1994). Key elements of this appraisal are: the importance of the marginal woodlands in 'containing' the site by screening surrounding development; the contrast between areas of open ground and adjacent areas of woodland and the visual intrusion of certain elements such as club houses, exotic conifer trees and traffic on the North Circular Road.

Wildlife

Despite its urban location, the Welsh Harp Reservoir supports a range of habitats and species. Brief descriptions of the habitats and their wildlife are provided in sections of the Management Plan. These follow the priority habitats of the UK biodiversity Action Plan, and for the wider area, broader habitat descriptions to encompass features such as allotments and sports pitches. For the purposes of this Management Plan, these zones provide guidance to their boundaries; and in practice the Welsh Harp area is a much more intricate mosaic of habitats and features.

Bird Life:

Bird life is the site's greatest attraction for naturalists, particularly over-wintering wildfowl, which migrate into this country in autumn from breeding grounds further north. The SSSI designation also relates to breeding waterfowl, Great Crested Grebes breed in good

numbers and also several duck species. The site attracts both dabbling and diving ducks; dabbling ducks are those that feed by straining the surface water or up-ending, whilst diving ducks dive right under the water to seek their food.

The numbers of individual species fluctuate from year to year. When the SSSI status was first granted in 1950, the reservoir was one of the best sites in the country for Smew - a small black and white diving duck from the Baltic area. The UK winter population of this species has declined markedly over recent years. Today the site is more important for dabbling ducks during the late summer and autumn when peak counts of Shoveler and Gadwall often exceed 200 which are nationally important counts. It is a good site for Teal with winter counts often peaking at over 100; teal has also bred at the site which is very unusual for London. Amongst the diving ducks, Tufted Duck regularly reach over 300 with Pochard peaking at 80 -100. The Reservoir is one of the few London breeding sites for Pochard, Shoveler, Gadwall and Teal with one or two pairs of each most summers.

Cormorant and Heron can be observed roosting on the rafts and islands. Large flocks of gulls (chiefly Black-headed Gull) congregate on the open water during the winter together with up to four other gull species. There is a regular winter flock of Snipe, usually over 30 in the Eastern Marsh. These areas also provide cover for the Water Rail (a curious, secretive species which is more often heard 'squealing' in the rushes than seen out in the open).

Over the past twenty years, this has been one of the best sites in London for breeding Great Crested Grebe, with up to 25 pairs in most years. However the nests are susceptible to flooding when the water level rises, with inevitable consequences for the young. A few pairs of Little Grebe breed most years, although numbers were higher a few years ago. Moorhen, Mute Swan, Mallard, Tufted Duck and Coot nest most years. Rafts, which were first constructed in the early 1980's to provide roosting platforms for wildfowl, were adopted by Common Terns, currently 20 -25 pairs breed each year. There are also 2-3 pairs of Lesser Black-backed Gulls nesting on the rafts which have been seen to predate on the Tern chicks. Extending the reed-beds has been a priority in recent years and Reed and Sedge Warblers and Reed Bunting are regular breeders. This has occasionally attracted rare visitors such as Bittern.

Elsewhere in the Local Nature Reserve, Whitethroat, Lesser Whitethroat, Blackcap, Willow Warbler, Chiffchaff and Garden Warbler nest in the rough grassland, woodland and scrub. Grey Wagtail and Pied Wagtail breed on the site and Kingfishers have recently returned. Tawny Owl, Sparrowhawk and Kestrel also breed on the site. The oak and damp willow woodlands are especially good for woodpeckers and several pairs of Great Spotted and Green Woodpeckers nest at the site.

The site is also important for birds on passage, such as Blackcap, Grasshopper Warbler, Chiffchaff, Redstart and Flycatchers. Over 30 Blackcaps have been heard singing on a single day in the spring. The areas of scrub are especially important for these birds in both Spring and Autumn. Eight species of warbler regularly breed in the various habitats around the reservoir and on the Open Space.

Whilst high nesting or over-wintering numbers are important in assessing the site's importance for nature conservation, for the local birder the sheer range of species is a source of inspiration. In 2011, a total of 148 species was recorded and the Annual Spring Bird Count has recorded as many as 81 species in a single day. Many rarities have been

seen, especially during the spring and autumn passage. Some of the more unusual records included Slavonian Grebe, Bittern, Night Heron, Garganey, Smew, Blue-winged Teal, Ring Billed Gull, Long-eared Owl, Hen Harrier, Montagu's Harrier, Osprey, Cuckoo and Pied Flycatcher.

Bats: Commons Pipistrelle, Soprano Pipistrelle, Nathusis's Pipistrelle, Daubenton's Bat, Serotine, Leisler's and Noctule bats have been recorded at the reservoir.

Amphibians and reptiles: Smooth Newts and Frogs are regularly observed in the reservoir and nearby ponds, and there are a few isolated records of Common Toad. Lizards were observed on broken concrete near Cool Oak Lane bridge in the 1960s, although their survival is thought unlikely. A small number of Slow-Worms were introduced some years ago near the Youth Sailing Base.

Invertebrates

The insect fauna of the site is of considerable interest, both for wetland species and those associated with old grassland, woodland and hedgerows. Over 40 species listed in the Red Data Book for Invertebrates (JNCC 1991) have been recorded here as well as other uncommon insects. Twenty-four species of butterfly have been recorded for the site including the White-letter Hairstreak and a Marbled White population. A population of the Ringlet was first recorded in 2009. Damselfly and dragonfly list totals 13 species including the nationally uncommon Ruddy Darter. Other notable records include the day flying chimney sweeper moth, the longhorn beetle *Phytoecia cylindrica*, hoverfly *Epistrophe diaphana* and brown lacewing *Symphorobius elegans*. The UK BAP Priority Species crane-fly *Lipsothrix nervosa* has been identified at the Reservoir.

Plants

The plants of the Brent Reservoir were listed by Williams, Warren and Hutchinson (1995). Five species of orchid have been recorded. Broad-leaved Helleborine grows in damp woodland near the eastern marsh, whilst Common Spotted-orchid occurs in grassland on the northern and southern shores. Southern Marsh-orchid can be found in the northern and southern marshes; a Pyramidal Orchid was discovered in the eastern marsh in the 1980s. Bee Orchid was discovered on rough ground in 1994. In total, several hundred species of plants have been recorded at the reservoir.

Biological recording: This is led at the Reservoir by the Welsh Harp Conservation Group; and records are deposited with local, regional (e.g. London Natural History Society; and Greenspace Information for Greater London) and national recording schemes. Records by other organisations, individuals and professionals are also made and disseminated through these systems. The Welsh Harp Conservation Group are part of several recording schemes for birds and for water-birds; and are also monitor butterflies as part of the UK Butterfly Monitoring Scheme.

Conservation

Site of Special Scientific Interest

The reservoir and marginal habitats were designated a Site of Special Scientific Interest (SSSI) in 1950 and subsequently re-notified in 1985 under the Wildlife and Countryside Act 1981. It was designated as an SSSI primarily on account of its interest for breeding wetland birds and in particular for significant numbers of nesting Great Crested Grebe (*Podiceps cristatus*). The diversity of wintering waterfowl and the variety of plant species

growing along the water margin are also of special note for Greater London. The SSSI designation is significant in that it imposes restrictions on the management of the designated area by identifying a range of operations that are considered likely to damage the special interest of the site. Before any of these operations are undertaken written notice must be given to Natural England and written consent must be received (or 4 months have elapsed since notice was given). Alternatively, the operations will be permitted without specific consent provided they are in accordance with a management plan drawn up with Natural England under the Countryside and Rights of Way Act 2000.

Site of Metropolitan Importance for Nature Conservation

The Greater London Authority and the two local authorities recognise the Welsh Harp as a Site of Metropolitan Importance for Nature Conservation. This designation is used for planning purposes. In their other planning policies both Boroughs highlight the need to enhance both the recreational and nature conservation interest of the area.

Local Nature Reserve

Much of the Reservoir and the surrounding area is a Local Nature Reserve. Brent Council's Executive Committee agreed the Declaration of the Brent Reservoir / Welsh Harp Local Nature Reserve on 20 June 2005, the Declaration was made on 21 July 2005; and the Public Notice was published on 1 September 2005. Barnet Council arranged the Declaration for their part of the Local Nature Reserve.

Boating

A range of boats, largely wind- or hand powered use the Reservoir under the auspices of the Welsh Harp Sailing Association. The principal water sports on the Welsh Harp are sailing, windsurfing and canoeing. The reservoir area to the south of the Cool Oak Lane Bridge is leased by Canal & River Trust to the Welsh Harp Sailing Association. The total number of water sport visits per year is estimated at 40,000.

The Welsh Harp Sailing Association represents all the water sports users of the reservoir (around 2000). With an executive committee including delegates from all constituent bodies, it negotiates on their behalf with the landlord, and with all other outside bodies (such as the Environment Agency). It holds the head-lease on the majority of the site at Birchen Grove and hosts a number of events each year. The constituent bodies of the WHSA are:

- BTYC Sailsports
- Seahorse Sailing Club
- North Circular Road Sailing Club
- Sea Cadet Corps
- Wembley Sailing Club
- University of London Sailing Club
- Baden Powell Sailing Association
- Welsh Harp Youth Sailing Base

As part of the Health and Safety requirements covering the clubs, there is a need to provide powered rescue launches. The use of these craft is at times a source of conflict with conservation interests as the operation of the rescue craft can disturb waterfowl and other birds using the reservoir. To minimise disturbance there exist agreed limits beyond which sailing is not permitted. The boundaries of these areas are marked by floating buffer rafts. The representative organisations for the water-sports and nature

conservation interests have negotiated an informal agreement for zoning of the water in parts of the reservoir. The arrangement is a pragmatic approach and dictated also by the depth of silt in different places. Whilst the WHSA lease is for the whole of the open water area, refuges for birds have been created at the eastern end of the main arm of the reservoir, and in the northern arm of the reservoir. During the last decades of the 20th century, the London Borough of Barnet had a Youth Sailing Base with the base off the north-east side of Cool Oak Lane bridge and accessed the southern part of the northern arm of the Reservoir for water activities. The northern arm has since been a refuge for wildfowl; and any future base would more practically be served by accessing the main arm of the reservoir.

Both sailing and nature conservation benefit from limiting the tree growth along the edge of the reservoir.

Recreation

The open spaces around the Reservoir are much used for informal recreation, particularly walking, walking of dogs, and walking the Capital Ring around London which passes along the north side of the Reservoir. Other activities include cycling, picnics, participating in guided walks, visiting the bird hides, tending allotments, and team sports.

People's enjoyment, use of and recreation across the Welsh Harp can be facilitated by a range of generic issues including safety, access, facilities, interpretation, education, involvement and participation. These issues need to be addressed by the management of each organisation; and are outlined but not detailed in this Management Plan. The three public sector organisations are required to take economic, social and environmental issues into account and work towards sustainability.

Access to the Welsh Harp:

The majority of visits are probably by local people visiting the site from nearby residential areas. The Welsh Harp is also well-served by bus routes. Several Underground and over-ground train lines serve the Welsh Harp within a thirty-minute walking distance or by bus. Car parking is provided for at Birchen Grove car park; and at West Hendon Playing Fields. Two car parks, one at Neasden Recreation Ground off Aboyne Road, and one off Cool Oak Lane have been closed to vehicle parking for several years due to problems of anti-social behaviour. Parking is also available in some nearby roads. Whilst parking is provided, the emphasis is on encouraging access for pedestrians and by public transport.

The safety implications of the narrow road bridge at the West Hendon end of Cool Oak Lane has long been a concern to local residents and visitors. The bridge was constructed in its present form in the 19th century. Issues here include the cost of improving the bridge, enabling safe access for pedestrians, cyclists and other users. The road is best reserved for local traffic only; and through traffic should be routed via more suitable nearby roads around the reservoir.

Access within the Welsh Harp:

Footpaths: In addition to statutory paths; and the Capital Ring (a 72-mile route around London) there are a large number of other paths, some hard-surfaced and some on grass, to facilitate access. All need maintaining; particular requirements are the need to manage encroaching vegetation, and to maintain surfaces. A path near to the reservoir

edge at Neasden Recreation Ground was funded by the 'Water of Life' initiative and HLF award. A circular path around the whole of the Brent Reservoir has been suggested on several occasions, but is not practical due to the cost of bridging the River Brent downstream of the dam (the dam itself is not suitable for public access); and there are several other sections that would be problematic for access. The emphasis therefore has been to create a network of paths that provide as much access as practicable. Some paths are also accessible for cyclists. Disabled access needs to be considered in relation to all projects.

Signage:

On-site: signage is provided and updated by the local authorities and by the Canal & River Trust. Off-site signage includes heritage brown signs with 'Duck' logos on several of the approach roads in the vicinity.

Interpretation:

Focal points (two: Welsh Harp Open Space, and Neasden Recreation Ground) have a range of interpretative signs.

Websites: Website links are provided in the contacts section to this plan..

Park furniture:

The land owners maintain a range of furniture including seats, benches, litter bins, bins for dog waste. Each local authority, the Canal & River Trust and other organisations at the Welsh Harp generally have their own styles for public furniture, signage, bye-laws etc. and there does not appear to be any overall advantage in a separate 'Welsh Harp' image. Nevertheless materials should be in styles appropriate for the location and park furniture should be robust, fit for purpose, and of sustainable materials. There are viewing platforms at the south side promontory, and off West Hendon Playing Fields. There are bird hides in the eastern, and the northern marshes.

Visitor facilities and access

A number of buildings cater primarily for users rather than the general public, such as the Welsh Harp Environmental Education Centre and the Sailing Clubs. The Greenhouse is a retail nursery with café and toilet facilities open during trading hours.

There are two bird hides on the site, built and maintained by the Welsh Harp Conservation Group. A new bird hide and two accessible viewing platforms have been built with Heritage Lottery Funding. Access to these hides is for key-holders only and the hides can only be reached by foot along the eastern shore and northern arm of the reservoir. Any member of the public can purchase a key and there are over 200 current key-holders. In addition, the hides are regularly used by local schools and on guided walks.

Events:

Kingsbury and Welsh Harp Reservoir Open Day.

Heritage Lottery Award:

The Heritage Lottery Fund grant award, and matched funding provided by partners, enabled the investment of over £700,000. The on-going maintenance and management needs arising from the Heritage Lottery Fund projects have been incorporated into the management plan sections above, but in general include:

- Marshland: Annual tree management covering in alternate years the shores of the Welsh Harp Open Space and Neasden Recreation Ground in Brent; and following the Barnet tree management programme in the eastern marsh. Other work in the northern marsh.
- South bank promontory
- Reed bed near to the North Circular Road.
- Hedgerow: now established along the boundary with the North Circular Road.
- Focus points: maintenance of the interpretation panels and the focus points.
- Car park at Birchen Grove.
- Capital Ring:
- Off-site signage:
- Footpath/s to bird hides.

Environmental education and interpretation

The Welsh Harp Environmental Education Centre in the north-west of the site. It provides an opportunity for local children to experience and use the Welsh Harp for environmental education. On the Barnet side, a council officer has led regular day visits by primary school groups.

Staffing

The Parks, or Greenspace services of the two local authorities are involved in the management of the Welsh Harp; grounds maintenance of the open spaces; and there are varying Warden services provided on a mobile basis covering the respective Boroughs. The Welsh Harp Environmental Education Centre has a full-time member of staff. The volunteers of the Welsh Harp Sailing Association manage the sailing base; and lead on managing floating vegetation within the Reservoir. The Welsh Harp Conservation Group is a volunteer organisation, originally formed to oppose development on the site, dedicated to maintaining and enhancing the conservation interest of the Welsh Harp.

Other initiatives of reference to the environment of the Welsh Harp are:

- Biodiversity Action Plans: Barnet; Brent; and London
- River Brent Catchment Management Plan
- Brent Cross Shopping Centre Development
- Local Agenda 21
- London Cycling Network
- Capital RING
- North Circular Road Improvement Programme
- West London Waterways Walks
- West Hendon regeneration. The reconstruction of the West Hendon housing estate (east of the northern arm of the reservoir), has provided opportunities to enhance the area.

Services

Current information on utility and telecom services should be available from utility operators. Absence of a service from any plan should not be taken as indicating that services are not present and checks should always be undertaken.

The Welsh Harp Open Space holds the Green Flag Award.

MANAGEMENT ZONES

Revised zones are based, in part, on physical features and functional features, and the priority habitats of the UK Biodiversity Action Plan

General notes:

Works should be undertaken to best practice guidelines and in accordance with any necessary consents. Major works, and those not listed here that are within the SSSI boundary, require prior consent from Natural England.

- Major management works should be undertaken outside of the bird breeding season (i.e. not between March – July inclusive).
- Tree works should consider the possible presence of bats, invertebrates, birds, and fungi; the value of dead wood; and landscape issues.
- Trees at the water's edge: Natural England consider that it is important to sensitively cut back willows from the water's edge to encourage the growth of marginal vegetation in the marsh area for use by waterfowl and to maintain a screen to reduce disturbance, particularly where there are houses backing directly onto the Reservoir.
- Grassland: Conserve a variety of grassland types, both for the flora and for invertebrates. Natural England recommend that approximately 10% of any grassland should be left uncut in any year as invertebrate refuges: in practice the problem is more likely to be in obtaining resources to ensure that the cutting is undertaken. Where possible the grass cuttings should be removed to prevent a matt of dead material accumulating; however the grounds maintenance costs of cutting and collecting cuttings are several times that of the cutting operation on its own. Thus, where resources are limited, priority will generally be given to cutting. Conserve ant-hills where possible: periodic cutting will still be required to conserve the grassland and to control the spread of Bramble and scrub.
- Herbicides: In general herbicides are not used in the management of the Reservoir due to the proximity of the water and wildlife. Where herbicides are used the use will take into account all statutory requirements, consultation with the landowner, Canal & River Trust, the Environment Agency and Natural England as appropriate, and with due regard to other policies, e.g. Environmental Management System, certified to ISO 14001.
- Monitoring: Detailed wildlife monitoring is undertaken by the Welsh Harp Conservation Group for the birds, and they also walk a butterfly transect. Data from both are used to inform both site management, and is feed into regional and national databases. For example the butterfly transect takes in a range of the habitats of the Reservoir and therefore the butterfly populations act as indicators of the effect of habitat management on the wildlife. The data is also provided to the London Butterfly Index to collate regional trends and to provide comparative feedback for the Welsh Harp Reservoir. The Welsh Harp is also included in the annual monitoring for National Indicator 197 'Improving Biodiversity' (now SD 160). The three main public landowners and the other public service organisations also have a statutory duty (the Biodiversity Duty) to further biodiversity at the Reservoir.
- Monitoring of the area of each habitat is currently available only as estimates. Changes could be estimated from historic records and maps, and from GIS systems.

- Monitoring of visitor numbers is not currently undertaken. The most recent estimates are from the Brent Council Parks Service Best Value Customer Survey last undertaken in 2010.

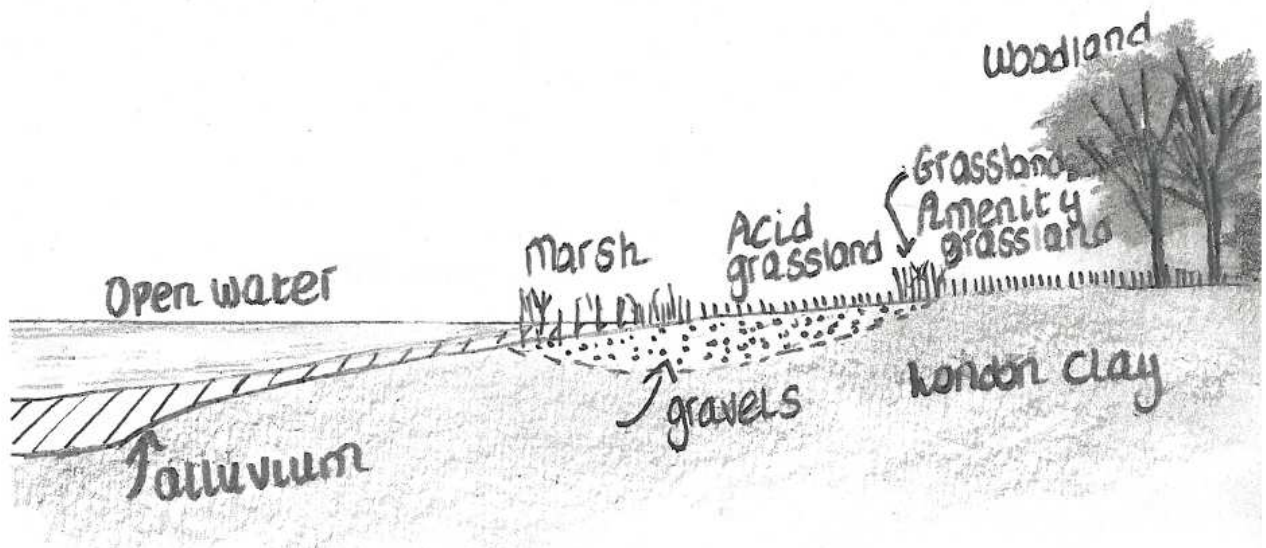


Figure 2. The mosaic and succession of habitats at the Brent Reservoir is particularly evident near to the shore. The Reservoir sits within a flooded London Clay valley, though deposits of alluvium of various depths have accumulated over the clay during the past 175 years since the reservoir was constructed. A narrow band of Taplow Gravels occurs, coincidentally at about the current water level, so the marshland vegetation can variously be growing on the gravel, London Clay or alluvium. The marshland extends from the shallow water to damp areas above the water line. Above that the well-drained, nutrient-poor vegetation is of acid grassland. Slightly higher up the slope, the London Clay is again apparent and provides a more neutral pH substrate, though less well drained during wet weather. Here the vegetation is of rough grassland, mown amenity grassland or of other features with some scrub and areas of woodland.

Eutrophic Open water: the reservoir

The open water of the Brent Reservoir is the central piece of the Welsh Harp area. Primarily managed by the Canal & River Trust the water level is generally kept at a constant level. The Reservoir is fed by the Dollis Brook from the east and the Silk Stream from the north.

The term 'eutrophic' refers to nutrient-rich water habitats, and while this may occur naturally, excessive nutrients lead to problems with blue-green algal blooms and communities of floating pondweed. Since construction in the 1830s, considerable quantities of alluvium have been deposited in the reservoir, together with quantities of litter and debris. Water from the urban areas has often been contaminated with nutrients, heavy metals and hydrocarbons. Oil booms and trash traps have been constructed across both the Silk Stream and the River Brent; these help to reduce oily surface films and unsightly litter, though oil and heavy metal deposits in the bottom mud

remain a problem. There are petrol and oil interceptors on drains taking water from the North Circular Road to the reservoir.

Infilling has also occurred, and the Reservoir is significantly smaller than at its maximum, when for example it stretched beyond the viaduct at Staples Corner (see the images in Hewlett, Geoffrey. 2011. Welsh Harp Reservoir Through Time. Amberley Publishing).

Most of the main arm of the Reservoir is available for water sports, particularly sailing, canoeing and board sailing though the eastern end is devoted to birds. Some areas to the south are also too shallow for water sports.

The Welsh Harp is relatively shallow, with an average depth of about two metres, and maximum of seven metres (at the dam outlet). This represents potentially good feeding habitat for diving and dabbling ducks. However, as the reservoir also plays a role in flood storage, the water level can rise after heavy rain, threatening any waterside nests that are not attached to floating structures.

The area is important principally as a roosting and feeding area for wildfowl. The whole reservoir can be used for feeding, though most bird species will shy away while water sports are in progress. Terns however can withstand mild disturbance. Large numbers of birds also use the water for roosting, especially in winter and during eclipse/moulting. Up to 8,000 gulls (mainly Black-headed) can be present in August, and significant numbers of Teal, Tufted Duck, Gadwall, Pochard, Shoveler, Great Crested Grebe and Little Grebe. From August through to November, weed and algae in the water attract also dabbling ducks such as Wigeon with occasional records of Garganey.

The refuge areas for birds in the eastern end and the northern arm of the reservoir are of national importance for breeding and wintering wildfowl (Natural England, 16.10.2002). Disturbance is reduced by a practical separation from water sports; and by the use of bird hides and screened paths to hide bird-watchers.

The main arm of the reservoir is used for sailing and wind-surfing, especially at weekends, with over 100 boats often out at once. This drives off all but the most tolerant wildfowl, such as Canada Goose and Coot, from the main body of the water. However a chain of rafts and islands cuts off a secluded refuge of undisturbed water along the eastern shore. This is valuable for shyer species, such as Shoveler and Gadwall. Its calmer, shallow water also provides feeding conditions for ducklings.

Eastern end: The eastern end of the Reservoir consists of areas of shallow water, deep alluvium, and an intricate boundary with adjacent habitats. The rafts help mark the conservation/recreation interface and reduce wave action, making the water between the rafts and the shore more sheltered, and protecting aquatic bird nests from inundation.

An island near the entry of the Brent River to the reservoir is capped with shingle and fringed with herbaceous vegetation. The deposition of further shingle on the island would improve the habitat for terns. The reservoir between the hides has re-silted since earlier dredging.

The Environment Agency maintains the trash traps where the Silk Stream and River Brent enter the reservoir. The sailing organisations help to remove rubbish and obstructions from the water, and through regular use of the water monitor the site for potential problems. Japanese knotweed and a small amount of Giant Hogweed grow on the river bank.

Northern arm: The northern arm of the Reservoir has similarities to the eastern end of the main arm of the Reservoir. It has areas of largely shallow water with large quantities

of alluvium (often with more depth of alluvium than of overlying water). The northern arm is generally less disturbed by recreation than the main are, and birds disturbed on the main arm often take refuge in the northern arm. Small islands, rafts and an intricate shoreline with other habitats provide additional interest. Most visitors can view the site from the west side: the new Welsh Hendon / York Park housing development will provide residents with good views from the east side. A trash screen located on the Silk Stream helps to prevent large debris from entering the Reservoir. This area is leased by Canal & River Trust to the London Borough of Barnet.

Welsh Harp Youth Sailing Base: Until about 2000, there was a Youth Sailing Base near to Cool Oak Lane bridge on the West Hendon side of Cool Oak Lane. Following closure, discussions at the Welsh Harp Joint Consultative Committee confirmed that with the northern arm now an important area for birds, any new centre would be better constructed on the south side of Cool Oak Lane (in the former car and boat park); and this would also enable more direct access for water-sport training to the main arm of the reservoir.

The sailing clubs abide by the Code of Practice to cover the operation of safety craft by the sailing clubs in non-emergency situations to minimise disturbance to birds:

- Safety boats (powered craft) are used only to provide safety cover for users of the water and for operational needs for the sailing clubs (e.g. events and maintenance needs). Except in an emergency, no fast runs are made early in the morning.
- Powered craft are not used for recreational use in themselves.

Management works:

- Maintain suitable conditions for water sports - both the physical conditions such as the area, depth, quality of water, weed growth control, and the operational conditions such as provision of emergency/support craft. Carry out weed control of the open water.
- Provide suitable conditions for the maintenance and, where possible, the increase in bird populations.
- Monitor the code of practice (see the Code in the Appendices in Part B) to cover the operation of safety craft by the sailing clubs in non-emergency situations to minimise disturbance to birds.
- Ensure regular clearance of river trash traps.
- Reduce waterborne pollutants, especially oil, that are passed into the Silk Stream and River Brent. Investigate pollution incidents.
- Maintain bird rafts. Undertake maintenance of the bird rafts, including repairs to their anchorage, edging boards, and replacement of washed out mud or shingle. Create new bird rafts as appropriate.
- Maintain pontoons and other infrastructure in the water.
- Clearance of annual growth on the shingle-capped island (for roosting and breeding birds).

Longer-term:

- Monitor rate of alluvium build-up compared to 2001 British Waterways datum.
- Investigate how to reduce; and to remove alluvium.

Reedbed

Reedbeds are a habitat dominated by the grass, Common Reed (*Phragmites australis*), which typically grows to a height of 2 metres or more. Reedbeds can also be of economic importance: providing the long-lasting roofing material for thatched buildings ('Norfolk Reed') and removing pollution from water. Reedbeds occur in permanently shallow water to a depth of about 0.5 metres. They create a unique local landscape and support wildlife species including birds that are adapted to nesting and roosting in this protective environment.

At the Brent Reservoir there are reedbeds on the southern shore of the eastern marsh; and smaller reedbeds towards the western end of the southern shore (off Neasden Recreation Ground); on the western side of the northern arm of the Reservoir; and in the run-off pool east of Neasden Recreation Ground constructed in about 2000.

Reedbeds are largely self-managing, though periodic harvesting of the grass helps to reduce succession to other habitats; and without periodic harvesting of the grass, removal of young willow trees may be necessary.

Management work:

- Manage and increase the reedbed habitats.
- Remove young willow trees from the reedbeds annually in winter.
- Maintain the new reedbed of approx. 2,000 square metres to the east of Neasden Recreation Ground. This channels the streams to remove pollutants from surface water flows from the North Circular Road and Dollis Hill, prior to discharging into the reservoir.

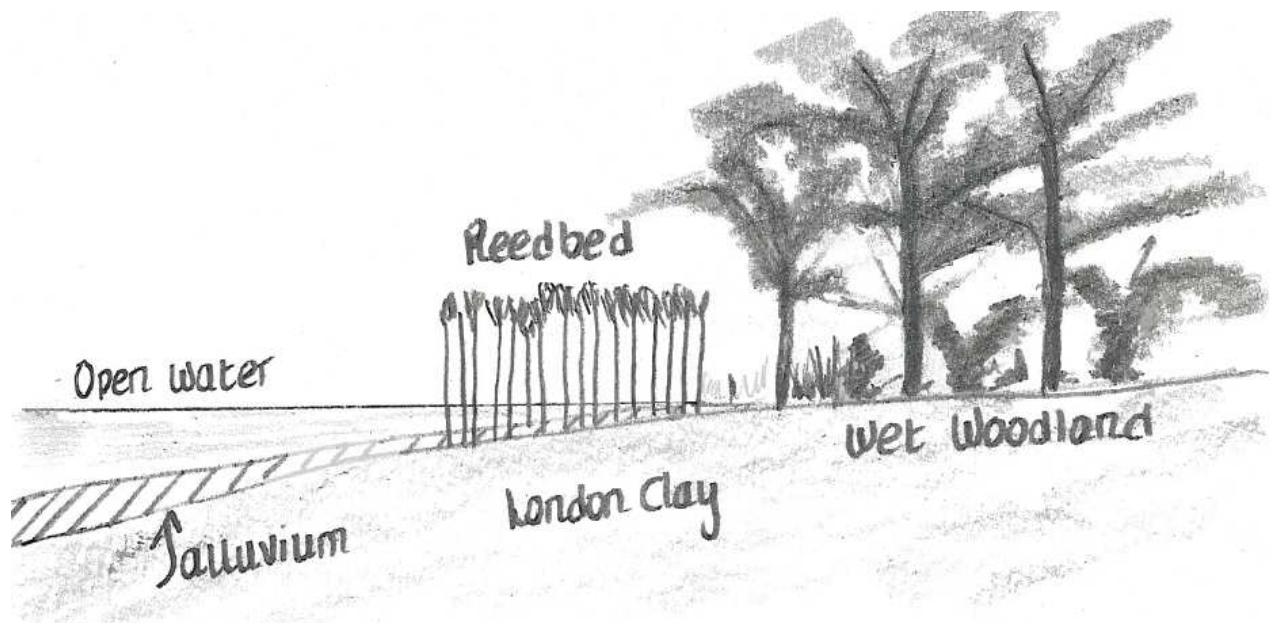


Figure 3 . The largest reedbed at the Brent Reservoir grows in the eastern marsh from moderately deep water to shallow water at the edge of the wet woodland. Other reedbeds occupy more open situations on the southern shore of Neasden Recreation Ground and in the northern marsh. In all cases it is important to remove young willow trees that grow from seed or from floating cuttings.

Marshland

Marshland occurs around the edges of much of the Reservoir where there is more-or-less permanently water-logged areas, often inundated with shallow water. There may be occasional trees but the areas are not wooded or shaded.

The full name of the UK Priority habitat is 'Lowland and coastal grazing marsh'; and the definition of grazing marsh is defined as periodically inundated pasture, or meadow with ditches which maintain the water levels, containing standing brackish or fresh water. The ditches are especially rich in plants and invertebrates. Typically this habitat is grazed and / or cut for hay or silage. Sites may contain seasonal water-filled hollows and permanent ponds with emergent swamp communities. In the context of the Welsh Harp the water is freshwater rather than brackish. Grazing by livestock ceased in about the middle of the 20th century: indeed it is the absence of grazing or regular cutting, resulting in the growth of scrub and trees that is locally one of the main threats to the habitat.

Over the past twenty years, extensive areas of swamp and marsh have grown up on the silt deposits around the margins of the lake. This is well developed along the eastern shore and northern arm. Stands of Sea Club-Rush, Common Club-rush and Great and Lesser Reedmace line the water's edge. The reed swamp grades into a tall marsh community of wetland herbs such as Great Willowherb, Purple Loosestrife, Yellow Iris, Amphibious Bistort, Water Pepper, Water Mint, Common Fleabane, Gypsywort, Meadowsweet, Wild Angelica, Indian Balsam and Reed Canary Grass. Others includes Flowering Rush, Cyperus Sedge, Remote Sedge, Wood Sedge, Fringed Water-lily, Greater Spearwort, Marsh Bird's-Foot-Trefoil, Marsh Woundwort, Water Forget-Me-Not, Water Figwort, Marsh Thistle, Square-Stalked St John's-wort, and Ramsons. Great Burnet survives near to old grasslands. Orchid species present include Southern Marsh Orchid. The marshland also contains some colourful, urban wasteland species including Canadian Goldenrod and vast clumps of Michaelmas Daisy. The marshland provides habitat for many invertebrate species including dragonflies, cover and food for birds, and a foraging area for bats.

Ponds are a UK priority habitat but are considered in this plan as part of the marshland. The Welsh Harp has few ponds though there is one near to the parish boundary on the northern side of the Reservoir. To help retain water in dry years, a liner was installed over the base of the pond and re-covered with the local clay to protect the fabric. Elsewhere scrapes have been created in the edges of the marshland, including one on the northern shore of the reservoir and are primarily filled by water from the reservoir.

Management work:

- Conserve, and where possible restore and extend marshland to create a ring of habitat around the margins of the Reservoir.

- Control tree growth within the marshland. Whilst in general trees and woodlands are to be encouraged at the Welsh Harp, the marshland needs to be kept largely clear of tree growth. There are three main reasons for this:
 - Trees and their shade will reduce the area of marshland habitat.
 - Trees create a wind-shadow of approximately twenty times their height and which at the water's edge would significantly reduce the areas of water available for wind-based water sports.
 - Landscape: a belt of trees at each edge of the Reservoir can block the views that are so valuable in the gently sloping valley. Visitors rather like to be able to see the view of the water of the Reservoir and continue that view as the ground slopes up from the edge on the other side of the reservoir. The occasional tree however can add to the scene; perhaps one tree every fifty metres or so, and preferably of a range of species.
- Maximise the scalloping of the shoreline to promote more edge, ditches, swamp, marshland and bays.
- On the main arm of the reservoir, the tree belts were largely removed from the shore along the Welsh Harp Open Space and Neasden Recreation Ground in the 1990s; and coppicing of new growth has continued since, focusing on alternate sides of the reservoir in consecutive years. Work is undertaken during the winter to avoid the bird breeding season.
- Control tree growth along other areas of marshland.
- Where possible, and safe, retain trees with a degree of dead wood and cavities which are of value to wildlife.
- Control shrub growth in front of the viewing hides.
- Maintain viewing platforms and observation bird hides.
- In the marshland between the rear of Woolmead Avenue and the shore of the Reservoir, Barnet Council have mapped the positions of willows and other trees and have an agreed management plan for the coordinate an annual programme of pollarding/coppicing on Crack Willows in the marshland and on the small island. This is undertaken on a five-year repeat pattern.
- Manage ponds and scrapes.
- Monitor the boundaries with adjacent properties.
- Monitor and remove fly-tipping.
- Control Japanese Knotweed and Giant Hogweed.

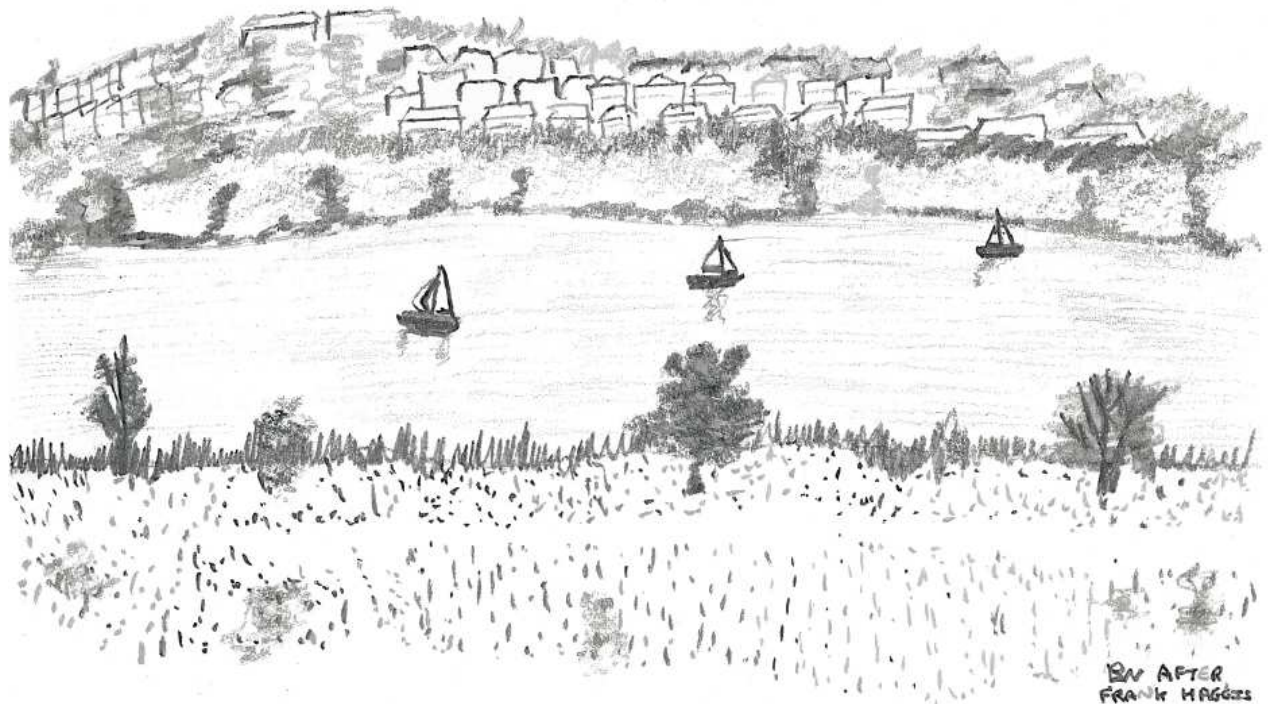


Figure 3. Trees at the edge of the water can contribute to the landscape but the marshland is the more important habitat in this location. Too many trees can shade out the marshland vegetation, while also obscuring the view to, from and across the reservoir valley. Trees also create a wind-shadow, with a horizontal distance of about twenty-times the height, so can reduce the wind available for water sports. The illustration here from the Welsh Harp Open Space looking south towards Neasden Recreation Ground and Dollis Hill illustrates an objective: large areas of marshland with occasional trees several tens of metres apart.

Wet Woodland

Wet woodland (or carr), occurs at locations around the Reservoir. Crack Willow dominates the tree canopy together with White Willow; several of the shrubby willow species for example, Osier, Goat Willow, Grey Willow, Almond Willow and various hybrids are also present. Alder and Hawthorn are frequent in some areas. Small pools within the wood serve as further wildfowl retreats. Woodland probably developed on marshland where the growth of trees had not been managed. The ground is more or less permanently damp soils often inundated with shallow water. Wet woodland is particularly prominent on the south-eastern shore of the reservoir between the water and edges of the North Circular Road industrial estate, and continuing around the eastern end of the Reservoir. An area of planted and now mature Alder woodland occurs beyond the eastern end of Neasden Recreation Ground. Wet woodland is also present around the northern end of the north arm of the Reservoir and elsewhere.

As it is nearer to a climax community, there is less need for active management, as compared with for example the marshland that requires regular management.

Management work:

- Monitor the tree growth and vegetation.
- Japanese Knotweed needs to be controlled, and there are particularly large areas in the wet woodland at the eastern end of the Reservoir.
- Rubbish: continue the work by Canal & River Trust to prevent rubbish tipping; and where possible to remove material that has been deposited in the past.

Acid grassland

Above the extent of the water-line, the habitats of the Welsh Harp start with a band of acid grassland. A band of Taplow gravels around the edge of part of the Reservoir, and some of this is covered by the water and by marshland. However, where the gravels extend above the edge of the marshland, acid grassland develops on the well-drained and nutrient-poor strata. There is also a small area of acid grassland on the high ground of West Hendon Playing Fields near to Cool Oak Lane; and a colony of Marbled White butterflies have become established here. Acid grasslands on gravels and some other strata are characteristic of other such areas in lowland Britain. However, London has lost much of this habitat, and in Brent only a few remnant areas survive, for example on parts of Barn Hill, at Gladstone Park and around the Welsh Harp. Acid grassland is often dominated by a dense but low growing mat of Fescue and Bent grasses and other species include Sheep's Sorrel, Common Bird's-foot Trefoil and Heath Groundsel. Many invertebrate species occur here, and elsewhere reptiles may be present.

Partly on account of the long but relatively thin belt of the acid grassland at the Welsh Harp, it is highly susceptible to lack of management, encroachment by other habitats and by fragmentation. While grazing would have maintained the grassland, grazing appears to have ceased locally in about the middle of the 20th century. Paradoxically the heavy recreational pressure of walkers near to the edge of the reservoir may be a factor in the survival of this habitat; as are some of the mown paths along the same routes. Encroachment of scrub growth from the marshland, from belts of trees on adjacent grassland linear and those that are self-seeded within the acid grassland are however major problems.

Management work:

- Conserve acid grassland by continuing mowing.
- Manage scrub and trees within, and adjacent to acid grassland.
- Investigate managing the acid grassland above West Hendon Playing Fields (Cool Oak Lane) by a combination of decreasing for part of the area, and increasing for part of the area, mowing as appropriate.

Grasslands

Merging into the acid grasslands are a range of semi-natural grasslands in areas where wildlife, landscape and informal recreation are important, and for example at Neasden Recreation Ground, the Welsh Harp Open Space, along the north side of the reservoir, and on sloping ground at West Hendon. These grasslands are primarily on soils of approximately neutral pH (i.e. they are neither particularly acidic or alkaline) and are managed from regularly mown, to cutting once a year or every few years). Many of these areas could fit the informal description of 'rough grassland' and the tall False Oat-grass

is typically present. The grassland contains tufted hair-grass, bent-grass, cock's-foot, Yorkshire fog, red fescue, creeping buttercup, meadow vetchling, bird's-foot trefoil, creeping thistle, red and white clovers, creeping cinquefoil, yarrow, hogweed, common mouse-ear, lesser stitchwort, hoary ragwort, tufted vetch and other species. If they are not cut at all, they succeed to areas of thistle, bramble and scrub.

A range of grasses and wildflowers include Burnet Saxifrage in an area of rough grassland over rubble-filled soil near Cool Oak Bridge. In Five Acre field below the shooting range there are remnants of old grassland with species including Great Burnet, Pignut and Sneezewort. In addition to a range of typical wildflowers, these areas are important for butterflies, insects and other invertebrates. The grasslands are important for nesting Sedge Warblers nesting in Cow Parsley, warblers, feeding by finches and by Kestrels seeking small mammals.

On the zones map these areas are shown simply in one colour, while in practice they include a mosaic of other habitats including trees, scrub, hedgerows and woodland. These have their own section in the Management Plan. Whilst the Management Plan is concerned with preventing succession to woodland, the presence of some trees within the grassland provides additional features for wildlife, and the edge habitat with hedgerows and woodland can be particularly important.

Included within this broad description are areas of ruderal vegetation; open habitats that contain a proportion of grasses but where cutting management is infrequent resulting in high proportions of herbaceous vegetation and often succeeding to scrub. There are numerous such areas at the Welsh Harp; examples include around the dis-used car park off Cool Oak Lane, and the rough-ground and scrub between the Silk Stream and the West Hendon Housing estate off the Edgware Road.

Management

- For the purposes of wildlife, landscape and recreation the aim is to conserve and manage these grasslands to maintain their condition. Cutting frequency should range from 2-3 cuts per year to one cut per year, and exceptionally to one cut every two years.
- Paths and areas of frequently-mown short grassland for sitting should be maintained.
- Restoration is required to restore grassland areas at risk of succession to bramble and scrub. These include:
 - Five Acre Field (Barnet)
 - The grassland on raised mounds at the eastern end of Neasden Recreation Ground; and which unusually is on a substrate of crushed rubble and was sown with a calcareous wildflower mix to mimic chalk grassland.
- Ant hills: Ant hills occur in some of the grassland areas and provide for the Yellow Meadow Ants, flora and food for Green Woodpeckers. Where practicable grassland management should avoid damaging the ant hills.

Woodland

The Welsh Harp has a variety of woodlands. On the map of zones these are not shown separately, except for the main block of wet woodland, because of the intricate pattern of

woodlands, scrub, hedgerows and individual trees. The grassland zone also includes some woodlands, copses, scrub, individual trees and hedgerows.

Though some of the hedgerows at the Welsh Harp may be remnants of the original woodland, and there is some evidence to support that from an analysis of the species of Hawthorns present, most of the woodlands are secondary woodlands in that they have been planted or have grown relatively recently. Woodland management is a detailed area and the management notes below provide the main outlines.

Management

- Manage for a variety of woodland types at the Reservoir, and for example:
 - Oak dominated woodland alongside the parish boundary.
 - The hedgerow / woodland belt alongside the North Circular Road.
 - Woodland at the Welsh Harp Environmental Education Centre and the educational use of these woodlands.
 - Hedgerows.
 - Woodland on sloping ground at West Hendon, including planted Gorse.
 - Scrub to the west of the northern arm of the reservoir. The mosaic of scrub, grassland and tall herbs is valuable for birds, particularly warblers, and also for invertebrates and small mammals.
 - Green lane of Wood Lane: an original green lane section of Wood Lane marks the boundary between the two Boroughs. This is listed as an archaeological earthwork in the Brent Unitary Development Plan.
 - Woodlands that have developed in the bunds on dredged alluvium from the reservoir. There are two bunds near to the Edgware Road, and a series at West Hendon. Subject to regulatory approval, these areas serve again in the future if alluvium needed to be deposited on site.
 - North of Staples Corner alongside the Edgware Road, between the bunds and the residential area, is an area of mixed sycamore woodland. Ownership of part of this area is not known (WHJCC, 26.06.2001). It includes an old crab apples tree.

- The Welsh Harp is in general well treed; and there only is limited need for additional tree planting or additional woodland creation.

- Tree growth near to the edge of the reservoir should be managed, and a large proportion of the edge of the reservoir should be open without belts of trees or woodland. Marshland habitats should predominate near to the edge of the water; and as trees create a wind-shadow, the water sports will benefit from having more open areas. As a landscape the Welsh Harp could be considered as a gently sloping valley framed by woodland and trees at the outer edges.

- Dead wood is an important habitat. Opportunities should be sought to retain any dead wood on site, and preferably in the shade. Dead wood should however be kept back from the edge of the reservoir, should any be dislodged by fluctuations in water level and then become an obstacle on the water. Standing dead wood is also important but public safety is the first priority.

- The Welsh Harp provides habitat for several species of bat, some of which are dependent upon cracks and voids in trees for roosting and nesting. Many

invertebrates and insects are dependent upon dead wood. Of the butterflies, the Purple Hairstreak requires living oak trees, while the White-letter Hairstreak is dependent upon elm trees.

Green lane and parish boundary

Considered above, as part of the woodland habitat, is the green lane, once part of Wood Lane, that also marks the boundary between Barnet and Brent Councils, and formerly, the boundary between the parishes of Hendon and Kingsbury.

Management:

- Manage the green lane on the parish boundary. Where necessary manage adjacent scrub woodland to permit more light, and hence ground vegetation, to protect the banks of the green lane. Coppicing of that scrub could be beneficial and also where there are remnants of acid grassland on the southern side.

Dam Wall and associated structures

The dam wall serves to retain the water of the reservoir, and to enable its original purpose of providing water to the canal system via the Canal Feeder. Nowadays it also provides flood prevention and storm water control for parts of north-west London.

In addition to the dam wall, Canal Feeder and mechanisms, the structures also include the spillway area and continuing the River Brent downstream. The west face of the dam wall is largely covered in grassland. The Canal Feeder and the Brent have vertical banks, though there are some shingle banks in the river.

During 2005-2007, the Canal & River Trust undertook major works to the dam wall including raising the height of the south wall; replacing the grassland turf of the face of the dam wall with a grasscrete / soil and grass/wildflower plant mix; reducing the scrub and herbaceous vegetation on the southern bank; construction of a hibernacula; and the construction of a grassed clay bund into Neasden Recreation to effectively increase the size of the dam to hold major flood waters. Planted with a wildflower-grass mix to provide for wildlife at low cutting heights. These works were to enable the dam to provide better flood protection to include an up to 1 in 10,000 year storm.

Public access to the dam wall is restricted for operational and safety reasons.

Management

- Management of the dam wall and structures is by the Canal & River Trust.
- The face of the dam wall is maintained as short grassland: the species mix, alkaline pH of the grasscrete honeycomb and the well-drained design could mimic chalk grassland.

Allotments

Barnet Council has allotments, now self-managed by the West Hendon Allotments Association. On the western edge of the Welsh Harp area, there are Brent Council

allotments at Birchen Grove, and on the western side of a stream, at Dors Close. Management of allotments is by individual plot holders and their managing organisations.

Welsh Harp Environmental Education Centre

The Welsh Harp Environmental Education Centre is managed by Brent Council to provide a service to schools and other users. The habitats are primarily woodland, but also include hedgerows, ponds, grasslands and a bat hibernaculum.

Also located in the grounds of the Centre are the offices of Energy Solutions North-West London (is this the correct name?).

Management:

- Management is by the Welsh Harp Environmental Education Centre. There is a separate Management Plan.

Wider Welsh Harp area

Other facilities within the Welsh Harp area and are listed below. Some of these form part of an extended green grid of open spaces:

- The Greenhouse Nursery: retail nursery situated off Birchen Grove.
- St. Andrew's Churchyard, Old St. Andrew's Church, and St. Andrew's Church
- Sports pitches, particularly at West Hendon Playing Fields, and also Kingsbury Football Club off Townsend Lane, and in Silver Jubilee Park.

ACTION PLAN for 2012-2013

This Management Plan outlines the short- to long-term management considered necessary to sustain the Welsh Harp: to increase and optimise the wildlife, recreation, landscape, flood-control, economic and other benefits of the reservoir. They are achievable over varying time-frames, though many are not affordable in the short term. The following are the main actions identified in this Management Plan for 2012-13. There is evidence that the deposit of alluvium is continuing; and that at some stage in the future that the deposits will need to be removed to sustain the future of the water-body. That is currently un-costed but would be at a high cost.

Action	Lead	Budget	Approximate timetable
Dam wall and reservoir	Canal & River Trust	Existing resources	Maintain. On-going
Maintain open water for water-sports	Welsh Harp Sailing Association.	Led by the Welsh Harp Sailing Association	Maintain. Summer. On-going.
River trash traps.	Environment Agency	Environment Agency	Maintain. On-going.
Sailing infrastructure	Sailing clubs	Refer to Sailing Clubs	On-going

Bird rafts, islands.	Welsh Harp Conservation Group	Existing resources	Maintain, repair or renew. On-going. Autumn / winter.
Reedbeds: remove young trees	Welsh Harp Conservation Group	Existing resources	Remove young trees. On-going. Autumn / winter.
Reedbeds: increase	All	None specific but encourage natural growth.	Periodic reviews as part of Biodiversity Action Plans.
Marshland: maintain extent	Brent Council	Existing resources: Sports and Parks Service	Alternate years: reduce young tree growth on shores of Neasden Recreation Ground, Welsh Harp Open Space
Marshland: maintain extend	Barnet Council	Existing resources.	Tree Management Programme works for eastern end of reservoir.
Marshland: increase	Brent, Barnet, Canal & River Trust, West Hendon regeneration / Barratt.	Tree reduction at the shoreline is the most practical route. Possibly scrape creation too. Brent: £10,000 of section 106 available for flood / marshland works.	Increase the extent of the marshland around the shores of the Reservoir. West Hendon development shoreline. Discuss section 106 project with Natural England.
Bird hides	Welsh Harp Conservation Group		
South-bank boardwalk	Canal & Rivers Trust	Canal & Rivers Trust	
Japanese Knotweed and Giant Hogweed	Canal & Rivers Trust, Barnet Council, Brent Council	No budget: works undertaken as part of other works; or with grant funding.	Complete the control within the SSSI at Neasden Recreation Ground.
Wet woodland	Canal & Rivers Trust, Barnet, Brent	Largely self-managing.	
Acid grassland	Brent, Barnet.	Partial management through path cutting maintenance. Seek funding opportunities to reduce encroaching scrub.	
Grasslands, paths cutting	Barnet, Brent	Maintenance: within existing grounds maintenance resources.	

		Restoration work is currently unfunded.	
Woodland	Brent, Barnet	Largely self-managing. Unfunded: management of woodland to increase diversity, but potential for creative use of material.	No significant works in 2012-13.
Welsh Harp Environmental Education Centre	Brent	Funding arrangements are currently in place.	On-going.
Allotments	Brent, West Hendon Allotment Society	For Brent refer to Allotments and Food Growing Strategy.	
Open spaces, pitches, paths, Capital Ring, signage, interpretative signage, litter and dog bins,	Barnet, Brent	Existing maintenance resources. Brent: Sports and Parks Service.	On-going.
Monitoring: wildlife, and other indicators	Welsh Harp Conservation Group (wildlife); local authorities (social, other), Environment Agency (water), Natural England (SSSI).	Within existing resources	On-going

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Websites to access are:

Canal & River Trust,
Barnet Council

Brent Council: <http://www.brent.gov.uk/pks.nsf/pages/LBB-67>

Capital Ring: <http://www.walklondon.org.uk/section.asp?R=1§ion=34&x=13&y=12>

Natural England: The digital boundaries of the SSSI are available on Natural England's web-site at www.natural-england.org.uk

The data have been compressed to shorten download times, and are suitable for most geographic information systems.

Welsh Harp Conservation Group www.brentres.com

Welsh Harp Environmental Education Centre: <http://www.london-northwest.com/sites/WelshHarp/>

Wildlife walks at the Reservoir:

- The Capital Ring (section of the round-London footpath). See the respective leaflets and / or the Transport for London website for further details.
- See also Walk booklets on areas of the Borough produced by Wembley History Society.

Appendix 1: Versions of the Management Plan

Each version of the Management Plan had approval recommended by the Welsh Harp Joint Consultative Committee. When appropriate, consultation was also available to the wider public. Versions from 2003 to 2010 were based on the zones as demarcated in a map produced by Cobham Resource Consultants, 1994. Management Plan for the Welsh Harp. ref. 7272, Cobham Resource Consultants, OX14 1UG; with some minor subsequent amendments by the Welsh Harp Joint Consultative Committee.

Date of version	Notes	Deposit with Natural England
15 May 2003 (signed by Natural England)	Version dated: Part A (16 December 2002) and Part B (12 June 2001). Approved by the three statutory organisations listed above in late 2002 / early 2003 and signed off by Natural England on 15 May 2003.	Hard copy.
9 December 2003 (amended by the WHJCC)	Parts A and B both dated 10 November 2003.	Electronic copy.
23 September 2004 (draft)	Parts A and B both dated 23 September 2004	
17 February 2006	Revisions to Parts A and B completed: 17 February 2006. The two parts of the Plan re-united within one document.	
13 November 2007	Revised version agreed by Welsh Harp Joint Consultative Committee	
23 October 2008	Minor revisions.	
24 March 2010	Minor revisions. Refer also to separate Action Plan, to be agreed c. July 2010.	
July 2012	This version: currently in draft form: June 2012	

The most current and as appropriate, earlier versions of the Management Plans are available on the Brent Council website at www.Brent.gov.uk/parks . A hard copy of the signed version (May 2003) is retained by Brent Council Parks Service. Electronic copies of annual revisions are retained in an electronic archive by Brent Council.

Appendix 2: SAFETY AT THE BRENT RESERVOIR

This leaflet has been designed to enable you to plan a safe and enjoyable visit to the Brent Reservoir area. The Reservoir itself is owned by Canal & River Trust, though Brent and Barnet Councils own and manage much of the adjacent Open Spaces. The leaflet does not however provide technical advice on legal, medical or health issues that you may obtain from appropriate sources. Water sport users operate additional safety guidelines. For information or comments on this leaflet please contact Brent Council Sports and Parks Service: 020 8937 5619.

WATER SAFETY

If you are interested in water sports, please join one of the clubs recognised by Canal & River Trust. These provide supervised activities and have their own safety procedures. Unsupervised water sports are not permitted. The Reservoir contains deep and soft mud, underwater obstructions, and other hazards. In addition there are risks from blue-green algae and water borne diseases.

Swimming: Swimming and bathing are not permitted in the Reservoir, rivers or waterbodies. There is much broken glass in the shallows of the Reservoir.

Ice: It is highly dangerous to attempt to walk on the ice if the Reservoir surface is frozen. Apart from the above hazards, a person can die in minutes from hypothermia should they fall through the ice into the water. Drowning is very easy in such circumstances - and you will also place at risk the life of anyone who attempts a rescue.

Pets: For similar reasons, it is advisable not to let pets enter the water, and never to walk on the ice if the Reservoir surface is frozen. It is safer to keep dogs on a lead.

Mud: Never attempt to walk on the exposed mud if the water level is low.

WATER BORNE DISEASES

Several water borne diseases are potentially present in the water and soil. Generally there is no risk to Reservoir visitors. Risks increase if contaminated water comes into contact with a cut, graze or through a mucous membrane. If you do come into contact with the water (e.g. during pond dipping or a practical conservation project), wash your hands in clean water and until then, avoid eating, drinking smoking, or other contact between your hands and face. Seek medical advice if you suffer illness within two weeks of exposure to the water and inform your doctor of the nature of the contact.

Weils Disease (also known as Leptospirosis):

The disease enters the water from the urine of rats.

Toxocara canis:

Enters the water and damp soil from dog faeces.

Tetanus:

If you are involved in water activities it is advisable to be inoculated against Tetanus.

Others:

Other pathogens also occur in the soil, and in the Reservoir and other water bodies.

BLUE-GREEN ALGAE

The reservoir contains many types of algae, including some called blue-green algae. Like other species of algae, they may increase rapidly due to eutrophication (excess nutrients in the water) and at times of high sunlight (energy), blooms of these algae may occur on the water surface and get washed up as blue-green scums on nearby shores. These particular algae contain a toxin which may cause irritations and illness to humans and pets touching the scum. Although algal scum is not always harmful, it is a sensible precaution to avoid contact with the scum and the water close to it. Wash any skin after accidental contact. This applies to dogs too.

CANADA GEESE

Please do not feed the Canada Geese. Their numbers have increased rapidly at the Reservoir. They cause excessive grazing and fouling of bankside vegetation, thus eroding the shores and making slippery and unpleasant surfaces on footpaths and lawns. Furthermore, rats have inhabited the banks where Geese are fed, feeding on the excess food, and thus increasing the risk from Weils Disease.

GIANT HOGWEED (*Heracleum mantegazzianum*)

This is the only plant, out of over 400 that have been recorded at the Reservoir, that is considered to be a particular danger to visitors. It is not too be confused with the common Hogweed or with Cow Parsley which grow to about shoulder height and are relatively safe. The Giant Hogweed is a huge plant that grows to a height of three or four metres each spring. It has large leaves, up to a metre across and massive white flower heads. At the Reservoir it grows it is currently known near to the River Brent; and formerly on the boundary between the Welsh Harp Open Space and The Greenhouse nursery. The sap of this plant, which is exuded from the stem and leaves, causes phytophotodermatitis (PPD), a type of contact dermatitis which results in the formation of conspicuous blistering and hyperpigmentation of the skin. Symptoms are exacerbated when that area of skin is exposed to the ultraviolet component of sunlight. In addition to the initial blistering, permanent skin damage may result. Avoid contact with this plant.

FISHING:

Canal & River Trust do not permit fishing at the Reservoir. One of the reasons for this is to prevent trampling of waterside vegetation and disturbance to birds, as the Reservoir is a Site of Special Scientific Interest.

COUNTRY CODE:

Please comply with the Country Code when visiting the Reservoir. Brent Council Sports and Parks Service hope that you enjoy your visit: please respect the enjoyment of other Reservoir users and of the wildlife, too. Please use the litter bins provided or take your litter with you. And please clean up after your dog.

POLLUTION:

The Environment Agency monitor and investigate pollution incidents at the Reservoir, (and in water courses throughout the country). If you come across a pollution incident, avoid contact with the pollutant and do not smoke. Contact the freephone, 24 hour, emergency number on 0800 80 70 60, giving location details and as much information as possible.

ULTRA-VIOLET LIGHT:

Don't forget to protect your skin from excess ultra-violet light during sunny weather!
Suitable clothing is probably best.

Appendix 3:

BRENT RESERVOIR EMERGENCY AND OTHER CONTACTS

The Brent Reservoir (or Welsh Harp) area is managed by three main organisations: Canal & River Trust, Brent Council (or London Borough of Brent), London Borough of Barnet.

If there is an emergency requiring the emergency services:

Police	Telephone	999
Ambulance	Telephone	999
Fire Services	Telephone	999

For other emergency or general enquiries please contact:

Police Telephone 101

Canal & River Trust (Canal and River Trust from autumn 2012)

Canal & River Trust are responsible for the Reservoir (the water body), the dam wall and some marginal land. Contact:

Emergencies (other than the 999 calls)	0800 47 999 47
General enquiries (during office hours)	020 7985 7200
Other enquiries	0303 040 4040

Brent Council

Brent Council Sports and Parks Service are responsible for some of the open spaces and parks around the Brent Reservoir. For urgent matters contact:

Emergencies:

During office hours Telephone 020 8937 5619

Outside of office hours Telephone 020 8937 1234 and ask for 'Parks Standby'

For non-urgent information or to make an enquiry please contact:

Brent Council, Sports and Parks Service, Cultural Services, Environment and Neighbourhood Services, Brent House, 349-357 High Road, Wembley, Middlesex HA9 6BZ. Tel: 020 8937 5628, Reception: 020 8937 5619, Fax: 020 8937 5715

E-mail: Leslie.Williams@Brent.gov.uk,

Web: For information about the Reservoir including the Brent Reservoir Management

Plan: www.Brent.gov.uk/parks

For all other enquiries to Brent Council, please 'phone: 020 8937 1234

London Borough of Barnet

The London Borough of Barnet are responsible for some of the open spaces and parks around the Brent Reservoir. For general enquiries telephone 020 8359 4600.

Barnet Emergency Service:

Customer Care: During office hours Telephone 020 8359 4600

Outside of office hours Telephone 020 8359 2000

The outside of office hours number is available from 6.00pm (1800 hours) to 9.00 am (2100 hours) the following morning.

The Street Enforcement Service have some responsibility for patrolling the Welsh Harp.

Email: parks@barnet.gov.uk