

HA12: Lakes, Ponds and Reservoirs

Definition

Lakes, ponds and reservoirs include all areas of standing open water. Reservoirs, by definition, are artificially created water-bodies, some of which enclose a very large area of water. All of London's lakes are also likely to be artefacts resulting from the damming of streams to create water features in parks and other formal landscapes, or as a consequence of mineral extraction (sand and gravel pits). Some of London's ponds may have natural origins but most extant 'natural' ponds are likely to be former farm ponds or marl and clay pits. In more recent years many new ponds have been dug for aesthetic or nature conservation ponds in parks, gardens and amenity open spaces; many of these newer ponds have artificial liners as they do not naturally hold water.

London's Lakes, Ponds and Reservoirs Resource

The total area of open water documented in the London Wildlife Habitat Survey 1984/85 is provided in Table 1. This figure is based mainly on the larger water-bodies (lakes and reservoirs) and excludes the majority of smaller ponds. Boroughs such as Enfield, Waltham Forest and Hillingdon have a particularly high proportion of standing open water because of the presence of large reservoirs (in Waltham Forest and Enfield) or extensive former gravel workings (in Hillingdon). The map provides a picture of the resource across the capital.

Table 1: Area of Standing Open Water in Greater London

Borough	Area of Standing Open Water (ha)	Percentage of Standing Open Water Resource in London (%)
City of London	0.5	-
City of Westminster	31	2
Barking & Dagenham	40	2
Barnet	47	2.5
Bexley	18	1
Brent	29	2
Bromley	45	2.5
Camden	16	1
Croydon	8	0.5
Ealing	6	0.5
Enfield	320	18
Greenwich	7	0.5
Hackney	20	1
Hammersmith & Fulham	1	-
Haringey	25	1.5
Harrow	16	1
Havering	110	6.5
Hillingdon	299	17

Borough	Area of Standing Open Water (ha)	Percentage of Standing Open Water Resource in London (%)
Hounslow	68	4
Islington	2	-
Kensington & Chelsea	0.5	-
Kingston upon Thames	5	-
Lambeth	1.5	-
Lewisham	4	-
Merton	20	1
Newham	100	6
Redbridge	45	2.5
Richmond upon Thames	130	7.5
Southwark	14	1
Sutton	12	1
Tower Hamlets	58	3.5
Waltham Forest	230	13
Wandsworth	16	1
London Total	1744	

NB: The above figures exclude canals (but include docks) and have been amended to take account of changes in borough boundaries that occurred subsequent to the 1984/85 habitat survey.

Table 2 shows the number of water-bodies identified within each borough. These figures include ponds and other small water-bodies in open landscapes (but excludes garden ponds and the like). Havering has 343 sites, the largest number recorded, representing approximately 19% of the London total. Barnet has 191 sites (10% of the London total) and Hillingdon has 153 sites (8.3% of the London total). These outer London boroughs have higher total numbers due to the farm ponds remaining in the more rural parts of the Green Belt. Conversely, inner London boroughs have far fewer water-bodies; Tower Hamlets, for example, has 13 recorded sites (0.7% of the London total) and Kensington and Chelsea has only 6 recorded sites (0.3% of the London total). Inner London borough site totals would significantly increase with the inclusion of private garden ponds.

Areas of the main reservoirs in London are shown in Table 3.

It is difficult to put the extent of open water in London into any national or regional context. The UK Steering Group report does not attempt to give any indication of the area covered or distribution of any of these open water habitats. However, the concentration of large reservoirs in and around London is significant.

Table 2: Number of Lakes and Ponds by Borough

Borough	Number of lakes and ponds	Borough	Number of lakes and ponds
City of London	8	Hillingdon	153
City of Westminster	14	Hounslow	47
Barking & Dagenham	38	Islington	3
Barnet	191	Kensington & Chelsea	6
Bexley	44	Kingston upon Thames	30
Brent	35	Lambeth	23
Bromley	114	Lewisham	39
Camden	26	Merton	45
Croydon	29	Newham	18
Ealing	57	Redbridge	47
Enfield	111	Richmond upon Thames	102
Greenwich	43	Southwark	29
Hackney	9	Sutton	23
Hammersmith & Fulham	12	Tower Hamlets	13
Haringey	13	Waltham Forest	54
Harrow	90	Wandsworth	25
Havering	343	London Total	1,834

Data from Langton 1984 and LEU

Table 3: Area of Major Reservoirs within Greater London

Borough	Reservoir	Area (ha)
Barnet	Brent	26
Brent	Brent	28
Enfield	William Girling	149
	King George's	142
Hackney	Stoke Newington	17
Hounslow	Kempton Park (East)	16
Richmond	Stain Hill & Sunnyside	20
	Lonsdale Road	9
	Barn Elms	(35)*
Waltham Forest	Walthamstow	176
	Banbury	37
London Total		697

*Barn Elms reservoir is now The Wetland Centre, owned by WWT

Nature Conservation Importance

Ponds, lakes and reservoirs make an important contribution to London's biodiversity. However, these habitats generally differ in their nature conservation interest.

Smaller water bodies tend to provide valuable habitat for amphibians such as common frog, palmate newt, great crested newt and many species of dragonfly. Where there are dense stands of emergent vegetation such as greater reedmace *Typha latifolia*, a diverse range of other invertebrates are supported, such as the hoverfly *Parthelophilus versicolor*, a soldier fly *Odontomyia tigrina* and the bulrush wainscot moth.

Larger water-bodies (lakes and reservoirs) are noted especially for their wildfowl. Most larger lakes in London will support species such as pochard and tufted duck, and where fish are present, cormorants are now regularly seen. Better quality waterbodies support additional species including gadwall, shoveler and great crested grebe. In winter the large reservoirs provide important feeding and roosting sites for wildfowl and they can hold huge numbers of the aforementioned species as well as many others. Although the numbers of birds utilising London's lakes and reservoirs declines during the summer months, many lakes and reservoirs have breeding common tern and, where there is dense emergent vegetation, reed warbler, water rail and mute swan. Lakes and reservoirs are also favoured feeding locations for house martin and sand martin.

Water bodies can contain a variety of marginal and submerged vegetation. Nationally scarce plant species such as mudwort *Limosella aquatica* and marsh dock *Rumex palustris* occur in ponds around London (although the former is only known from one site in Richmond upon Thames. More typical components of London's pond flora include yellow iris *Iris pseudacorus*, greater pond sedge *Carex riparia* and lesser reedmace *Typha angustifolia*. The larger deeper water-bodies contain a variety of submerged or floating aquatics including spiked water-milfoil *Myriophyllum spicatum*, rigid hornwort *Ceratophyllum demersum* and yellow water-lily *Nuphar lutea*.

Some Ponds, Lakes and Reservoirs of nature conservation value in Greater London

Bennett's Hole and The Watermeads, LB Merton

Fairlop Water, LB Havering

Islip Manor, LB Ealing

Kempton Waterworks, LB Hounslow

King George's and William Girling Reservoirs, LB Enfield and LB Waltham Forest

Stoke Newington Reservoir, LB Hackney

Wynter House Pond, LB Lambeth

Threats and Opportunities

Threats

The most apparent threats to all areas of standing water are direct loss (redundancy of reservoirs, infilling of ponds), pollution (especially nutrient enrichment) and conflicting use (many of London's larger water bodies have a recreational and/or water supply function).

Ponds Small ponds are most susceptible to direct loss through deliberate infilling, or neglect resulting in the pond becoming silted, choked with marginal vegetation and eventually developing into willow carr. Although the latter scenario results in the loss of the pond it can

sometimes result in a habitat or habitats which may be equally important from a nature conservation perspective. Other ponds may suffer from being over-managed, with aquatic vegetation and accumulated silt and detritus being cleared too regularly at the expense of some species of invertebrate that may require these habitat features. Ponds in more rural parts of London may be polluted by fertilizer or pesticide run-off and ponds adjacent to roads, are often polluted by run-off of oils and other pollutants.

Many species that are dependent upon ponds for part of their life cycle (e.g. amphibians and aquatic invertebrates), are threatened by loss of terrestrial habitat surrounding their breeding ponds. Frogs and newts spend the majority of their adult life away from ponds, feeding and finding hibernation sites in adjacent terrestrial habitat. Similarly, several species of adult dragonfly hunt their prey in grasslands and along woodland rides away from their natal ponds.

Lakes Most of London's lakes are highly eutrophic because of the build up of organic material such as leaves, wildfowl excrement, fishing bait and run off from land drains. The problem of gross eutrophication is often exacerbated by stocking lakes with bottom dwelling fish, which constantly stir-up silt at the bottom of the lake and topping up lakes with mains water (which is high in phosphorous) or river water (which may be nutrient rich). Highly eutrophic lakes are usually turbid, thus limiting the growth of submerged aquatics and are subject to algal blooms, which reduce oxygen levels resulting in fish mortality.

Lakes are also subject to intense recreational pressure ranging from angling to boating and sailing. Lakesides are also a favoured location for walking and exercising dogs; indeed in many parks the lakeside is either paved or tarmaced to allow access, or the banks are seriously eroded or compacted as a consequence of the desire to access the water's edge. As well as causing disturbance to wildfowl, access to the water's edge often limits the potential for marginal vegetation to become established.

Reservoirs Most of London's larger reservoirs were built to supply London with drinking water. One exception is Brent Reservoir, which was constructed to provide a top-up supply for London's canals. The need for large reservoirs has diminished in recent years with the construction of the London ring main and therefore some reservoirs are becoming operationally redundant. Loss of some of the larger reservoirs would result in a loss of significant areas of wildfowl habitat.

Reservoirs are very much multi-functional sites, able to provide valuable recreational facilities in the urban area. Several of the London reservoirs are fished and some have canoeing and sailing facilities. Intensive recreational use can provide severe constraints on maintaining or enhancing biodiversity.

The operational requirements of reservoirs limits the amount of habitat enhancement which can be implemented with respect to encouraging marginal vegetation and other water's edge habitats. The need to maintain the integrity of embankments and other structures often negates the possibility of encouraging vegetation at the margins or along the banks.

Opportunities

Water bodies, whether ponds, lakes or reservoirs, are one of the most popular landscape features; there are few parks in London which do not contain a pond, lake or formal water feature. Likewise the larger lakes and reservoirs attract anglers, boating/sailing enthusiasts and bird-watchers. Consequently, the awareness-raising opportunities are huge.

Restoration of neglected ponds is a task that can be achieved with relatively little input. In many cases a few days of volunteer effort or a day with a earth-mover can restore ponds or create new ones. Ponds can also be restored or created during the alteration or modification of flood-defence works along rivers or as flood storage lagoons or balancing ponds in flood relief schemes. The Countryside Stewardship scheme and environmental awards provided by local authorities and others often highlight ponds as a habitat that could be restored or re-created in the landscape. Garden ponds are thought to be an important resource for amphibians and sound practical advice on construction and planting of garden ponds could dramatically increase the number of wildlife-friendly garden ponds.

All new development schemes could be encouraged to include ponds (and other wetland habitats) as part of surface water and grey water drainage schemes.

The London Lakes Project (1993-1996), managed by Wandsworth Council and part funded by the European LIFE fund, investigated the problem of London's highly eutrophic lakes and suggested methods to enhance their aesthetic and nature conservation value. Recommendations included the following: planting aquatic plants and reedbeds and fencing these areas to protect vegetation from grazing by wildfowl and trampling by humans; removing populations of bottom-dwelling fish and restocking with species which are less likely to disturb silt and uproot plants; reducing the numbers of feral geese by a variety of techniques including egg-pricking, fencing at the water's edge and eliminating large areas of mown grass adjacent to the water; and identifying a better quality water supply with which to top-up lakes - groundwater from boreholes for instance. The project also noted that awareness-raising was an essential part of any proposal to enhance the lake habitat. If park users could be encouraged to desist from providing excessive amounts of food for wildfowl, using too much ground bait; and allowing their dogs to enter the water they could contribute to improving the ecological value of the lake.

New lakes can be created as the result of the restoration of mineral workings and many water-bodies of value for nature conservation have been created in the past as a result of flooding of gravel pits. Restoration techniques have been refined to allow for the creation of a wide range of habitats ranging from islands to reedbeds to nest sites for sand-martins.

Redundant reservoirs can be enhanced to create new and very valuable wildlife habitat. The transformation of Barn Elms reservoir into the Wetland Centre is a perhaps the most impressive example. Although this is unlikely to be repeated on quite the same scale, new wetland habitats can be created within redundant reservoirs, or a compromise can be effected where the reservoir can be used for recreation with appropriate restrictions to maintain existing nature conservation interest.

Management of the recreation/nature conservation conflict of the operational reservoirs is likely to be the main opportunity for further progress in the future.

Data sources

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Rationale and limitations of approach

Data in Table 1 is based on the London Pond Survey (Langton 1984). Langton's survey (1984) cross-referenced water bodies shown on Ordnance Survey maps produced in the 1860s (at the scale of 25 inches to the mile) with modern maps and aerial photos. The survey represents the most comprehensive data on London's water-bodies but unfortunately does not provide area measurements for the listed sites.

The Lakes, Ponds and Reservoirs audit data should be used as a guide and not as a definitive statement of Greater London's water body resource. Many of the sites that have been included within the audit have no recent data; consequently the audit will include some inaccuracies when compared with the present day situation.

Information on Table 1 data was gained by cross-referencing the name and grid references of all water bodies included in the LEU data against Langton's (1984) data. If the waterbodies highlighted in the LEU data were not included within the Langton data, the new sites were added - see Table 2 for details.

Whilst carrying out this process, some Langton sites were found to have incorrect grid references. However, due to time constraints it was impossible to check grid references for each site. It is likely that there are remaining anomalies in this data set in terms of grid references and names given to water bodies. This may be rectified over the next year by the Environment Agency project.

Small ponds, such as garden ponds, are not highlighted on the OS maps and as such will not be included within this audit. The boroughs of Merton, Newham, and Richmond upon Thames have carried out garden pond surveys. The data from these garden pond surveys has not been included. Survey methodology and return rates will vary preventing any direct cross-Borough comparison of results. Had the garden pond data been included with the London-wide data it would have led to misleading trends, as the other 28 London Boroughs do not hold garden pond data.

As such the pond resource in Greater London will only represent a fraction of London's resource. The fact that the London Boroughs of Merton and Richmond each had over 100 returned garden pond questionnaires highlights the extent of this untapped resource. However, it is hoped that a garden ponds will be addressed within a Garden Habitat Action Plan.

Further research is required to identify the full resource. The Environment Agency have recognised this as a research need and are about to commence a full audit of all standing water bodies within Greater London. Each borough could contribute to the biodiversity action planning process, through a comprehensive re-survey, recording any new sites.