Canada Goose Management in the Wandle Valley

This report identifies the issues faced in the Wandle Valley due to the Canada goose population. It aims to identify current population distribution, management controls in place and techniques that can be implemented to reduce Canada goose numbers.

Living Wandle Landscape Partnership Scheme

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1.0 Goose Management in the Wandle Valley

The Living Wandle Landscape Partnership Scheme (LWLPS) has been asked by the scheme funder Heritage Lottery Fund (HLF) to produce some Goose Management guidance for the Wandle Valley. The LWLPS membership provides a good opportunity to take a Wandle wide view of the goose population, and assess the current situation across the four boroughs whilst involving key local groups and landowners. The report aims to provide an insight into the current Canada goose situation in the valley, identify whether there are strategic or localised impacts because of populations and the management methods currently in use. The toolkit also includes goose management options available to land managers. The report has been produced using information made available to the Living Wandle Team.

1.1 Summary

This report demonstrates that there is not consistent data about populations, distribution and behaviour patterns of Canada geese in the Wandle Valley, especially breeding pairs. Whilst efforts are being made to record goose numbers in some locations in the Wandle Valley, there is not the same data for all the open spaces and suitable habitats in the Valley. We need to understand where the geese are breeding and where they are travelling, in order to create the joined up approach needed to tackle the problem when the population numbers become too high. Some information is available but it is not regular across all four boroughs in the Valley. Canada goose numbers in the valley appear to have declined overall since 1999-2005, but populations are on the increase in a few localised areas. Population hot spots are not focused on the river itself, but on the lakes and areas of open water; in particular Battersea Park, Mitcham Common, Carshalton Ponds, Beddington Farmlands and Waddon Ponds. High Canada goose densities are a problem, primarily for water quality, the geese are however one of a number of contributing factors affecting water quality in the Wandle.

There is often an assumption that Canada geese are disliked, but for many members of the public the geese are a reliable type of wildlife they can show their children. Public feeding of geese and ducks is widespread and is likely to be a key influence on Canada goose numbers at certain sites. The localised goose problem is currently not out of control, but numbers need to be identified along with scale and likely impact. Following this, methods need to be established to prevent issues already associated with the geese from escalating. Sites without data identified in the report need to be prioritised for data collection, to build up a holistic picture of the populations in the Valley.

There are a number of localised control methods in place across the four boroughs (at differing levels), but no strategic application of Canada goose controls across the Wandle Valley. Land managers with localised populations that currently have limited controls in place could match the efforts being carried out across the Valley by others; with an aim of having a more co-ordinated approach to geese management. Some management controls outlined may only be appropriate in some locations; effective solutions will differ on a site-by-site basis. To ensure Canada goose numbers do not further increase, and efforts to improve water quality within the Wandle can progress, a series of control measures need to be taken forward by landowners in the Wandle Valley, these need to be proportionate to the problem.

1.2 The Wandle Valley

The Wandle Valley includes the London Boroughs of Wandsworth, Merton, Sutton and Croydon. The Valley is centred on the river catchment of the Wandle. The river is a tributary of the Thames and the catchment extends to the chalk ridge of the North Downs. Urbanisation and historical industrialisation have shaped the valley and changed the river's natural course. There is a large variety of green open spaces providing recreation to the surrounding communities.

The All London Green Grid (ALGG) divides London's unique landscapes; the Wandle Valley is area framework 8 in the ALGG, and there are area specific objectives and opportunities outlined as well as a list of current and potential future projects. For more information visit london.gov.uk/sites/default/files/AF08%20Wandle%20Valley_2014update.pdf

Natural England commissioned a Landscape Character Assessment (LCA) of the Wandle Valley in 2012; it outlines information about the River Wandle, the evolution of the Valley, the character of the area and a vision for the future. We have used the study area (Dave Hares Landscape Architecture, 2012, pp. 5) featured in the LCA to identify the green and open spaces highlighted in the report. These featured areas also correspond with those in the Wandle Valley Regional Park.

For the purpose of this report, the River Wandle can be divided into two halves: the upper Wandle from sources in Croydon and Carshalton to the tramline in Morden Hall Park, and the lower Wandle from the tramline to the mouth at Wandsworth.

The LWLP is not aware of any previous studies about Canada geese covering the whole Wandle Valley.

1.3 Geese

Canada goose (*Branta canadensis*) is the most prevalent species of goose found in the Wandle Valley). Canada geese in the UK are regarded as 'common place' (Steel and Coleman, 2012) because the wintering numbers in the UK are in excess of 190,000 birds (RSPB, 2015). Canada geese typically have a life span of six years. Generally, the Canada geese lay six eggs per clutch and incubate these for between 28-30 days. The geese have a 'moult' period each year around the end of June for 3-4 weeks; the birds are flightless during this time (Natural England, 2011a).

The species were scarcely breeding in London until the 1950s and not recorded on the River Wandle until 1978 (Steel and Coleman, 2012, pp 84). Canada goose numbers have shown a large increase that has slowed down both nationally and in London. Nationally, the 25-year trend (1988-2013) and 10 year (2003-2013) is 55% and 7% respectively (Baker and Coleman, 2000). Geese in the UK are protected under the Wildlife and Countryside act 1981, it is an offence to capture, kill or injure a wild bird. The species is listed under Schedule 9 of the Wildlife and Countryside Act 1981, where it is an offence to release them into the wild. It is also an offence to damage or remove eggs from a nest, there are however exceptions relating to licensed actions and the open season (Sep 1 – Jan 31 England and Wales).

2.0 Canada geese in the Wandle Valley; a problem?

High Canada geese populations are causing an issue in some locations in the Wandle Valley. The geese (and other waterfowl) themselves and public activities associated with waterfowl more generally are affecting water quality in the River Wandle, its surrounding water bodies and open spaces. Canada geese can cause a variety of problems in our open spaces; the Natural England Technical Information Note (Natural England, 2011a) identifies many of the problems associated with high numbers of urban Canada geese. They are associated with over grazing and trampling, particularly amenity grassland in public parks. The geese feed on both aquatic and terrestrial vegetation, many geese flock to areas because the public feed them.

Feeding ducks and geese is something that reminds people of their childhood. For some, feeding waterfowl is an easy way to introduce their children to wildlife and it is something they value greatly. There can be many problems associated with feeding geese (and other waterfowl). Geese can suffer from poor nutrition and become dependant on feeding; this in turn can affect their natural migration pattern and can cause diseases such as 'angel wing'. Angel wing is caused by a high-protein or carbohydrate diet; it can mean the wings grow outwards making the birds flightless, see figure 1 (RSBP, 2011). Public feeding of waterfowl also creates nutrient changes in the water and can attract unwanted wildlife such as rats to an area.

Figure 1: Canada goose with 'Angel Wing' (RSBP, 2011)

Goose droppings can be a problem; they are unsightly and unhygienic. Continual fouling can also cause problems and increased costs for land managers who clean paths to ensure public safety when there is limited rainfall. Droppings can also affect the nutrient levels particularly in small or artificial water bodies that are still or have limited circulation or aeration. It can lead to algal blooms, reducing oxygen levels and in extreme cases can affect other aquatic species. Canada geese can also disturb other wildlife, destroying habitat through grazing, for example bank erosion and associated bank side vegetation.

Grazing and bank erosion affects many of the ponds and areas of open water in the Wandle Valley. Poaching by geese (and other waterfowl) has eroded the banks by as much as three metres (depth).

It is not just Canada geese that are breeding in the Wandle Valley, Egyptian and greylag populations

are slowly increasing (RSPB Croydon Local Group, 2013). There have been confirmed breeding pairs of Egyptian geese in Merton and Croydon; these species could contribute to the problems already associated with Canada geese.

A local example:

In the Wandle Valley, all of the issues identified above occur on different scales and intensities. Nutrient balances are a particular problem at the various sources of the Wandle as well as some of the open water expanses in some parks. The Wandle Trust (Wandle Trust, 2014) carried out some preliminary water chemistry sampling; from initial testing, it appears that wildfowl are causing an increase in nutrient levels in Carshalton Ponds. There is a large population of individual geese congregating at Carshalton ponds, they are currently preventing water vegetation from establishing through extensive grazing, thus preventing the process of ecological recovery in this area. Development of water plant communities would stabilise the polluted muds, remove nutrients and plants would out-compete algae, reducing algal blooms. An increase in marginal water plants could also reduce the direct contact between people and the open water and a good way of reducing public feeding opportunities.

2.1 Canada goose populations and distribution

There are open spaces and water bodies in the Wandle Valley of all shapes and sizes, most are unaffected by goose populations, whilst some have resident and breeding populations of Canada geese. There is generally a lack of information and data across the whole Wandle Valley, some areas are observed and recorded frequently, but for others, there is only anecdotal evidence about the Canada goose population, distribution and behaviours. As previously mentioned, the green spaces focussed on in this report are those identified in the Natural England Landscape Character Assessment and the Wandle Valley Regional Park.

A local bird recorder (Coleman, 2015a) explained that the river is not the main breeding area of Canada geese; other larger land areas have more breeding pairs than the river. A large number of what appear to be non-breeding Canada geese (most likely adolescent geese) congregate and cause problems in some of the water bodies, particularly at the source of the Wandle.

Table 1: Wintering Canada goose populations on the Wandle (Wandle Companion, 2012 pp. 80)

Year	Number of Individual Birds
2004	44
2007	65
2010	85

The figures available (Table 1) show that there has been a steady increase in wintering Canada goose Populations on the Wandle (between Butter Hill and Morden Hall Park) since 2004. This localised increase in population could increase pressure on the green spaces and areas of open water in the

valley. The occurrence of the problems outlined previously could be exacerbated, in particular water quality issues, fouling and over grazing. An increase in population could also create competition for habitat, nesting sites and food between the geese and other wildlife. In London, counts of adult and juveniles in 1983, 1991 and 2000 were 1552, 5037, 6106 respectively (Baker and Coleman, 2000). A similar pattern has occurred in the Wandle Valley, but numbers seem to have declined since a peak around the late 1990s. Canada geese were a rare visitor to the River Wandle in the 1970s and the earliest successful breeding pair recorded on the river was in 1985 at Morden Hall Park, the pair bred first at Beddington Farmlands in 1983 (Baker and Coleman, 2000).

Other data available from Coleman (2015a) covers the Wandle from Butter Hill Bridge, Carshalton to the tramline at Morden Hall Park (Coleman, 2015a) shown in Figure 2. In 2001, there was no count. This data represents observations along the Wandle and does not include full surveys for all the associated green spaces along the surveyed stretch. A moult count on the Wandle this year produced 73 birds (excludes juveniles).

In the upper Wandle, geese are known to breed along the river but the main breeding sites are Beddington Farmlands and Mitcham Common and without these two sites, it is unclear as to whether the population would be self-sustaining. The creation of islands on the lakes at Beddington Farmlands in 2000 and 2009 led to an increase in the number of pairs breeding, the islands on the ponds on Mitcham Common also provide suitable breeding habitat. The number of young produced from these two sites account for the majority of the birds seen on the upper Wandle. Canada geese do breed on the river but never produce such high numbers of young.

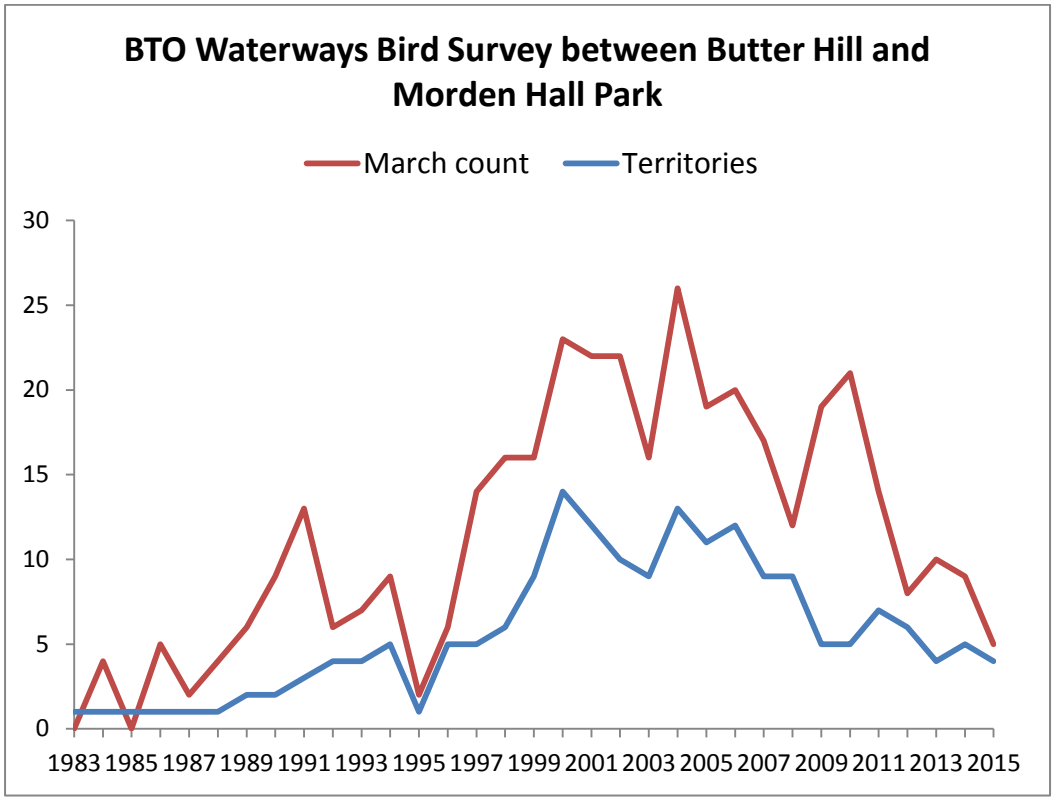

Figure 2: Graph showing the Canada geese numbers along the River Wandle (Coleman, 2015a)

The number of Canada geese is recorded by territories, the definition used when a bird is seen at least three times at the 'same place' during a survey of seven or more visits, it does not equate to breeding pairs (pairs present but not necessarily successful) with young (Coleman, 2015a).

These figures show that the populations and territories along the Wandle fluctuate between years and that there has even been a decrease since 2005. This is only a measure between Butterhill and Morden Hall Park, Canada goose habits and territories could change year on year. The number of territories (pairs present but not necessarily successful) on the river between Butter Hill, Carshalton and Morden Hall Park reached a peak of 14 in 2000, since then it has declined to four in 2014. Pairs also often attempt to breed at Carshalton Ponds, Beddington Park and Waddon Ponds.

Further discussion about population distribution of Canada geese in the Wandle Valley is detailed below by Borough:

2.2 Wandsworth

Feedback from the Wandsworth Council biodiversity officer has identified that in Wandsworth, the open spaces and parks within the Wandle Valley have few resident goose populations, parks in Wandsworth with a breeding population are not directly adjacent to the River Wandle. In the lower Wandle, very few pairs breed and little use is made of the river by geese. In counts made in late December every year since 2003, no geese have been recorded, except in 2005 when two were present in King George's Park (Coleman, 2015b). There is a resident population in Battersea Park, Tooting Common and Wandsworth Common, which is northeast of the Wandle Valley. Public feeding in the main parks in Wandsworth is a large problem. For example: there is a rat problem on Tooting Common at the main pond where the public feed the birds and other wildlife, the water quality is affected by wildfowl and public feeding in all of these parks. All three of the parks mentioned also have slowly increasing numbers of greylag and Egyptian geese.

2.3 Merton

Information provided by a parks officer at Merton Council suggests that Mitcham Common and Three Kings Pond on the edge of the common have a resident population with occasional breeding pairs. A group of roughly 40 Canada geese travels between Seven Islands pond Mitcham Common and Three Kings pond. The group tend to travel between surrounding areas such as Beddington Farmlands and the Three Kings pond. There is extensive feeding at the Three Kings pond; as a result, the water quality is particularly bad. Feeding is not the only reason for poor water quality; factors such as road run off etc. also contribute. The feeding problem is not so prolific at the lake on Mitcham common.

There is a small population of geese on the River Wandle at Ravensbury Park; this population tends to be mobile, with birds moving around the area. There was at least one successful breeding pair in 2014 at Ravensbury Park.

Another site in Merton is the National Trust (NT) property Morden Hall Park. The park has a small goose population observed by the local nature group (Morden Hall Park Nature Group, 2014) their numbers suggest there is often a population no bigger that nine, but the numbers fluctuate with birds moving between other areas in the Valley. There are often breeding pairs on this site, and a

pair of breeding Egyptian geese.

Cannon Hill Common in Merton has a lake with an island; the friends group have reported a breeding pair on the island for a few years, last year the brood was successful and a breeding pair has been confirmed this year (2015).

2.4 Sutton

Anecdotal information from the Assistant Parks Manager at Sutton Council has identified that in Sutton, Grove Park, the Grange Gardens & Beddington Park and Carshalton Ponds have large populations of individual sitting geese; these migrate between various parks and water bodies in the southern part of the valley. The parks department often have to jet wash the paths in Grove Park to remove goose droppings in the interest of public safety. They have also put up fencing in some areas in the parks to reduce grazing as sometimes they graze areas down to mud. Historically, there was a very aggressive male Mute Swan at Beddington Park that chased off geese and despite the departure of this bird; numbers have not increased at this site.

Counts from Carshalton Ponds were higher in the late 1990s than they are today. The water quality in Carshalton Ponds (which is a source of the Wandle) is poor and the slow nutrient break down is causing the ponds to silt up. The high numbers of wildfowl (particularly Canada geese) can create large quantities of droppings, increasing the organic content of the ponds; this in addition with low flows, silt build up and road run off can result in algal blooms and deterioration in the water quality. Residual food from public feeding also adds to the nutrient levels in the ponds.

Another site is Beddington Farmlands owned by Thames Water and leased to Viridor waste recycling company. This site has a fluctuating population of Canada geese, the species records are documented by local recorders, breeding pairs have increased from 12 pairs in 2010 to 21 pairs in 2013 (Alfrey *et al*., 2015). The maximum annual general population of Canada geese has increased from 116 in 2012 to 177 in 2013 showing a large increase in visits by the geese to the farmlands area. Throughout the year, some geese use the lakes on Beddington Farmlands to roost at night from where they fly to feeding sites during the day. This area is not open to the public and therefore unrestricted feeding is not an issue, however there are parks (The Grange, Beddington Park) near to the farmlands where feeding is a larger issue, the geese can easily move between these open spaces. Predation does occur on this site, but the safe environment also allows large broods to hatch successfully. Counts from Beddington Farmlands are difficult to interpret since they are made during the day when many birds have dispersed to other sites to feed, ideally counts need to be made late evening/early morning when the birds are still roosting or when birds are flightless while moulting in June/July. Counts of roosting birds are rarely made and counts of birds in moult since 2004 show large fluctuations with little indication of any change (Coleman, 2015b).

Figure 3 shows an increase in goose numbers most years, with some steep increases or declines. The population figures are much higher at Beddington Farmlands than the figures collected in the same year along the Wandle, between Carshalton and Morden Hall Park. Beddington Farmlands is an area not accessible by the public and therefore more appealing for geese as there is are fewer disturbances.

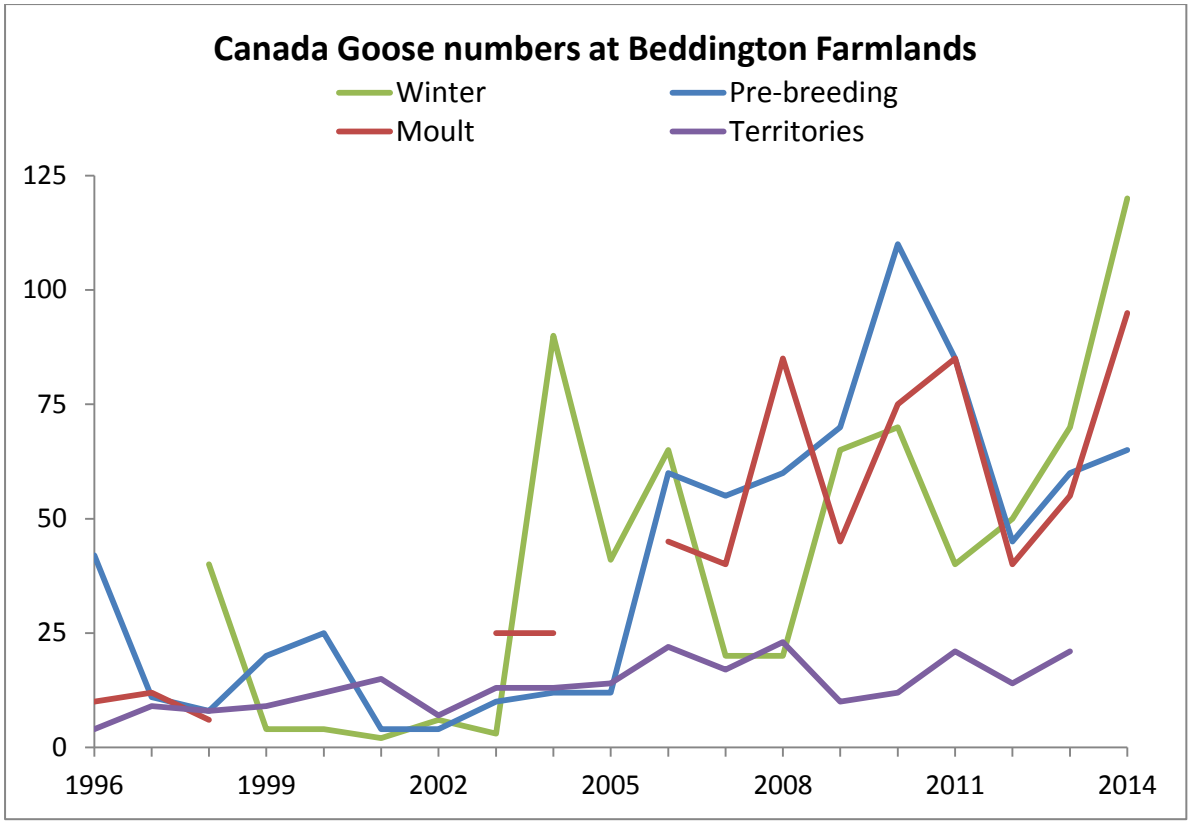

Figure 3: Graph showing Canada goose numbers at Beddington Farmlands (Alfrey *et al*., 2015)

2.5 Croydon

Observations from the Green Space Development Officer at Croydon council have identified one site within our featured area with a Canada goose population, Waddon Ponds. In the past, the ponds have suffered from a high volume of geese, in the region of up to 100 birds. Figure 4 (overleaf) highlights the high count of individual Canada geese present at Waddon Ponds during the winter months. Only a few geese are resident at the ponds, but this can result in up to 15 goslings per breeding season. In June 2015 a nest, the eggs and the female were destroyed, the circumstances of the attack are unknown, but it could have been predation or human intervention. Other broods were been successful in 2015 at the ponds. Fouling is a large problem at Waddon ponds (also contributed to by the high volume of coots at the ponds, however numbers of Canada geese have declined from around 100 to 30 in recent years); over grazing by the geese is also an issue here. The poaching of the banks at the ponds has resulted in erosion of the bank structure by 2 – 3 metres. The ponds are spring fed and the flowing water carries any fouling residue through the weir. If the flow of the spring reduced it could result in the water level dropping, leaving stagnant water, fouling could then contribute towards problems such as blanket weed etc. Public feeding is a big issue at Waddon ponds, large amounts of bread are often left on the banks by local people and a local food vendor.

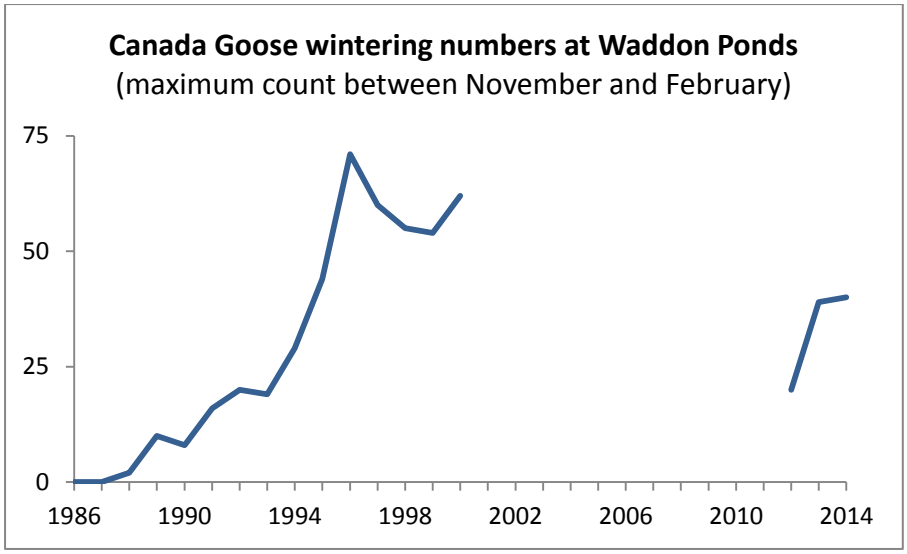

Figure 4: Graph showing the wintering Canada goose numbers (Individual) at Waddon Ponds – No count made in the period 2000 - 2012 (British Trust for Ornithology, 2015)

The Croydon RSPB (2013) group have recorded details of birds at Waddon Ponds that were originally ringed in different parks in the Wandle Valley and further afield in west London and even Sevenoaks (Kent). Geese sighted at Waddon Ponds have also been sighted at the following South London sites: Bushey Park, Battersea Park, Barn Elms Wetland Centre, Clapham Common, Hampton Court, Isleworth, Richmond Park, South Norwood Country Park, Sanderstead Ponds, Tooting Common and Wimbledon Park. Figure 5 shows a ringed Canada goose grazing at Waddon Ponds, documented by the Croydon RSPB group. Wandle Park in Croydon does not currently have a goose population and geese are scarcely seen according to the recorders from Croydon RSPB.

Figure 5: Canada goose at Waddon Ponds BTO 5251108, ringed in Sevenoaks on 25/06/2006 (Birkett, 2014)

2.6 Wandle Valley Distribution

The map (Appendix 3) aims to summarise the data provided so far and identify the green spaces and areas of open water observed in this report. It differentiates between areas with information on goose populations, areas with no information and areas where goose populations are causing an issue or breeding. This has been produced using information available to the Living Wandle Landscape Partnership. The green spaces acknowledged are those that fall within the Wandle Valley Regional Park boundaries.

Appendix 3: Map identifying the green spaces in the Wandle Valley included in this report and the Canada goose data available. The colours indicate areas where there are known breeding Canada geese, areas with a Canada goose population, areas with no population and areas for which we do not have data. (Appendix 3 – separate attachment)

The map shows that there are only 13 areas identified with breeding populations, their locations suggest the breeding populations are not centred on the river. The areas identified in grey indicate where data has not been available; these must become the priority for data collection to build a better picture of goose populations in the valley.

2.7 Summary

Once adult, Canada Geese are long-lived with a typical life-span of six years (maximum recorded nearly 32 years) (Coleman, 2015b) and with a large number of young reared each year it might be expected that the population would still be increasing. The evidence available in the Wandle Valley suggests that numbers have declined from a peak around 2000. Predation is probably the most significant cause of mortality, particularly signets. The number of foxes has increased since the 1980s and has had an impact on the goose population (Coleman, 2015a). Another factor is a net dispersal away from the Wandle Valley, there is considerable movement of geese within London and probably further afield shown by the sightings of ringed birds. It is also possible that part of the population moves away from the Wandle to moult, which may explain the large fluctuations in the moult counts from Beddington Farmlands. Previously it has been suggested that the River Thames may be the principal moulting site in London (Baker and Coleman, 2000). It is possible that the control measures currently in place in the London boroughs (both in the Wandle Valley and throughout London) will have limited the population increase.

It is clear however, that even with a declining population Canada geese along with other waterfowl are causing a variety of problems in the Wandle Valley. It is clear that public feeding and fouling are the main problems faced by land managers. The principal feeding sites are attracting the large numbers of geese, especially non-breeding birds. It is also evident that to gain a more accurate idea of goose populations in the valley a coordinated count during the moult season is required.

The information shows that there is a lack of comparable data across the whole valley, with the majority of the data coming from local recorders who observe certain stretches of the Wandle. The geese along with other factors are contributing towards the water quality problems, geese along with other wildfowl are contributing towards over grazing, the damage of bank side vegetation and are creating a minor public hazard though fouling.

3.0 Canada Goose Management Control options

There is a variety of ways in which landowners can adapt their current management of parks and open spaces to discourage Canada geese. Some controls are achievable at low cost whilst some require legal permissions. In urban areas, public opinion needs to be considered; public consultation and perception are crucial when seeking to carry out any changes in management to public spaces. Many people enjoy seeing Canada geese in their parks, public consultation may suggest that people

do not wish to see action taken in their park. Therefore, it is key to keep people informed about what is happening in the park, any changes in management of an area and the reasons behind the changes.

The control options are outlined below in order of ease: the easiest and least expensive methods listed first, while the harder, more expensive and controversial methods listed last. This is not an exhaustive list and only outlines a few options deemed appropriate to an urban context. The management methods can be broken into behavioural changes, either public or goose behaviour or direct number control methods. Public engagement should be undertaken when carrying out any of the management control options outlined below.

3.1 Behavioural changes

There is a deeply held belief that the public have the right to take their children or grand children and feed the wildfowl, it is often perceived that the council discourage feeding because it saves money, reducing the need to clean up the food debris or sweep the paths as often. The ecological advantages associated with discouraging feeding are not widely believed by the public and therefore education is crucial to help inform the public and change their habits and perceptions.

Feeding discouragement

A relatively low cost method is feeding discouragement measures. These can be in the form of posters or signs in parks at popular feeding sites, or education about the problems with feeding wildfowl via web information or social media. This can be informing the public of the impact feeding has on wildfowl or giving alternative ideas of what to feed wildfowl (natural seed etc.). The Canal & Rivers Trust launched a campaign in 2015 to educate the public about the effects of feeding wildfowl; they have had a big presence on social media particularly Twitter and Facebook. Figure 7 demonstrates the Canal & Rivers Trust's use of Twitter to educate the public. The campaign can be found at https://canalrivertrust.org.uk/news-and-views/features/help-us-keep-our-ducks-healthy

Figure 7: Canal & Rivers Trust social media posts about feeding wildfowl (Canal & Rivers Trust, 2015)

Educating the public and changing their perceptions of feeding can help reduce the problem; this method does not require direct intervention with wildlife. It also engages the public and gives them the opportunity to make their own informed choices. Figure 8 shows examples from Wandsworth, Merton, Sutton and Croydon of signs installed to educate the public about the problems with feeding wildfowl. Signage can be a good opportunity to use humour and can be written in a formal way (Sutton BC's signage) or informally (Merton BC's Signage) depending on the land managers outlook.

The signs can be as simple as printed posters or more permanent signs positioned in areas where feeding occurs. Posters templates have been provided in Appendix 1; these can be edited and used by land managers in the Wandle Valley. Some areas have sought funding from local businesses to help pay for the cost of installing the signage which would reduce the cost to the landowner. It is important to include details about the effects feeding the wildfowl has and reasons why the public should avoid feeding them (rats etc.), and education about appropriate alternatives. Educating Children is also a great way to discourage feeding; children will often take the information home and educate their families with what they have learnt.

A local example:

As of summer 2015, the local Management Advisory Committee (MAC) for Wandsworth Common has begun a partnership project with the café on the common. The café sells bags of waterfowl grain to raise money for the MAC whilst the MAC actively work to engage people feeding inappropriate food stuffs and redirecting them to purchase the grain from the café.

Figure 8: Signage displayed to discourage feeding in all of the Boroughs. Sutton (Top Left) Croydon (Top Right), Merton (Bottom Left) and Wandsworth (Bottom Left)

Fencing: Protecting vegetation, or fencing off areas to restrict access by the geese is another method suitable for the Wandle Valley.

Permanent: Canada geese dislike enclosed areas, it makes them more vulnerable to predators and restricts their ability to take off and land, by fencing an area it makes it less attractive to the geese. This deterrent method can protect sensitive areas and prevent bankside access by geese to bodies of water (Natural England, 2011a). This method can however cause problems for other wildfowl that the land manager may be trying to attract; therefore, it must be used sensitively. Croydon Borough Council has used fencing at Waddon Ponds (Figure 9) to break up open water and prevent bankside access. Permanent fencing can restrict public access as well as geese. Restricting public access can keep the public away from the waters edge and discourage feeding.

Temporary: Temporary fencing can be used to allow vegetation to establish in ponds or on banksides to prevent geese from damaging the planting. Once the vegetation is established the fencing can be removed; when installing fencing, the public must be kept informed of its purpose to prevent objection and potential damage to the fences.

Figure 9: Fencing at Waddon Ponds used to break up the expanse of open water

Habitat Adjustment: Vegetation and bankside management are a natural way of discouraging geese from green spaces or open water. This is a natural method using vegetation to deter geese; it can reduce access to water bodies or bank edges. It creates natural barriers between areas and reduces the flight paths for Canada geese in and out of water bodies (Natural England, 2011a). Vegetating banksides can also reduce the public's direct access to the water, potentially reducing feeding (throwing food) directly into the water. This method is also practical for use on large expanses of grass, breaking areas up with borders or shrubs, restricting the view of open water/landing sites. Figure 10 &11 demonstrates habitat adjustment that has taken place at Waddon Ponds, Croydon. Planting aims to reduce access to the pond and the vegetation can be temporarily fenced while it establishes.

Managing the grass and marginal vegetation differently can also help make an area less appealing for Canada geese. By leaving areas of grass longer or rotating mowing regimes the concentration of geese can be moved around, relieving areas of pressure. Changing marginal vegetation to robust species (that Canada geese do not favour) can help to reduce the available food source for the geese, the impact on other wildfowl must be considered if using this method. Table 2 indicates species suitable to deter geese (this is not an exclusive list). Preventing nesting and making areas less appealing is a good way to avoid allowing birds to nest.

Figure 10: Marsh Marigold amongst other vegetation planted at Waddon Ponds, Croydon

Figure 11: Vegetation fencing before and after photos at Waddon Ponds in

Table 2: Species suitable for vegetation adjustments - appropriate species are dependant on location, habitat and local area.

Species (Common name):	**Scientific Name:**
Common Reed	*Phragmites australis*
Yellow Iris	*Iris pseudacorus*
Marsh marigold	*Caltha palustris*
Water mint	*Mentha aquatica*
Purple Loosetrife	*Lythrum salicaria*
Sedge Sp. (lesser)	*Carex*
Sweet- grass Sp.	*Glyceria*
Meadow sweet	*Filipendula ulmaria*
Rush Sp.	*Juncus*

More advice about the best species to use for bankside vegetation can be sought from government agencies such as Natural England and Environment Agency (EA). 'What to plant in the river corridor' guidance has been kindly provided by the Environment Agency in Appendix 2.

Scaring: There are two different methods, visual and acoustic scaring. **Visual** scarers rely on the geese fearing them, because geese in urban areas are used to being in close contact with people visual scarers are often less effective. Visual scarers can come in the form of flags, tape, balloons or rotating mirrors, they rely on wind to create movement. They are difficult to use in urban and public environments because they often affect the recreational uses of the park, they can often attract vandalism and some require maintenance.

Acoustic scarers make sudden loud noises, frightening geese and other bird species, these scarers however are not suitable for public areas because of their sudden nature and potential impact on the public. The Acoustic method along with visual options would also have an impact on other wildfowl, if implemented this could negatively affect the diverse wildlife of the Wandle.

Scarers do not work well in highly populated urban areas and are therefore not appropriate in the Wandle Valley.

3.2 Number Control Methods

Number control methods are instant and can give immediate results, but are not necessarily the most cost effective.

Egg Treatment: Egg treatment is a method where the eggs are removed, pricked, boiled or oiled to prevent them from hatching; this method requires a licence (https://www.gov.uk/wildlife-licences). Eggs are (where possible) left in the nest to prevent the geese laying another batch. Egg oiling requires the egg to be covered in a mineral oil (e.g. liquid paraffin), this prevents the embryo's access to oxygen (Natural England, 2011b), and the oil does not affect the geese sitting on the nest. More information is detailed in the Natural England Technical Information Note (TIN) 022.

Egg pricking works by inserting a pin into the egg and killing the embryo, it is then best to return the eggs to the nest. Boiling the eggs also kills the embryo, the eggs should also be returned to the nest to prevent the geese from laying another brood. The egg treatments during nesting season require a

lot of staff resource. Due to low mortality rates in Canada geese it means that all nests at any one site need to be treated in order to reduce bird numbers. These methods are considered humane and receive less public opposition than methods such as culling. Egg treatment is currently used in parks across Wandsworth and has been included in their management for many years, it has been successful and is carried out annually.

Round up and cull: This is the quickest method for reducing goose numbers but is the most contentious. Culling takes place in June and July, their flightless period (Natural England, 2011c), and requires skilled specialists and a license (https://www.gov.uk/wildlife-licences). 'In most urban areas shooting will not be possible because of public safety considerations' (BASC, 2012). The birds are rounded up and dispatched; this is problematic in urban public places due to likely public presence and potential opposition. There is also the matter of disposing of the geese once they have been dispatched. Culling is a very expensive and controversial method and is rarely effective in the long term. It often opens up areas with sufficient habitat and food to geese immigrating from elsewhere, therefore it requires co-ordination of control over large areas; highly complex in the fragmented land-ownership patterns of London. A licence is required for this method; more information is available in the Natural England Technical Information Note (TIN) 046.

3.3 Management Technique Matrix

The type of management has been cross-referenced with other variables and rated between 1-5. One is the lowest (cost, most effective etc.) and five is the highest (most expensive and resource intensive etc.)

Table 3: Matrix cross-referencing goose management controls and other variables such as cost

Type of Management	Ease of implementation	Expense (Estimate)	Legal permissions required	Possible Public Dispute	Total
Feeding Discouragement	1	1	N	2	7
Habitat Adjustment	2	2	N	2	8
Fencing	2	2	N	3	10
Scaring	4	4	Y	4	17
Egg Treatment	4	4	Y	4	13
Round up and cull	5	5	Y	5	20

It is clear from the matrix that the most appropriate control methods for land managers in the Wandle Valley are feeding discouragement and habitat adjustment.

4.0 Current Canada goose Management in the Wandle Valley

There are not many goose management measures in place in the Wandle Valley; currently the most commonly used method is using signage to encourage the public not to feed waterfowl.

4.1 Wandsworth

Wandsworth Borough Council carries out legal egg pricking in three of their largest parks in the borough. It used to be carried out in King George's Park but there is no longer a breeding population in this park. They carry out egg pricking on Wandsworth Common, Tooting Common and at Battersea Park. This control method has been used by the council since 1991 and there has been a significant decrease in how many eggs are pricked from a total of 945 in 1991 to a total of 61 in 2014 (Wandsworth Borough Council, 2014). The egg pricking takes place as part of the integrated lakes management in the Borough and is combined with methods such as habitat adjustment.

At Tooting Common, public feeding has lead to a large problem with rat populations. Wandsworth Council have used the signage in the park to try to discourage feeding wildlife as it is contributing towards the increasing rat population (See Figure 8).

4.2 Merton

There are no current management or control policies in Merton Borough Council for the control of Canada geese. There are some feeding discouragement signs at one site, Three Kings pond in Mitcham (See Figure 8).

The National Trust does not carry out any control methods, the Trust follow guidance as per Natural England guidance TIN009. The National Trust guidance suggests that if a species is severely compromising native species and water quality, it should be controlled or managed. The populations at Morden Hall Park are not currently considered by the National Trust as a cause for concern, so no species control is currently planned.

4.3 Sutton

There are no current wildfowl control measures in place and there has been no control of any kind for at least 20 years. The council along with the local friends group have tried to restrict feeding of bread to the birds in Grove Park and that seems to have reduced numbers this year. The Friends of Grove Park installed six signs some time between 2010 and 2014 in at attempt to educate the public about the impacts of feeding the wildfowl (See figure 8).

Recently the Wandle Trust added Siltex to Carshalton ponds, a natural chalk-like substance that helps to increase the speed of silt breakdown (a lot of silt build up caused by food and goose droppings). Siltex is a costly method and is not sustainable as an approach to deal with the water quality problems at this site.

We do not have any information about management or control policies at Beddington Farmlands.

4.4 Croydon

The Council have a Canada geese management strategy, the strategy has been produced in partnership with Quadron and is due to be implemented in 2015 and run until 2020. In Croydon's strategy, egg control is identified as the most viable method. Works over the past year at Waddon Ponds have involved the restoration of eroded banks by using reclaimed silt and planting to reinforce soil structure. Plant species used have been selected for their height and texture, for example sedges have been used to create a tall boundary around the waters edge to discourage geese climbing onto the banks. A divide has been installed to the large pond in order to reduce the large expanse of water that is attractive to geese, although geese can still fly over the fence and land in the water.

The Council have installed fencing around new bankside vegetation at Waddon Ponds to protect it from the geese, this method has helped the vegetation to establish without disturbance. Croydon Council have a few posters at Waddon Ponds explaining about the impacts feeding the wildfowl bread has on both the birds and the water quality (See figure 8). Park users often remove the posters on display (Figure 8). A slight reduction in geese has been observed since the fencing and planting measures have been implemented.

There are no management controls in place at Wandle Park as there are currently no geese present in the park, only two birds have been sighted in the park this year.

4.5 Goose Management in another London Valley context

The Lee Valley Regional Park is an example of another Valley within an urban and London context where the control of Canada geese takes place. The Lee Valley Regional Park Authority (LVRPA) carry out rough counts of Canada geese during their moult, adults counts during this period range between 450-650 individuals. LVRPA control their Canada geese populations for some of the reasons outlined previously, but mainly because of the effect of crop grazing on their farm. The LVRPA have carried out a variety of management methods; initially scarers such as scarecrows, gas guns and geese alarm calls devices were used, but the geese soon because acclimatised , making these methods less effective. The Park Authority is restricted to which goose management methods it can use due to the high number of public users, this means that approaches such as culling are not possible.

The LVRPA currently use two methods in the valley, egg oiling and feeding discouragement methods. Eggs are rolled in paraffin oil in spring, but some nests are still successful due to early, missed or late broods. LVRPA also try to educate park users about feeding wildlife responsibly using posters and direct engagement, but it continues to be a problem in some areas (LVRPA, 2015). The fact that there is one major authority controlling the majority of the area in the Lee Valley Regional Park makes the implementation and organisation of goose management easier than

5.0 Next Steps

This report identifies some of the goose population issues in the valley but there is the opportunity to continue investigating the Canada goose populations further, prioritising and coordinating the

next steps is crucial. The Wandle Landscape and Biodiversity group (made up of representatives from all four boroughs, London Wildlife Trust, the Wandle Trust, the National Trust, Living Wandle Project, Environment Agency, GiGL and Wandle Valley Regional Park) may be able to take ownership of the plan and next steps. Investigation could for example continue through the following actions:

5.1 Target Data Collection

The Living Wandle Landscape Partnership has launched an online species recording form in May 2015, in partnership with GiGL (Greenspaces Information for Greater London). It would be possible to encourage the public to target Canada geese as a species, this would increase the amount of Canada goose data held on the GiGL database. Data could then be used to inform future control measures.

5.2 Coordinated monitoring across the Wandle Valley

In order to understand the goose numbers across the valley better, and understand what factors are making some areas more populated there will need to be more coordinated monitoring. Having data for all of the potential habitats for geese along the Wandle would make it easier to understand the problem. This would also make it possible to monitor if management measures in place are working, and this could inform future control options for the valley. Monitoring would need to be regular, systematic and in place at all key sites within the project area – both "on stream" and at key water bodies "off stream" too.

Organising a coordinated count during the moult period (End of June – beginning of August) along the Wandle would give a more precise count as the geese would not be able leave the area. Some geese move to different areas during their moult period, which might affect the count numbers, but would still offer a good baseline and insight into populations across the valley. Moult counting should be taken forward in order to understand the collective problem and how best to deal with it on a landscape scale. Further analysis of new and existing data is another coordinated approach. Data from the BTO could be analysed in order to build a better picture of goose movement patterns within the Wandle Valley. This data could then feed into a wider study of Canada goose migration across the wider London area.

5.3 Coordinated action

The above monitoring could then direct and guide coordinated work to reduce goose numbers within the Wandle Valley as a whole. This approach has proven effective e.g. London Lakes Project where work was coordinated between Wandsworth & Royal Parks once it was understood that the same birds used lakes on land managed by both organisations. What activity the bird undertakes at each site will govern the actions needed e.g. breeding sites will need to control eggs, whereas feeding/moulting sites may need to adjust vegetation and fencing.

5.4 Targeted programme of public awareness

Once data for the Wandle Valley is assessed, an area within the valley could be chosen for a trial, or information from areas where methods are already in place could be analysed to see their effectiveness. Information on goose numbers, water quality and vegetation could be gathered

before and after measures are put in place. Measures could include the display of feeding discouragement posters, talks to local schools and a campaign on social media. Results then used to influence future management in other green spaces and serve as examples of best practice. Detailed study documents for particular parks in the Wandle Valley could be produced, including information on the methods used, costs and effectiveness to provide other land managers with practical evidence.

5.5 Useful Contacts & Further Information

Natural England - Natural England, Wildlife Licensing Unit, First Floor, Temple Quay House, 2 The Square, Bristol, BS1 6EB

Telephone: 0845 601 4523 (local rate) E-mail: wildlife@naturalengland.org.uk

The general licences and a range of leaflets on wildlife topics are available online at: www.naturalengland.org.uk/ourwork/regulation/wildlife/default.aspx

BASC - The British Association for Shooting and Conservation (BASC), Marford Mill, Rossett, Wrexham, LL12 0HL. Tel: 01244 573000. E-mail: enq@basc.demon.co.uk

Environment Agency - National Customer Contact Centre
PO Box 544
Rotherham
S60 1BY

Email enquiries@environment-agency.gov.uk Telephone 03708 506 506

RSPB - London Office Telephone: 0207 808 1240 RSPB London Office
2nd Floor, 65 Petty France
London
SW1H 9EU

English Heritage (2014) *Landscape Advice Note: Canada Geese* https://content.historicengland.org.uk/images-books/publications/lan-canada-geese/lan-canada-geese.pdf/

Friends of Animals (2005) *Canada Goose habitat Modification Manual*. Darien, CT https://friendsofanimals.org/sites/default/files/Goose%20Habitat.pdf

NJ Department of Environmental Protection Division of Watershed Management (2001). *Management of Canada Geese in Suburban Areas: A Guide to the Basics (Draft)* http://www.state.nj.us/dep/watershedmgt/DOCS/BMP_DOCS/Goosedraft.pdf

Smith, A. Craven, S and Curtis, P. (2000). *Managing Canada Geese in Urban Environments: A technical Guide* http://dspace.library.cornell.edu/retrieve/61/

Rehfisch, M. Allan, J and Austin, G (2010). *BOU Proceedings – The Impacts of Non-native Species*. http://www.bou.org.uk/bouproc-net/non-natives/rehfisch-etal.pdf

Wilkinson, M et al. 1998 *London Lakes Project: an overview of works and results of the project.* Wandsworth Borough Council

Underhill, M 1997 *London Lakes Rehabilitation Project Overview: Phase 3 - Waterfowl Monitoring and Management.* Wandsworth Borough Council

Bibliography:

Alfrey P, Milne B, Coleman C and the BFBG, (2010). *The Birds of Beddington Farmlands*.

Allsopp Helikites Ltd & Bird Control Systems Ltd (2015) *Flashman*. Available at: http://birdcontrol.net/html/Flashman.htm (Accessed 19.01.2015).

Baker, H. and Coleman, D. (2000) *Status of the Canada Goose, the Greylag Goose and other naturalised geese in Greater London 2000*. London Bird Report 65: pages 199-205

Birkett, J. (2014). *Canada Goose ringed 25/06/2006* [Photograph] In possession of: John Birkett: Croydon

British Association for Shooting and Conservation (BASC). (2012). Canada Geese. A guide to legal control measures in the UK. *Information Sheet*, pp. 1-6

British Trust for Ornithology (2015) WeBS count Waddon Ponds.

Canal & Rivers Trust (a). (@CanalRiverTrust) *"Help us keep our ducks healthy: Follow our simple duck feeding tips"*. 30 Mar 2015 – 16:30

Canal & Rivers Trust (b). (@CanalRiverTrust) *"A good food guide (for ducks): follow our tips to make your local ducks happy & healthy"*. 7 Apr 2015 – 14:31

Coleman, Derek (2015a). *Goose Management*. Message to Crothall. L From Coleman, D. Local Bird Recorder. Sent 17.03.2015 16:51. (Accessed 17.03.2015 13:13).

Coleman, Derek (2015b). Goose Management. Message to Crothall. L From Coleman, D. Local recorder. Sent 29.06.2015 09:53. (Accessed 29.06.2015 10:30).

Dave Hares Landscape Architecture (2012) *Landscape Character Assessment of the Wandle Valley London*. Chichester: Natural England, pp. 5- 7.

Greater London Authority. (2008) *Parks, People and Nature: A guide to enhancing natural habitats in London's parks and green spaces in a changing climate*. Available at: www.london.gov.uk pp. 22-27.

Lee Valley Regional Park Authority (2015). Canada Goose Management. Message to Crothall. L. From D. Richardson, Acting Senior Conservation Officer. Sent 19.03.2015 16:38 (Accessed: 19.03.2015).

Morden Hall Park Nature Group. (2014) *Wetland Birds Survey (WeBS)*Available at: http://mhpng.weebly.com/wetland-bird-survey.html (Accessed 18.11.2014)

Natural England. (2011a) 'The management of problems caused by Canada geese': a guide to best practice. *Technical Information Note* (TIN), 009 (4), pp. 1 – 12.

Natural England. (2011b) Use of liquid paraffin BP to prevent eggs of certain birds from hatching. *Technical Information Note* (TIN), pp. 1-3.

Natural England. (2011c) Control of Canada geese: round-up and cull during the moult (flightless period). *Technical Information Note* (TIN), PP.1 – 5.

RSPB. (2011*) Community Chat.* Available at: http://www.rspb.org.uk/community/chat/f/2542/t/37786.aspx (Accessed 9 December 2014).

RSPB Croydon Local Group (2013). *Croydon Bird Report*. London: RSPB

RSBP. (2015) *Bird guide: Canada Goose*. Available at: http://www.rspb.org.uk/discoverandenjoynature/discoverandlearn/birdguide/name/c/canadagoose/index.aspx (Accessed: 1 April 2015).

Steel, B. and Coleman, D. (2012) *River Wandle Companion and Wandle Trail Guide*. 1st edn. London: Culverhouse Books.

Wandle Trust (2015). *Living Wandle Landscape Partnership & Goose Management.* Message to Crothall.L From Van Biervliet. O, Water Quality Officer. Sent 18.11.2014 11:05 (Accessed: 18.11.2014).

Wandsworth Borough Council. (2014) *Lakes Management*. Message to Crothall, L From Selby, V, Principle Parks Officer (Biodiversity & Parks Development). Sent 02.12.2014 (Accessed: 02.12.2014)

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Appendix 1: Poster ideas and examples for discouraging public feeding

We LOVE people

but not their food!

Bin the Bread and let us fly!

Regularly feeding our watery Wandle birds causes

Unnatural Behaviour. Water Pollution. Over Crowding.
Delayed Migration. Poor Nutrition. Disease

Bin the Bread

and let us Fly!

PLEASE do NOT feed us

it will hurt our Tums!

Bin the Bread!

Birds need their five a day too

Bread isn't good for the wildfowl or

the River Wandle

Feed them peas and sweetcorn

on the bankside instead

Appendix 2: Environment Agency 'What to plant in the river corridor)

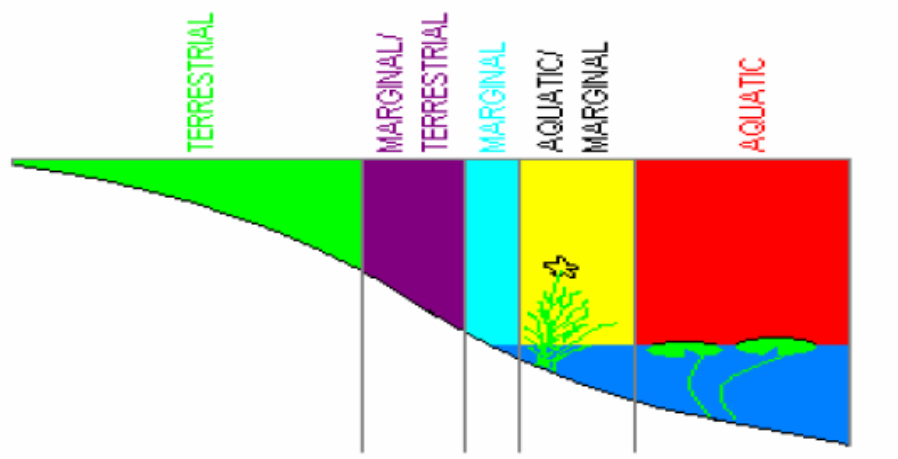
What to plant in the river corridor

We have put together this native species list to guide you in getting the best from your planting scheme. It should only be used as a guide as it is not exhaustive. We strongly recommend that you consult an ecologist when compiling your native planting plans and the plants you use should be of at least UK genetic provenance.

The plants occurring upstream and downstream of your site should be looked at to give an indication of the most appropriate planting. Where this is not possible (ie. culverts or domination by invasive alien species either side of the site) we suggest you gather this information from the Natural History Museums post code plant finder (http://www.nhm.ac.uk/nature-online/life/plants-fungi/postcode-plants/).

As with all new planting schemes some plants will die. However, you can reduce this by picking naturally occurring native species.

The plant species have been split into 5 different zones depending on where they naturally occur on the bank, these are shown below:



The plants asterixed (*) are highly competitive species and you should note this when selecting them in order to prevent them taking over. Species suitable for chalk rivers are marked (°).

AQUATIC

Herbs		**Sedges & Rushes**	
Berula erecta °	Lesser Water-parsnip	*Schoenoplectus lacustris*	Common Club-rush
Callitriche stagnalis °	Common Water-starwort	**Other Monocotyledons**	
Ceratophyllum demersum	Rigid Hornwort	*Butomus umbellatus*	Flowering-rush
Myriophyllum spicatum	Spiked Watermilfoil	*Sagittaria sagittifolia*	Arrowhead
Ranunculus aquatilis	Common Water-crowfoot	*Sparganium emersum*	Unbranched Bur-reed
Ranunculus circinatus °	Fan-leaved water-crowfoot	*Sparganium erectum* *	Branched Bur-reed
Ranunculus penicillatus	Stream Water-crowfoot	**Horsetail**	
		Equisetum fluviatile *	Water Horsetail

AQUATIC/MARGINAL

Other monocotyledons		**Grasses**	
Alisma plantago aquatica	Water-plantain	*Glyceria maxima* *	Reed Sweet-grass
Iris pseudacorus	Yellow Iris	*Phragmites australis* *	Common Reed
Typha latifolia *	Reedmace		
Sedges & rushes		**Herbs**	
Carex riparia	Greater Pond-sedge	*Rorippa nasturtium aquaticum* °	Water-cress
Eleocharis palustris	Common Spike-rush		

MARGINAL

Herbs		**Grasses**	
Apium nodiflorum [c]	Fool's Water-cress	*Glyceria declinata*	Small Sweet-grass
Lycopus europaeus [c]	Gipsywort	*Glyceria fluitans* [c]	Floating Sweet-grass
Lythrum salicaria [c]	Purple-loosestrife	*Glyceria notata*	Plicate Sweet-grass
Mentha aquatica [c]	Water Mint		
Myosotis scorpioides [c]	Water Forget-me-not		
Ranunculus sceleratus	Celery-leaved buttercup	**Sedges & Rushes**	
Rumex hydrolapathum	Water Dock	*Carex acutiformis*	Lesser Pond-sedge
Veronica anagallis aquatica [c]	Blue Water Speedwell	*Juncus articulatus*	Jointed Rush
Veronica beccabunga [c]	Brooklime		
Veronica catenata	Pink Water-Speedwell		

MARGINAL/TERRESTRIAL

Herbs		**Grasses**	
Caltha palustris	Marsh-marigold	*Catabrosa aquatica*	Whorl-grass
Epilobium hirsutum	Great Willowherb	*Phalaris arundinacea* [c]	Reed Canary-grass
Eupatorium cannabinum [c]	Hemp-agrimony		
Ranunculus flammula	Lesser Spearwort	**Trees and Shrubs**	
Scrophularia auriculata [c]	Water Figwort	*Salix fragilis*	Crack-willow

TERRESTRIAL

Herbs		**Trees and Shrubs**	
Bidens cernua	Nodding Bur-marigold	*Alnus glutinosa*	Alder
Angelica sylvestris	Wild Angelica	*Corylus avellana*	Hazel
Bidens tripartita	Trifid Bur-marigold	*Cornus sanguinea*	Dogwood
Cardamine pratensis	Cuckooflower	*Crataegus monogyna*	Hawthorn
Dipsacus fullonum	Wild Teasel	*Fraxinus excelsior*	Ash
Filipendula ulmaria [c]	Meadowsweet	*Fagus sylvatica*	Beech
Lotus pedunculatus	Greater Bird's-foot-trefoil	*Ilex aquifolium*	Holly
Lychnis flos-cuculi	Ragged-Robin	*Rubus fruticosus*	Bramble
Lysimachia vulgaris	Yellow Loosestrife	*Salix alba*	White Willow
Petasites hybridus	Butterbur	*Salix caprea*	Goat Willow
Pulicaria dysenterica	Common Fleabane	*Salix cinerea*	Grey Willow
Scutellaria galericulata	Skullcap	*Sambucus nigra*	Elder
Solanum dulcamara	Bittersweet	*Viburnum opulus*	Guelder-rose
Symphytum officinale [c]	Common Comfrey	*Quercus robur*	Pedunculate Oak
Valeriana officinalis	Common Valerian		
Sedges & rushes			
Carex flacca	Glaucous Sedge		
Carex hirta	Hairy Sedge	**Grasses**	
Carex otrubae	False Fox-sedge	*Arrhenatherum elatius*	False Oat-grass
Carex paniculata	Greater tussock-sedge	*Agrostis stolonifera*	Creeping Bent
Carex pendula	Pendulous Sedge	*Deschampsia cespitosa*	Tufted Hair-grass
Juncus effuses	Soft-rush		
Juncus inflexus	Hard Rush		
Scirpus sylvaticus	Wood Club-rush		

Additional beneficial species for terrestrial species (including invertebrate loving flora):

Species (Common Name)	Latin name
Foxglove	*Digitalis purpurea*
Toad Flax	*Linaria vulgaris*
Red Campion	*Silene dioica*
Kidney Vetch	*Anthyllis vulneraria*
Red Clover	*Trifolium pratense*
Field Scabious	*Knautia arvensis*
Olde Mans Beard	*Clematis vitalba*