1. Introduction

Amphibian, Reptile & Mammal Conservation Limited were contracted by the Royal Borough of Kensington & Chelsea on 1st May 1997 to undertake a mammal survey at a range of sites, based on the London Ecology Unit's Schedule of Sites of Ecological Importance, where suitable habitat was present to allow for small mammal trapping.

The survey objectives were to:

* establish the species diversity present at each site

* record the distribution of mammals, with the exception of bats, in the Borough

* make appropriate recommendations for habitat improvements which may be undertaken to benefit mammal populations

No attempt was made to estimate the population sizes present at each site.

2. Survey Methodology

The survey sampled the range of small mammals present using standard Longworth live-traps which were set out in the most suitable areas of habitat present at each site in order to maximise the capture rate.

In addition to the live-trapping programme, an extensive search was made at each site for direct observations and field signs of other mammals which would not be recorded in Longworth traps: hedgehog, common rat, grey squirrel, fox, mustelids (weasel family) and deer. This part of the contract was carried out earlier in the year, mainly between June and September 1997.

The trapping period was chosen to coincide with the autumn peak of small mammal populations. The survey was carried out between October and December 1997. The traps were set out in late afternoon in order to minimise the risk of disturbance and visited at approximately 0830 hours on the second day of each trapping period. All traps were removed from the site after the trapping period. Where the results were considered to be anomalous, such as where excessive fox disturbance of the traps had led to a reduced capture rate, a second trapping period was operated.

Sites with no suitable mammal habitat present (River Thames and the Moravian Burial Ground) were not visited and sites which had recently been fully surveyed for mammals were not re-surveyed (Natural History Museum Gardens). There was no access to Kensington Palace, the Carmelite Monastery and various rail-side lands.

Bats were excluded from this contract, having been previously surveyed by the London Bat Group in 1994 (Herbert, 1995).

Prior to the commencement of field work, a desk study and search of the London Mammal Group's extensive County Database was undertaken to highlight past records.

3. Survey Results

The following survey results are presented using the London Ecology Unit's site names, together with their classification of the site's general level importance for wildlife. Although the survey methodology excludes bats from the field work, the site classification used by the London Bat Group is included for completeness.

The site description has been taken directly from the London Ecology Unit's Schedule of Sites of Ecological Importance and updated with specific reference to mammal habitats where appropriate.

3.1 Grand Union Canal (Paddington Branch)

LEU Ref. - M6 Grid Ref. - TQ 235 824

3.1.1 Site Description
The canal system is a strategically important ecological and landscape feature in London. Its major habitats include standing water, scattered trees, vegetated walls, neutral grassland (semi-improved), rough land, and wet marginal vegetation. The short section in Kensington and Chelsea lies between the Kensal Green Gas Works and Kensal Green Cemetery, producing one of the largest sites in the borough for mammals, and with a corridor linking the borough to outer London boroughs.

3.1.2 Historical Records
Records of common rat were obtained on 29th March 1995 during the Borough Amphibian and
Reptile Survey undertaken by the London Amphibian & Reptile Group.

3.1.3 Site Status
London Ecology Unit: Site of Metropolitan Importance
London Bat Group: Site of Local Importance

3.1.4 Survey Results
A total of 15 Longworth traps were set out from behind the gas work cylinders along the vegetated wall up to the borough boundary line on 5th December 1997. The only species captured were 2 juvenile wood mice.

Although no field signs of common rat were detected, it is likely that they are still present. The Ecology Service have regularly observed rats in the vicinity of the site. Whilst typical riparian mammals, such as otters and water voles, have never been recorded from the borough, other more widespread species in London, particularly foxes and house mice, probably occur here from time to time.

3.2 Kensington Gardens

LEU Ref. - M103 Grid Ref. - TQ 258 801

3.2.1 Site Description
Together with Hyde Park, in the adjacent City of Westminster, Kensington Gardens forms the largest open space in central London. Within Kensington & Chelsea, two small ponds are planted with native emergent plants. The many scattered trees hold a variety of breeding bird species. Some of the grassland has plant species characteristic of acid grassland but there is little natural cover for small mammal populations.

3.2.2 Historical Records
The only historical records known from this site are hedgehog, rabbit, grey squirrel, common rat and fox. The latter species was first reported in 1939 (Fitter, 1949).

3.2.3 Site Status
London Ecology Unit: Site of Metropolitan Importance
London Bat Group: Site of Metropolitan Importance

3.2.4 Survey Results
No small mammal species were recorded during the course of the survey, although field signs of grey squirrel, common rat and fox were abundant.

Hedgehogs have not been observed in Kensington Gardens or Hyde Park for several years (Jennifer Adams, *pers. comm*.) and a survey in Hyde Park by the London Mammal Group in 1996 and 1997 also failed to record them. The reason for their apparant local extinction is unknown.

3.3 Kensal Green Cemetery

LEU Ref. - M125 Grid Ref. - TQ 234 825

3.3.1 Site Description
The cemetery grassland contains an assemblage of unusual plant species of old meadows or pasture. Habitats present include herb-rich neutral grassland, scrub, rough land, non-native broad-leaved woodland, vegetated walls and tombstones. This extensive site provides excellent cover for small mammals.

3.3.2 Historical Records
The only historical records from this site are of bank and field voles which were recorded under refugia (sheets of metal, roofing felt and wood provided for animals to shelter or bask under) used during the 1995 Borough Amphibian & Reptile Survey carried out by the London Amphibian & Reptile Group.

3.3.3 Site Status
London Ecology Unit: Site of Metropolitan Importance
London Bat Group: Site of Local Importance

3.3.4 Survey Results
This site has the highest mammal species diversity in the borough. The most significant observation was of a weasel, on 6th October 1997, which was photographed by Tim Freed. Also recorded by direct observation and field signs were hedgehog, common rat and grey squirrel.

The live-trapping programme using a total of 47 Longworth traps over several nights in October 1997 revealed the presence of bank vole, field vole and wood mouse.

3.4 Holland Park

LEU Ref. - M 131 Grid Ref. - TQ 247 797

3.4.1 Site Description
The only sizeable area of woodland in a large part of central London. Habitats present include non-native broad-leaved woodland, native broad-leaved woodland, scrub, semi-improved neutral grassland, tall herbs, wet marginal vegetation and standing water.

3.4.2 Historical Records
The first historical records from the site are of hedgehogs which were reported in 1922 (Fitter, 1949). More recently, animals have been regularly seen by the Park Manager and, in addition, individuals have been released during the 1990s. The latest re-stocking comprised 6 animals which were obtained from a rescue centre in Enfield and released in May 1997. It is not clear, however, that the population was unsustainable without these additional animals.

3.4.3 Site Status
London Ecology Unit: Site of Metropolitan Importance
London Bat Group: Site of Metropolitan Importance

3.4.4 Survey Results
A total of 47 Longworth traps were set out in the wildlife area of the park on 14th November 1997. The only species captured were 6 adult wood mice. Grey squirrels and foxes were also abundant and many of the traps were disturbed by them as they attempted obtain access to the bait.

In view of the unexpected low numbers and species diversity recorded during the trapping night, a repeat survey was carried out on 28th November 1997 which resulted in only 1 adult male and 2 juvenile wood mice being captured.

Two hedgehog droppings were found during the summer. No rabbits were observed, although a few droppings were seen. It is known that an outbreak of myxomatosis, or some other disease, in 1996 decimated the introduced population, leaving a few domestic animals present at the beginning of 1997 (E. Constantine, *pers. comm.*).

Also recorded during 1997, were occasional reports of common rats by the Parks Police and several sightings of a released or escaped feral ferret close to the Youth Hostel on the edge of the park.

3.5 Kensal Green Gasworks

LEU Ref. - Ke.BI 1 Grid Ref. - TQ 235 823

3.5.1 Site Description
A site colonised by a diverse grassland and tall herb flora. Other habitats present include semi-improved neutral grassland, scrub, wet marginal vegetation and standing water. Cover for small mammals is generally good, although bare areas of concrete foundations are present.

3.5.2 Historical Records
There are no known historical records from this site.

3.5.3 Site Status

London Ecology Unit: Site of Borough Importance - Grade I
London Bat Group: Unclassified

3.5.4 Survey Results
A total of 15 Longworth traps were set out on 5th December 1997. The only species recorded were 1 adult female and 4 juvenile wood mice. Foxes and grey squirrels were also abundant and had disturbed some of the traps.

3.6 Brompton Cemetery

LEU Ref. - Ke.BI 3 Grid Ref. - TQ 257 777

3.6.1 Site Description
The cemetery grassland comprises both acid and neutral grassland and has occasional chalk-loving plant species associated with the soil developing over some of the tombstones. Other habitats include non-native woodland and scattered trees.

3.6.2 Historical Records
There are no known historical records from this site.

3.6.3 Site Status
London Ecology Unit: Site of Borough Importance - Grade I
London Bat Group: Site of Borough Importance

3.6.4 Survey Results
A total of 48 traps were set throughout the cemetery on 13th November 1997. Only 2 wood mice and 2 house mice were captured, although many of the traps were disturbed by the resident foxes and grey squirrels. A total of 20+ individuals of the latter species were seen on 14th November 1997. There have never been any records of hedgehogs from this site (N. Butler, *pers. comm.*).

3.7 Chelsea Physic Garden

LEU Ref. - Ke.BI 4 Grid Ref. - TQ 276 777

3.7.1 Site Description
The site is of primary importance for its role in botanical research and education. Habitats present include planted shrubberies, flower beds, scattered trees, vegetated walls, wet marginal vegetation and standing water in two ponds.

3.7.2 Historical Records
There are no known historical records from this site.

3.7.3 Site Status
London Ecology Unit: Site of Borough Importance: Grade I
London Bat Group: Unclassified

3.7.4 Survey Results
A total of 25 traps were set out throughout the site on 28th November 1997. Only a single juvenile house mouse was captured, although the presence of grey squirrels and foxes was also recorded.

3.8 Ladbroke Grove Garden Complex

LEU Ref. - Ke.BII 4 Grid Ref. - TQ 245 807

3.8.1 Site Description
A group of 15 communal private gardens between which there must be considerable movement of animals. Habitats present include planted shrubberies, scattered trees, amenity grassland and scrub.

3.8.2 Historical Records
There are no known historical records from this site.

3.8.3 Site Status
London Ecology Unit: Site of Borough Importance - Grade II
London Bat Group: Unclassified

3.8.4 Survey Results
No access was obtained to conduct the live trapping of small mammals. However, grey squirrel dreys were present and local residents reported regular sightings of foxes.

3.9 Royal Hospital Old Burial Grounds/Ranelagh Gardens

LEU Ref. - Ke.BII 6/7 Grid Ref. - TQ 28 78

3.9.1 Site Description
The Royal Hospital Old Burial Grounds and Ranelagh Gardens are adjacent sites in the south of the borough and for mammal populations can be considered together. The former contains acid grassland, vegetated walls and tombstones, whilst Ranelagh Gardens comprises extensive shrubbery, rough land developing on some of the shrubbery slopes and amenity grassland.

3.9.2 Historical Records
Shrews (species unknown) were last seen about 5 years ago, with hedgehogs and common rats being observed up to 2 years ago by the site workers.

3.9.3 Site Status
London Ecology Unit: Site of Borough Importance - Grade II
London Bat Group: Unclassified

3.9.4 Survey Results
A total of 47 Longworth traps were set out throughout the site on 12th December 1997. A total of 2 juvenile wood mice and 1 adult house mouse were caught. Grey squirrels were abundant and site workers reported that foxes are controlled.

3.10 King's College

LEU Ref. - Ke.BII 8 Grid Ref. - TQ 260 773

3.10.1 Site Description
The college grounds have neglected shrubberies which have acquired a tall herb flora and some scrub. Other habitats include wet marginal vegetation, open water, scattered trees and vegetated walls.

3.10.2 Historical Records
There are no known historical records from this site.

3.10.3 Site Status
London Ecology Unit: Site of Borough Importance - Grade II
London Bat Group: Site of Local Importance

3.10.4 Survey Results
No mammal species were recorded during the course of the survey.

3.11 Horniman Pleasance

LEU Ref. - Ke.L 1 Grid Ref. - TQ 244 822

3.11.1 Site Description
A recently created park owned and managed by the Borough, which has been planted with native trees and shrubs. Other habitats include a drained pond and amenity grassland.

3.11.2 Historical Records
There are no known historical records from this site.

3.11.3 Site Status
London Ecology Unit: Site of Local Importance
London Bat Group: Site of Local Importance

3.11.4 Survey Results
No mammal species were recorded during the course of the survey.

3.12 Westway Wildlife Garden

LEU Ref. - Ke.L 2 Grid Ref. - TQ 235 811

3.12.1 Site Description
A small wildlife garden, owned and managed by the North Kensington Amenity Trust. Habitats present include a pond, tall herbs and semi-improved neutral grassland.

3.12.2 Historical Records
There are no known historical records from this site.

3.12.3 Site Status
London Ecology Unit: Site of Local Importance
London Bat Group: Unclassified

3.12.4 Survey Results
A total of 23 Longworth traps were set out on 2 sites on 13th December 1997. No mammal species were trapped during the course of the survey at the Westway Wildlife Garden. A single house mouse and several grey squirrels were found in the nearby Elkstone Road Community Square.

3.13 Avondale Park

LEU Ref. - Ke.L 3 Grid Ref. - TQ 240 806

3.13.1 Site Description
A park owned and managed by the Borough which includes a small wildlife garden. Habitats include neutral semi-improved grassland, tall herbs, wet marginal vegetation and standing water.

3.13.2 Historical Records
There are no known historical records from this site.

3.13.3 Site Status
London Ecology Unit: Site of Local Importance
London Bat Group: Unclassified

3.13.4 Survey Results
A total of 15 Longworth traps were set out throughout the park on 5th December 1997. No small mammal species were captured during the course of the survey. Grey squirrels were abundant and disturbed 8 of the traps set.

3.14 Natural History Museum Gardens

LEU Ref. - Ke.L 4 Grid Ref. - TQ 266 790

3.14.1 Site Description
The gardens are close to an area deficient in accessible sites of conservation importance. Habitats present include scattered trees and a planted shrubbery. Since the London Ecology Unit's habitat survey of the borough, the Museum have created a wildlife garden area in the south western corner of the grounds which has considerably enhanced the value of the site and also includes a large pond.

3.14.2 Historical Records
There are no known historical records from this site.

3.14.3 Site Status
London Ecology Unit: Site of Local Importance
London Bat Group: Unclassified

3.14.4 Survey Results
Longworth trapping on 1st August 1996 highlighted the presence of wood mice and house mice. An individual fox was observed on 13th January 1997 and a grey squirrel was seen on 24th September 1997.

4. Species Accounts

A total of 4 species of small mammal were recorded during the live trapping programme and a further 7 mammal species were identified during 1997 from field signs or by direct observation. In addition, shrews (*Sorex* sp.) have been recorded in recent years but were not confirmed during the current survey and are, therefore, not considered further below. Individual species accounts concerning habitat preferences, national distribution and population status are taken from Harris *et al* (1995).

4.1 Hedgehog (*Erinaceus europaeus*)
Found throughout mainland Britain but scarce or absent from very wet habitats, areas of very large arable fields and conifer plantations. They prefer the close proximity of grassland and are present in virtually all lowland habitats wherever there is sufficient cover for nesting.

Hedgehog populations are thought to be in decline on a national scale and many observers have reported a reduction in both the range and numbers seen casually in Greater London over the past decade. The only known record from Kensington & Chelsea away from the sites discussed in section 3 above, is an individual seen on 26th August 1996 by Mr. R. Galliers in St. Charles's Square, W10.

4.2 Rabbit (*Oryctolagus cuniculus*)
Widespread throughout mainland Britain, where they are found in a wide variety of habitat types. Areas of grassland, with some cover, often form the most suitable habitats for this ubiquitous species, although where they have been introduced in urban areas they can occur at unexpected isolated sites. Fresh outbreaks of myxomatosis cause local depletions which can be recouped relatively quickly.

4.3 Grey Squirrel (*Sciurus carolinensis*)
Distributed throughout most of England and Wales, they are found in areas of mature broad-leaved forest, mixed forest and mature conifers; also in suburban and urban areas. They have no population threats and are both common and increasing.

4.4 Bank Vole (*Clethrionomys glareolus*)
Occurs throughout mainland Britain but prefers areas of mature, mixed deciduous woodland, with a dense shrub and field layer. They are also found in grassland habitats, plantations and hedgerows. Bank voles are nationally less abundant than common shrews, field voles and wood mice.

4.5 Field Vole (*Microtus agrestis*)
Widespread on the British mainland, where they occur primarily in rough, ungrazed grassland. Low densities also occur in marginal habitats, such as woodlands and hedgerows. Field voles are considered to be the most abundant of all British mammals. Present in Greater London wherever suitable habitat exists.

4.6 Wood Mouse (*Apodemus sylvaticus*)
Occurs throughout mainland Britain, where they can be found in most habitats which are not too wet, including woodland, plantations, scrub and grassland. Widespread and abundant in Greater London.

4.7 House Mouse (*Mus domesticus*)
Widespread but very patchily distributed throughout mainland Britain. In urban areas they are generally more numerous than common rats but are usually rare away from buildings. Locally abundant and in Greater London can be easily observed at almost all underground stations.

4.8 Common Rat (*Rattus norvegicus*)
Found throughout Britain but are generally limited to habitats where competing species are few or absent or where food supplies are augmented by humans. Very dense populations can occur in favourable habitats, such as refuse tips, sewers, urban waterways and warehouses.

4.9 Fox (*Vulpes vulpes*)
Found throughout mainland Britain, in virtually all habitats where food and cover can be found. Numbers appear to be increasing, especially in urban areas, although parts of Greater London may have already reached maximum density. Records of foxes in Kensington & Chelsea away from the sites discussed in section 3 above include animals in Ladbroke Grove (May 1994) and in Sloane Square (July 1996).

4.10 Weasel (*Mustela nivalis*)

Found throughout mainland Britain in a wide range of habitats. Being closely related to fluctuations in rodent numbers means that weasel population numbers are unstable. They are a nationally common species, although they are continuing to decline. In Greater London few records are received and the species is largely confined to the outer boroughs or, closer to central London, in larger areas of suitable habitat adjacent to natural corridors.

4.11 Feral Ferret (*Mustela furo*)
Small numbers throughout mainland Britain and some offshore islands, wherever animal(s) have been introduced. There are isolated records from Greater London but no evidence for successful breeding, presumably because releases and escapes are usually of individual animals.

5. Legal Status

None of the species recorded during the current survey receives any legal protection under the Wildlife & Countryside Act (1981, as amended) with the exception of the hedgehog (and shrews if they are still extant in the borough) which is listed on Schedule 6.

This Schedule provides partial protection from killing and injuring unless in possession of a licence from the relevant Statutory Nature Conservation Organisations (English Nature).

It is also an offence under the Wildlife & Countryside Act to release, or allow to escape, in to the wild any non-native species (e.g. rabbit and grey squirrel).

6. Discussion

The survey has revealed a greater species diversity in the Royal Borough of Kensington & Chelsea than might otherwise be expected from an essentially highly urban area with a high proportion of sites of ecological importance which are effectively isolated from other areas of natural habitat.

The particular highlights of the survey are the presence of **weasels** at Kensal Green Cemetery and the occurrence of **hedgehogs** at both Holland Park and Kensal Green Cemetery.

The former species is rarely reported in Greater London and the majority of observations are from the outer boroughs. The Kensal Green Cemetery sighting represents the closest western record of a weasel to central London. It occurrence is doubtless due to the large extent of habitat present, together with its location on a natural corridor. The continued management of the cemetery to provide sufficient cover, and hence rodent prey, must be the highest mammal conservation priority to retain the species in the borough.

The decline of hedgehogs in London is of considerable conservation concern, although the reasons for this are poorly understood. The continued presence of this species at its two remaining Kensington & Chelsea sites seems assured and it is recommended that further releases should not take place at Holland Park. Despite the apparent extinction of hedgehogs at Kensington Gardens, it is recommended that no attempt at a re-introduction is made until the
causes of its demise at this site have been identified and reversed.

In view of the declining status of hedgehogs in Greater London and the loss of the species from some central London sites, it is recommended that a more detailed survey is undertaken as soon as possible at both its remaining sites in the borough in order to fully investigate the sizes of the populations using a mark-recapture study to determine numbers present. This will

then provide base-line data upon which to assess any future population changes and to confirm the recommendation given above that no further releases should take place.

The report by site workers at Ranelagh Gardens of regular **fox** control measures was certainly most unexpected for such an urban central London locality. A control programme on such a localised basis can only ever provide a short term solution to any perceived problem and the regularity of control is no doubt testimony to the continuing re-colonisation of the site from adjacent areas. This "pest" control policy is also counter to a perception by the majority of the general public of an animal forming a valued component of London's mammalian fauna. Adverse publicity would undoubtedly be generated if this policy was to be become general knowledge. It is also contrary to the "Fox Code" education programme promoted by the London Wildlife Trust and other conservation organisations. It is recommended that a control moratorium is implemented as soon as possible to allow the problems being caused by foxes to be re-evaluated and options for a non-lethal solution to be investigated.

The presence of an introduced or released **feral ferret** at Holland Park is undesirable but as only a single animal is believed to be involved, it is recommended that no action is taken to trap it. Publicity to discourage releases of animals, including **rabbits**, at this site might be a useful exercise.

Although **Kensal Green Cemetery** and **Holland Park** stand out as by far the two most important sites in the borough for mammals, almost all the other sites could be significantly improved if additional natural cover was provided.

The extension of ground cover at all sites represents the single most important habitat improvement activity which can be undertaken for mammal conservation in the borough. The additional cover would lead to the establishment of larger small mammal populations of all species, including shrews if they are still present in the borough. This would in turn result in an increased prey biomass for the benefit of all predators.

There are, unfortunately, no practical opportunities available to increase the mammal diversity of the borough through introductions. Some species have specialist habitat requirements, such as the common dormouse, and it would be impossible to provide this niche, even with extensive planting of suitable shrub species. Others, such as badgers, have large home ranges and there is no longer the undisturbed space and habitat available to accomodate them. It is also relevant to bear in mind that neither species has been recorded from the borough this century.

The key conservation action required is to maintain the existing mammal biodiversity of the borough and to enhance populations through the improvement and diversification of habitats rather than the initiation of any species introduction programme.

7. References

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8. Acknowledgements

The authors are grateful to Dr. Erica Constantine, Ecology & Leisure Services Officer, of the Royal Borough of Kensington & Chelsea for commissioning this survey and to all land owners and managers for allowing access to their sites. In particular, thanks are due to the Chelsea Physic Gardens and to Mr. Nick Butler, Mr. J. Forbes and Mr. M. McMillan of the Royal Parks Agency.

Site records have been kindly provided by Ms. Ceri Leigh, Mr. Richard Harbord and Mr. Martin Honey (Natural History Museum); Mr. J. Humpage and Mr. Tim Freed (Kensal Green Cemetery); Dr. Erica Constantine (Holland Park) and Mr. Mathew Frith.