

**A MAMMAL ASSESSMENT OF FINGAL
WOODLAND INCLUDING SITES AT
BALBRIGGAN, GORMANSTOWN,
PORTRANE, HOWTH, MALAHIDE
AND SANTRY**



(courtesy of Brian Keeley)

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THE MAMMAL FAUNA OF ARDGILLAN DEMESNE, BALBRIGGAN, FINGAL



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Introduction

In many respects Ardgillan Demesne offers high potential for providing conditions suitable for the support of a variety of mammal species dependent upon woodland. There are a number of woodland stands to provide shelter for invertebrates and hence to feed insectivores such as hedgehog, bat and shrew and this combined with the berries and birds (and the presence of mice etc.) would all benefit species such as fox and badger.

There is ample grassland for species sustained by grazing and this should benefit rabbits and hares. All that is missing from the estate to encourage and sustain biodiversity is a large water body (river, lake or pond). The fauna of this estate would provide an interesting overview of the fauna of a large relatively undisturbed area without the presence of water and with the availability of woodland cover.

The availability of data on a bat survey from 2000 and any mammal observations at this time assist in providing an overview of the mammal fauna here. It is intended to draw conclusions and recommendations for the demesne based on all observations.

Method of assessment of Ardgillan Demesne for mammals

Ardgillan demesne was assessed during three separate visits for the presence of all mammals. The first assessment was a mammal survey that provided specific details on the non-volant fauna (badgers, hares, foxes, rabbits etc.) with some general observations on roost potential for bats.

General mammal survey

All mammal signs were sought during a visit to the estate on April 25th 2006. This involved following all paths around the demesne, crossing through all woodland and examining at the base of all free-standing trees and following any mammal tracks that were encountered. Any areas of scrub were checked by firstly seeking tracks from the perimeter inwards and then by walking through the scrub, following any tracks that were discovered. Some sections were completely impenetrable especially in the sections along the north-eastern to south-eastern boundary running alongside the railway lands.

All animal burrows were examined to establish the identity of resident species. All footprints, tracks, faeces were examined to species level.

Bats

A bat survey of Ardgillan Demesne involved a very basic examination of the site for suitable trees in April 2006 during daytime for evidence of occupation or of historical presence as well as a subsequent nighttime bat detector and visual survey of roost sites and feeding areas.

The bat detector assessment was undertaken on 4th July 2006 to early on 5th July 2006.

The survey involved the use of two bat detectors, a Pettersson D240X ultrasonic heterodyne and time expansion bat detector and a QMC Mini 3 heterodyne bat detector.

Observations continued until approximately 2.00 am on July 5th 2006 after two bat species were noted entering Ardgillan Castle. Identification of the species concerned was undertaken and remaining feeding bats were observed at the corner of the castle where a security light is erected.

A bat detector evaluation allowed the identification of all bats encountered to species level with the corroboration of identification in the open based on visual cues such as height and mode of flight.

The attics and outbuildings of Ardgillan Castle were examined on August 25th 2006 with the assistance of Frank Macken. Mr. Macken related that he had encountered bats within the house on two occasions in recent years.

There is little by way of water courses through the demesne and there are no bridges with potential for roosting bats. The nearest fresh water lies in Hampton Demesne.

Data from a survey undertaken by the author within the park for Fingal County Council prior to tree felling is also included here for completeness.

Species of mammal present at Ardgillan Demesne

Irish hare *Lepus timidus hibernicus*

By far the most obvious mammal species at Ardgillan is the Irish hare. This species was noted several times during the three days (daytime) of survey. They were noted in the walled garden, in the woodland belt to the southwest of the demesne, in the woodland adjoining the car park and in the woods to the north of the demesne. In all, hares were encountered on at least five occasions. The most observed at any one time was two chasing each other in the wood to the northern end.

Hiding within woodland during the daytime is very common behaviour and these hares usually move out into grassland at night. To do so at Ardgillan in the daytime at the time of study would have left the hares completely exposed and prone to disturbance.

Hares on this estate were subjected to coursing by local clubs with the permission of the former owners (Owner of the Hampton demesne *pers. comm.*). This led to a huge decline in their number that is now reversing (or possibly entirely reversed) with the current absence of coursing within the estate. Coursing is stated as being an insignificant factor in an island wide decline in this species by the Zoology Department at Queens University Belfast. Despite this, both on this demesne and at Luttrellstown, there has been an increase in hare numbers following the cessation of coursing/ trapping for coursing.

Rabbit *Oryctolagus cuniculus*

Brown rat *Rattus norvegicus*

Grey squirrel *Sciurus carolinensis*

The species most in evidence are rabbit and brown rat. These species are clearly widespread and abundant throughout Ireland and they benefit enormously from any human settlements and cultivation. The rabbits are still present here and were noted during night studies in particular.

However, they are not present in substantial numbers as may occur in some areas in some years (when populations recover from myxomatosis). These areas have shown a virtual eradication of the rabbit, due most probably to the sporadic recurrences of myxomatosis. This has not been as a result of any intentional operation in these areas in recent times but as a consequence of former efforts to control rabbits.

Rats are one of the key beneficiaries from urban settlement and the litter/dumping problems that may arise in areas close to such settlements.

The adaptability of these species ensures that it is capable of surviving both in green areas and built areas and may as readily exist in a house cellar, shed or attic as in a riverbank or hedgerow.

Grey squirrels have colonised the park and red squirrels are entirely absent. It would be extremely difficult to foresee a situation in which this could be reversed given the presence of large broad leaf tree species throughout the demesne and no stands of conifers (such as Scot's Pine) and little opportunity to create suitably large areas for them.

Bats

There are a number of tree roost opportunities (see Figure 1.1) within Ardgillan as well as buildings close to woodland of use as roost sites including the castle and outbuildings, the coffee shop adjacent to the walled garden, and the ice house.

Leisler's bat

Leisler's bats were most in evidence late into observations around security lighting on the edge of Ardgillan Castle. Here the bats were noted for almost an hour, having been absent from the estate for over an hour of observations.

A dead Leisler's bat was discovered in one of the attics of the house on Friday August 25th 2006 (see Figure 2(d)). This individual was dehydrated and at least a year old. No clear evidence of currently roosting Leisler's bats was available.

Brown long-eared bat

There is clear evidence that brown long-eared bats are widespread in the attics of Ardgillan Castle (see Figure 2 (b)). Five individuals were noted in one section of attic and the distribution of droppings indicates that there are more bats present than this.

Brown long-eared bats were noted returning to the roof of Ardgillan Castle at approximately 1 am into a number of areas above the dining room. This species was first noted within the woodland to the west of the Castle at 10.46 pm after an absence of bat activity of almost twenty minutes from the first bat seen (a common pipistrelle).

A number of individuals were seen flying in sequence through the wood, presumably having emerged from the castle and flown here to feed.

Brown long-eared bats were repeatedly encountered along the eaves of the coffee shop building beside the woodland. These bats were clearly investigating this building either as a potential roost or because it is an actual roost.

Brown long-eared bats were noted returning to the castle from 12.40 am and this principally continued up to 1.30 am with the last individuals seen at 2.00 am.

Common pipistrelle

This species was also seen returning to Ardgillan Castle to an attic area to the south and centre of the house. This was the most widespread species within the park.

Pipistrelles were the first bats noted at 10.24 pm at Ardgillan Castle and also the last bat noted at the main gate at 2.06 am. This was the most commonly encountered species and fed at the lighting with Leisler's bats.

Soprano pipistrelle

Soprano pipistrelles were also encountered in the woodland throughout the park and along woodland edge but were the lesser of the two pipistrelle species numerically.

Whiskered/ Brandt's bat (2000 only)

No whiskered bats were encountered during this assessment in the area in which they occurred in a previous study (Brian Keeley 2000).

The species was noted in the neighbouring estate (Hampton) and the species is clearly within the area albeit in low numbers.

Badger

The badger fauna at Ardgillan would appear from the signs gathered to be undergoing either an alteration in their exploitation of their territory or are in decline.

An eight entrance sett lies on the boundaries of Ardgillan and Hampton Demesnes and the tracks are all overgrown. A second four entrance sett lies directly north of this sett. There are several tracks through the laurel and scrub most probably of badger origin.

There were no latrines noted at this sett despite an examination on two occasions nor were there any signs of badger feeding in Ardgillan or along hedgerow examined in Hampton. One or two entrances have been in use by badgers but it is certainly not a large number of badgers.

The neighbouring landowner Mr Hugh Scanlon was unaware of any activity by Department of Agriculture or of badger baiters that would have affected the resident badgers.

Badgers are a common and widespread mammal species that typically establish their setts on woodland edge close to farmland especially wherever there are livestock (in particular cattle).

They avail of earthworms and other invertebrates and will also mix their diet with carrion, small mammals including mice, voles, hedgehogs as well as birds.

Wood mouse *Apodemus sylvaticus*

The presence of some partially chewed hazel nuts indicates the presence of wood mouse. This is a widespread species, abundant in rural areas but it is found into towns and cities and on offshore islands.

The species is known to be present in Ireland for at least 7600 years.

While the female occupies home ranges as small as 0.1 hectare during the breeding season, males may occupy home ranges of as much as 3 hectares although most are less than 1.5 hectare.

Fox *Vulpes vulpes*

Foxes were not especially evident in the park and no earths, scats or scent were categorically identified during the survey period, although a single entrance burrow on the Hampton boundary of badger origin may serve as a fox earth. Fox paw prints were noted in mud leading to a farmyard on the Hampton Demesne between two study areas

Hedgehog

Hedgehogs were noted in 2000 on the edge of the grasslands towards the coastal edge of the demesne, feeding along the vegetation band that runs parallel to the railway line and on open grassland.

Significance of the mammals of Ardgillan Demesne

The demesne provides good opportunities for mammal species such as the Irish hare, rabbit and fox. These species are all clearly abundant here albeit that the rabbits go through population peaks and troughs. The presence of rabbits will attract predatory and scavenging species like the fox and buzzard. Species such as the stoat will also be likely resident but may not be as easily observed.

Badgers have established a relatively large sett on the east side of the demesne adjacent to Hampton. The neighbouring land owner reports that this sett was formerly highly active and that the wheat was occasionally levelled by badger activity around the sett. Ploughing was even hampered by the presence of the sett here. This sett showed little evidence of activity and overall badgers were not active in the estate.

No event was reported that would have affected the badger activity here (e.g. Department of Agriculture and Food clearance activity). Nor is badger baiting a known problem. This may of course be a covert activity that goes unnoticed or unchallenged in many areas. The sett was not noted to have been dug out or snared and it may be that the alternative setts used by badgers have been affected. It is unusual in such a large demesne to find no badger signs.

Hares have been generally accepted as being in decline. The presence of this species within Ardgillan is noteworthy. The numbers would appear to be relatively high here and hares appeared to be reasonably at ease close to humans suggesting no systematic disturbance.

The Irish hare is being considered for re-classification as a separate species from the mountain hare and this would give it the status of Ireland's only endemic vertebrate species (i.e. including reptiles, amphibians, birds and mammals).

The Species Action Plan of the National Parks and Wildlife Service and the Environment and Heritage Service (NI) projects that a desirable status for the Irish hare would be a doubling of population and the protection of suitable habitats.

While hares may be found in manmade habitats such as golf courses and managed amenity grasslands like Ardgillan, areas of upland bog, wet grassland and improved grassland are the more typical sites island wide.

Recommendations

Woodland should be connected by tree lines to create a more constant connectivity and to reduce the isolation of each site. Where there is a conflict with a panorama, low vegetation or shrubbery could be employed.

A water body (pond or lake) would create additional feeding sites for mammals and birds and increase the insect diversity within the demesne.

Visually, it would also enhance what might to some be considered a bleak landscape, while to others this may be seen as a well managed attractive vista.

If the coastal side of the building were to be avoided, then a water body could be introduced in less conspicuous areas of the demesne.

Planting of shrubs around the badger sett to the east of the walled garden may reduce its visibility and provide greater privacy for the badgers. This may allow this sett to be used as a main sett throughout the year.

Any work within Ardgillan Demesne's attics must respect the presence of the bats here and should not be carried out from May to late August to allow any young bats to reach a stage when they could fly away from disturbance.

Timber treatment within the attics must be "bat-friendly". A list of these is attached.

Access must be left for bats to enter and exit the roves. This may inadvertently be closed during repair work.

Bats may often avail of slipped slates/ tiles, warped fascia, lead flashing, holes in windows or doors to enter. Such holes may be as small as 15 mm.

Bats may be behind felt and may also roost under old plaster or between timber joists and stone work or within holes in timber themselves.

Species such as the whiskered bat are often present in farm buildings or attics with deep timbers. The availability of the outbuildings at Ardgillan or the coffee shop attic for bats may enhance the bat diversity... This would require that a) lights be switched off each night, b) that timber treatment chemicals be used sparingly and chosen for their low toxicity to bats, c) that small access holes be available in eaves or at roof level in ridge tiles etc.

This species is present within the area but may require suitable alternative roosts especially given the loss of old buildings to development in the Fingal area (through demolition or restoration).



Figure 1: Mammal signs and site potential at Ardgillan

(a) and (b) Roost potential in trees.

(c) and (d) Hares within the woodland

(e) Fox earth on Hampton boundary



Figure 2: Mammals of Ardgillan

- (a) Badger sett at Ardgillan in woodland and adjoining a cereal crop at Hampton.
- (b) Brown long-eared bat in attic of castle.
- (c) Outbuildings with evidence of brown long-eared bat usage.
- (d) Leisler's bat found in attic of house.

THE MAMMAL FAUNA OF HAMPTON DEMESNE, BALBRIGGAN, FINGAL



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Introduction

Woodland cover occurs in a small number of areas in Fingal. Such sites face problems such as illegal dumping, accidental or intentional fires, development of the land and drift of pesticides from agriculture, golfing etc. The value of such sites for wildlife may lie in the availability of shelter and invertebrate fauna.

Hampton Demesne possesses a small unmanaged wood adjacent to a golf course, intensive farmland and south of the town of Balbriggan. There has been some plating in the southern section of broad leaf tree species. The site has good possibilities as a refuge for the fauna of this area. This assessment looks at the mammal fauna and appraises the value of the site to these mammals.

The house and surrounding lands are in different ownership and the historical connectivity between the two is severed. This may in time have an impact upon the management of the site which in turn may affect the mammal fauna.

The abundance of laurel and rhododendron are hindrances to regeneration that may prevent the woodland from sustaining itself. The planting of trees adjacent to the older woodland may provide future opportunities for some species and will at least establish continuity for the woodland.

Within the remaining wood, there are numerous exotic individual trees as well as native species. Given the availability of some water bodies and a diversity of trees, it is interesting to examine the diversity of mammal species in such an area.

Methodology

Hampton Demesne was examined on two separate occasions to determine the mammal fauna present; April 26th 2006 during the daytime and May 19th 2006 at night for bats.

The mammal assessment involved the examination of all accessible areas for tracks, trails, burrows, faeces, food remains and the animals themselves. Further to this, discussions were held with the landowner Mr. Hugh Scanlon to determine which species had been noted by him in the area over the past thirty years. This woodland is within one kilometre of Ardgillan and there is almost certainly a movement of mammals between these two estates. It would therefore be expected that similar mammal signs would be evident in both sites.

The bat assessment required a night time examination of the site from 9.30 pm to 11.30 pm for the presence of feeding and commuting bats. Weather conditions were very poor for a date in late May and the two hours of study were marked by almost continuous rain fall, with approximately 15 minutes within which there was no rain.

Understandably, this interfered with the level of bat (and insect) activity. As a consequence of the rain, the two bat detectors employed (a Pettersson D240X heterodyne and time expansion bat detector and a QMC Mini 3 heterodyne detector) experienced slightly reduced sensitivity towards the latter part of the examination as well as a high level of interference from the sound produced by the rainfall. However, both detectors were picking up bat signals up to the end of the study.

Species of mammal at Hampton Demesne

Soprano pipistrelle

The first species of bat encountered during the night was a soprano pipistrelle. This individual flew along the southern edge of the woods and turned up along the young plantation edge. It fed along this route from 9.53 pm to 9.55 pm. It was only occasionally encountered along the woodland edge during the rest of observations. A soprano pipistrelle was noted feeding in the farmyard sheds at 11.15 pm and onwards. This movement towards farm buildings during heavy rain is typical behaviour for bats as it is probable that insects seek shelter within these sites and are more numerous here than in woodland during such conditions.

Common pipistrelle

There was one brief period of signals that may be attributable to this species but no recordings were available for further analysis. This species is certain to be present in the immediate area and was noted in Ardgillan Demesne in 2000.

Whiskered/ Brandt's bat

This is a species that was noted in Ardgillan in 2000 near to the eastern edge of the estate (close to the walled garden along the tracks here). It was only identified to species level (it was interpreted as being a *Myotis* species from the available information in the field) during the analysis of sound recordings made at Hampton as the bat concerned was not visible for much of the time it was heard.

This is one of the least common species of bat in Fingal and is widespread and uncommon throughout Ireland.

It has been recorded previously on the Royal Canal at Ashtown, Knockmaroon, Luttrellstown, Beech Park (Clonsilla), Somerton, St. Catherine's Park, Lucan (all five latter sites are along the Liffey Valley) and at Abbeyville, Kinsealy. This species was noted within Ardgillan Demesne in 2000 but was absent in 2006.

This species (both species are being treated together here as the difficulty in separating them prevents the possibility of dealing with a single species) is typical of woodland or areas of good hedgerow. It is intolerant of light and will not feed in illuminated sites or where cover is poor. A typical feeding area is along woodland paths and rides or along woodland edge.

Roost sites range from trees to barns to houses with large attics with deep timber joists. Few large roosts of this species are known in Ireland and it is most common to encounter small numbers of individuals or single specimens. Changes in the rural environment, such as increased lighting, hedgerow clearance and tree felling are likely to affect this species severely.

Building restoration or alteration of use has clearly affected this bat throughout the island especially in older estates where stables and outbuildings have been adapted for housing.

Even in Fingal, locations such as Somerton and Luttrellstown have undergone development and the bats present may face a loss of roost site and without controlled illumination and vegetation removal, loss of feeding and commuting areas.

Brown long-eared bat

One encounter was noted with this species within the woodland itself, along a track. The bat passed close to the observer without being seen at any point.

The bat approached approximately along the route of the human track and was heard for approximately five seconds. A time expanded signal was recorded and was confirmed using sound analysis software. Brown long-eared bats have been commonly recorded in Fingal by the author.

There is a roost of this species in Ardgillan Castle and it is also possible that this species is present in the outbuildings of Hampton Hall.

The presence of this woodland cover and Ardgillan held out the possibility of Natterer's bats but these were not noted in the study area on either estate. Only two records of Natterer's bat have been collected by the author: in Fingal Luttrellstown Demesne and Tooman, Naul with a third possibility along the coast at Malahide/ Swords. No additional records are held by Bat Conservation Ireland for Fingal.

This species is believed to have its European stronghold in England and it is unusual that Ireland would have a lower density than its neighbour. This may be attributable to under-recording due to the small number of bat specialists/ recorders on the island.

The roost site for the above two species is most probably the farm buildings associated with Hampton Hall. These and the ruined walls provide a number of roosting options as well as a range of mature conifers and broadleaves within the woodland.

There are a number of water bodies around the woodland and these would contribute to insect diversity and abundance. The laurel throughout the woodland would create shelter for insects but would have no overall benefit for invertebrate life including the bat prey.

Irish hare

A hare was noted running into the woods during the night of survey. Hares are relatively abundant in the adjoining Ardgillan Demesne.

Fox

Fox tracks were noted in mud close to the active farmyard adjacent to the wood. There was also a fox scent within the wood along the young plantation.

Badger

The evidence of badger is based on the presence of a sett on the boundary between the Ardgillan Demesne and Hampton. Here there is an eight entrance sett of which some of the entrances were clearly considerable at some point in the past. There is a sizeable spoil heap associated with at least two entrances and two entrances are in use at present. However, this is certainly not functioning as a fully active main sett and there is not a social group with cubs within this sett.

Discussions with Mr. Hugh Scanlon, the landowner, suggest that this sett was very active formerly and that areas of cereal were levelled by badgers possibly during feeding activity or play by cubs.

Brown rat

There are signs of this species in a number of sites. The occurrence of cereal is especially beneficial to rodents such as brown rat, wood mouse and (when stored) house mouse.

Rabbit

There are rabbit warrens within the cover provided by the rhododendron and laurel and rabbits are occasionally abundant throughout this area (according to the land owner and staff of Ardgillan Demesne).

Significance of the mammals of Hampton Demesne

The woodland is in many areas densely carpeted with rhododendron and laurel. These are not typical sites for mammals that create burrows as there are often dense root systems that interfere with digging. They would not normally be considered highly beneficial areas for bat fauna either.

However, the woodland provided evidence of the presence of one species of *Myotis* bat, the whiskered bat. This species is uncommon in Fingal and its presence here is of interest. A previous evaluation of Ardgillan indicated its presence on the western edge of the woodland cover (close to the walled garden). This lies relatively close to the Hampton estate and it is most probably the same population of bats in the two locations.

There are at least four species of bat feeding in and around the woodland and species such as the Leisler's bat may use the trees as mating roosts or temporary roosts. This species has also been found hibernating in trees in winter.

The presence of the water within the woodland may provide opportunities for *Myotis* species and this may allow bat species to exist here that are limited in areas of Fingal that are under intensive agriculture or are densely populated or built upon. The water quality would appear to be poor simply based on its appearance.

Recommendations

Fingal County Council has little input into this site as it is in private ownership. However, the recommendations are put forward that the site would benefit from the clearance of rhododendron and laurel. Monitoring of spraying on the adjoining lands and control of levels, ingredients and the disposal of containers would assist in encouraging native flora and invertebrates and enhance the area for all flora and fauna.

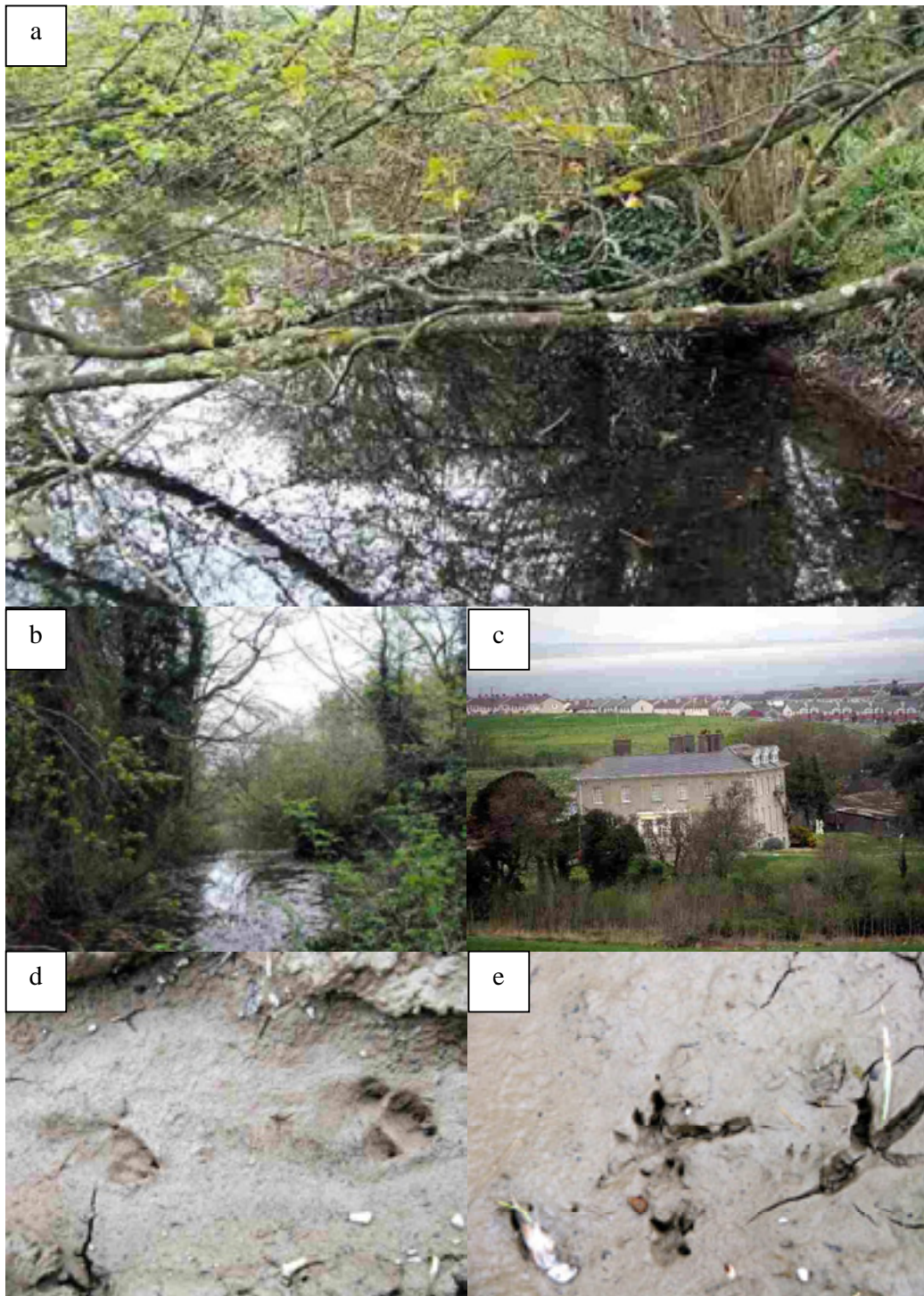


Figure 1: Hampton Demesne

This woodland provided evidence of two *Myotis* species of bat as well as pipistrelles and Leisler's bats. This may be due to the presence of water within the woods (a) and (b) as well as outbuildings and the old estate house itself (c). Evidence from the farmyard close by indicates the active presence of foxes and rats.

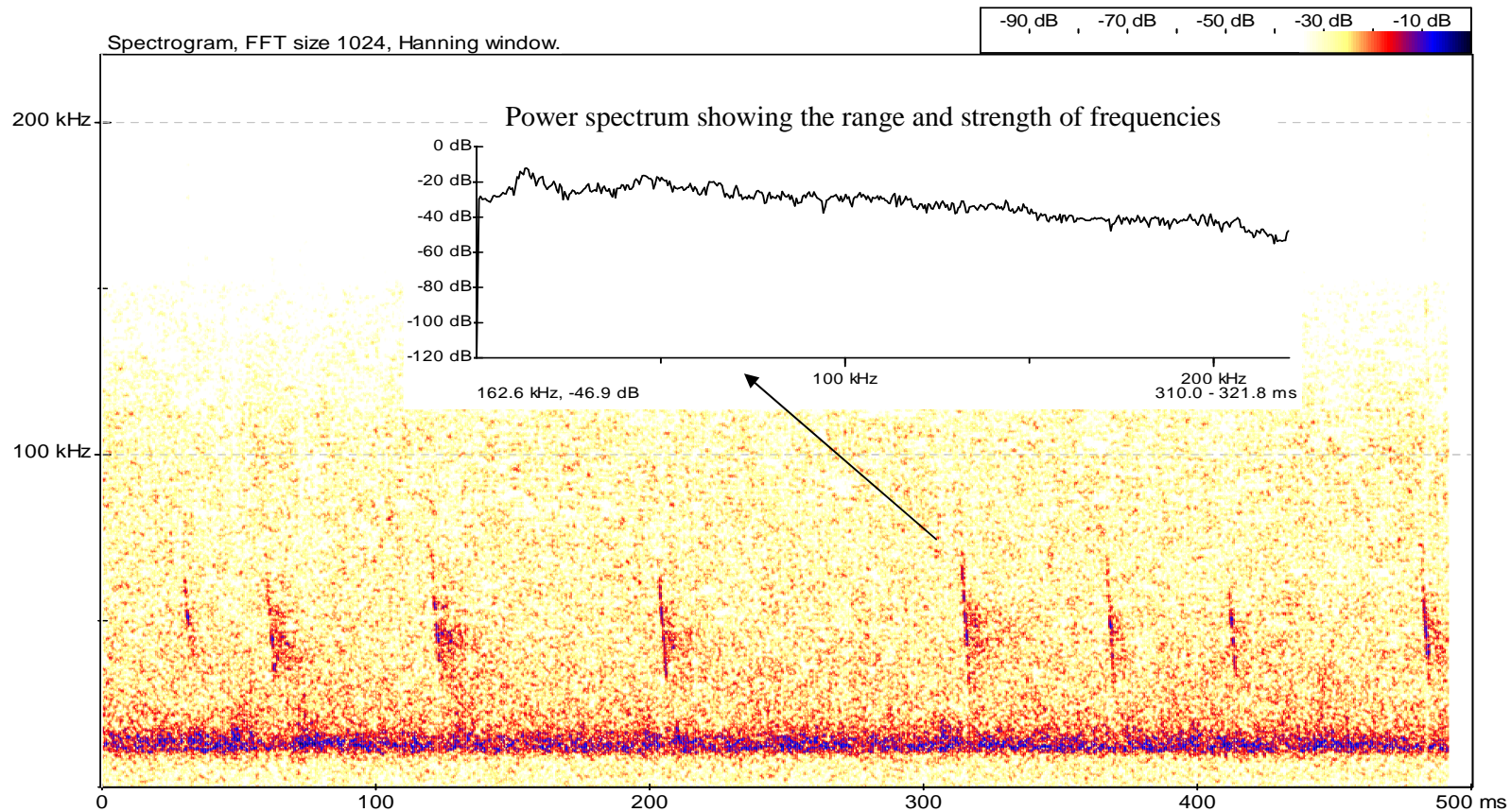


Figure 2: Spectrogram of bat feeding at Hampton Demesne. From the trace, this would appear to be a whiskered or Brandt's bat. This species is uncommon in the Fingal area and throughout Ireland. The detector sensitivity has been affected by rainfall.

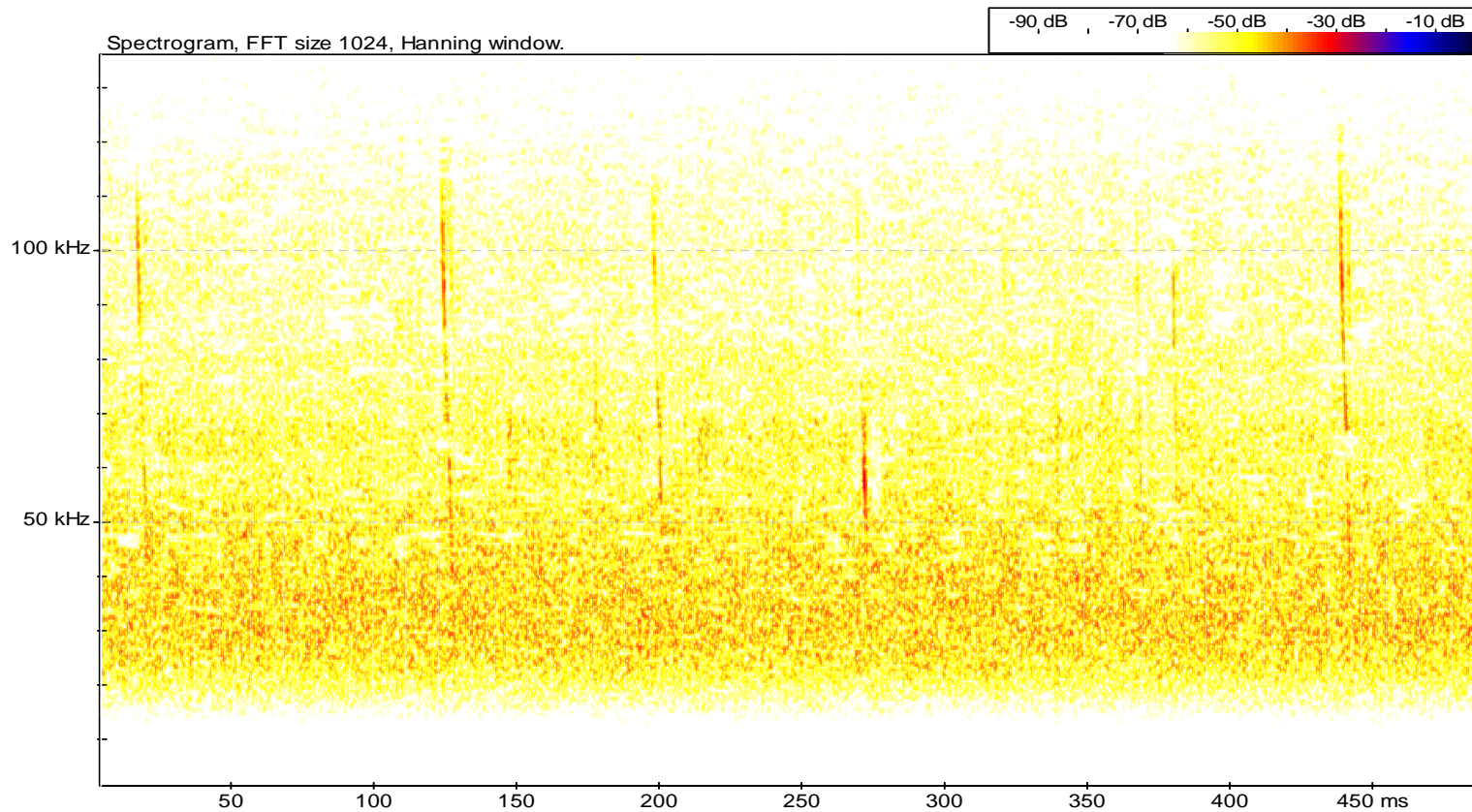


Figure 3: Spectrogram of bat noted in Hampton. This is the echolocation signal of a brown long-eared bat, a species in Fingal and associated with farmland and woodland and unlit areas. The signal is very quiet and directional.

THE MAMMAL FAUNA OF GORMANSTOWN COLLEGE



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Introduction

Demesnes, hospitals, private schools and public parks account for a considerable proportion of the green areas throughout Ireland. These sites are afforded a level of protection from uncontrolled development and may serve as refugia for mammal species that are under pressure from the loss of woodland, hedgerow and green belt that had been maintained both due to their agricultural value and from the slow rate of development in the period leading up to the mid 1990s.

The value of farming as an economic career has reduced and land has greater importance as a development potential for housing, retail etc.

It is essential to understand the role of such sites as Gormanstown College in providing a site where mammals are under reduced pressure both from land use changes and in the case of badgers, from agriculture itself.

Method of assessment of Gormanstown College (woodland and river) for mammals

Gormanstown was assessed during two separate visits for the presence of all mammals. The first assessment was a mammal survey that provided specific details on the non-volant fauna (badgers, hares, foxes, rabbits etc.) with some general observations on roost potential for bats.

General mammal survey

All mammal signs were sought during a visit to the estate on April 23rd 2006. This involved following all paths around the demesne, crossing through all woodland and examining at the base of all free-standing trees and following any mammal tracks that were encountered.

Any areas of scrub were checked by firstly seeking tracks from the perimeter of scrub and then by walking through the scrub, following any tracks that were discovered. Within the woodland there were some difficult sites that were so overgrown that there may be some potential for burrows being undiscovered. However, these would not be main setts or otter holts but rather either unoccupied single entrance setts or rabbit warrens etc.

All animal burrows were examined to establish the identity of resident species. All footprints, tracks, faeces were examined to species level.

The principal of the school was questioned on two occasions regarding any mammal observations.

This provided some evidence on the species of mammal present but such a discussion will clearly concentrate on obvious or obtrusive species

Bats

A bat survey of Gormanstown was carried out in two ways and at two stages: a bat detector assessment on 3rd July 2006 and a visual examination of the site in April 2206. The April evaluation involved a very basic examination of the site for suitable trees during daytime for evidence of occupation or of historical presence. The subsequent nighttime bat detector and visual survey of roost sites and feeding areas provided an actual summary of the bat fauna present on this date and indicated the areas where bats were most active.

Species of Mammal at Gormanstown

Mink

Signs of mink were present along the river and streams. Spraints were noted at three bridges and paw prints were discovered in mud see Figure 1 ((a) – (c))

No otter evidence was gathered from the river or streams. The principal of the school, Brother Kevin referred to observations of otter at the bridge at the upstream entry point of the Delvin River. This is very possible given the ubiquity of otter feeding activity throughout the island but it is also possible that there observations relate to mink.

Badgers

There is one 3 entrance sett under laurel with tracks leading along the ditch and into waterworks. Tracks follow the woodland parallel to the river and to the edge of the estate. Two relatively fresh dungs were noted beside the track as well as fresh paw prints in a number of places.

There was a second sett under snowberry further southeast of here which is more obviously abandoned and is occupied by rabbits. Tracks enter the woodland here past the perimeter of the waterworks.

It would not appear that badgers are in residence within the woodland at Gormanstown College. Rather, they enter the site from adjoining farmland. The signs noted included fresh tracks and dung. The presence of near-abandoned setts implies that badgers may have been more permanently resident than would now be the case.

Foxes

There is evidence of fox presence from the odour of fox urine but no earths were evident.

Scattered bird remains and a half consumed rat indicate their presence although some of these remains were left by a pair of breeding sparrowhawks that were seen and heard along the river edge.

Hedgehog

A hedgehog was encountered feeding along the verges flanking the driveway of the school and moving inwards along the avenue. The school principal indicated that hedgehogs were rarely seen within the school grounds and had not been seen for years.

Soprano pipistrelles

The most frequently encountered bat species overall was the soprano pipistrelle. This species was present along the river within the woodland and in open areas, along woodland edge and in some woodland clearings.

This species was seen flying close to tree top level and down to a height of no greater than one metre above the river surface. The two small bridges, one within the woodland and the second at the edge of the school were favoured sites for feeding. The larger bridge at the perimeter of the college grounds was also frequented by this species.

Daubenton's bats

The greatest number of bats of any one species within a small area was of Daubenton's bats. There were a maximum of four Daubenton's bats feeding on the river close to the weir at one time.

Daubenton's bats were noted feeding over the river both within the woodland as well as throughout the section that passes through the college grounds.

All sites where this bat fed were relatively dark or very dark and none of this species fed close to lighting.

The bridges along the Delvin River would provide suitable roost sites for this species.

Common pipistrelles

This species was not associated with the woodland and was only noted close to the woodland at the light on the school edge leading to the small bridge. Here a maximum of two bats were noted feeding around the light late into observations. One bat was emitting frequent social calls in flight.

Significance of mammals at Gormanstown College

Gormanstown College offers shelter and suitable habitat for a range of mammal species including the potential for most Irish bat species, badgers, fox, rabbit, hedgehog and other species such as the American mink and the grey squirrel.

The interior of the woodland was noted to be principally unused by bats with the exception of soprano pipistrelles and Daubenton's bats. The woodland edge was used by pipistrelles while the river was used by Daubenton's.

This woodland comprises a variety of native species but it is also made up of quite a level of conifer cover. No bats feed within the dense clutter created by closely planted young conifers and it was only at the river edge of this site that any bat activity was noted.

Hence, a large area of the woodland/ plantation close to the school is of low value for most mammals as it provides few sites for burrowing or feeding.

Badgers would appear to be entering into the grounds rather than living full-time here and a track was followed across the River Delvin and into farmland. The disturbance associated with the school may be sufficient to prevent badgers maintaining a main sett. There is evidence of social gatherings within the woodland.

Burning of vegetation by the school maintenance staff was noted within woodland. One tree was severely scorched by this burning.

Not only is this damaging to the flora and fauna of the wood, it is in fact against the Environmental Pollution legislation.

The practice is unlikely to bring about the exclusion of any mammal species but it potentially jeopardises the integrity and survival of the woodland.

Recommendations

Planting of trees

Creation of wildflower meadows

Removal of invasive shrubbery

This woodland and the adjoining parkland provide opportunities for the local fauna that would be enhanced by the inclusion of areas of wildflower meadow, new woodland plantation and the removal of species such as laurel from some areas.

Cessation of burning n the school grounds especially in woodland

The practice of burning within the woodland must stop immediately and proper measures to deal with grass clippings be introduced.

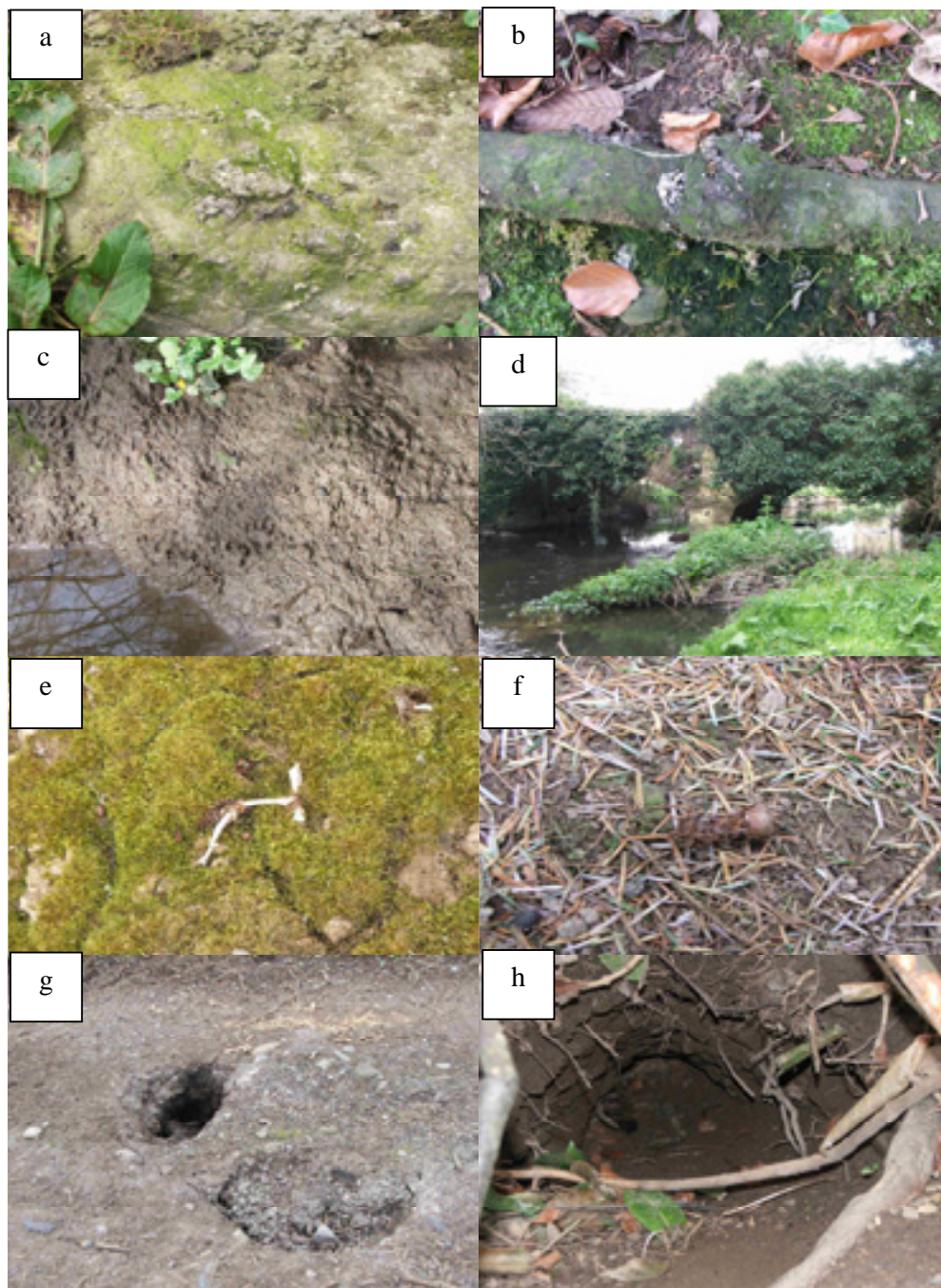


Figure 1: Mammal evidence at Gormanstown

- (a) Mink spraints along river and (b) on branch over path
- (c) mink tracks out of mud at pool from Delvin River
- (d) Bridge with good bat roost potential
- (e) Leg remains of birds and mammals were noted in the woodland
- (f) Chewed cones indicate the presence of grey squirrel
- (g) Rabbit warren under track causing collapse
- (h) Badger sett in use by rabbits

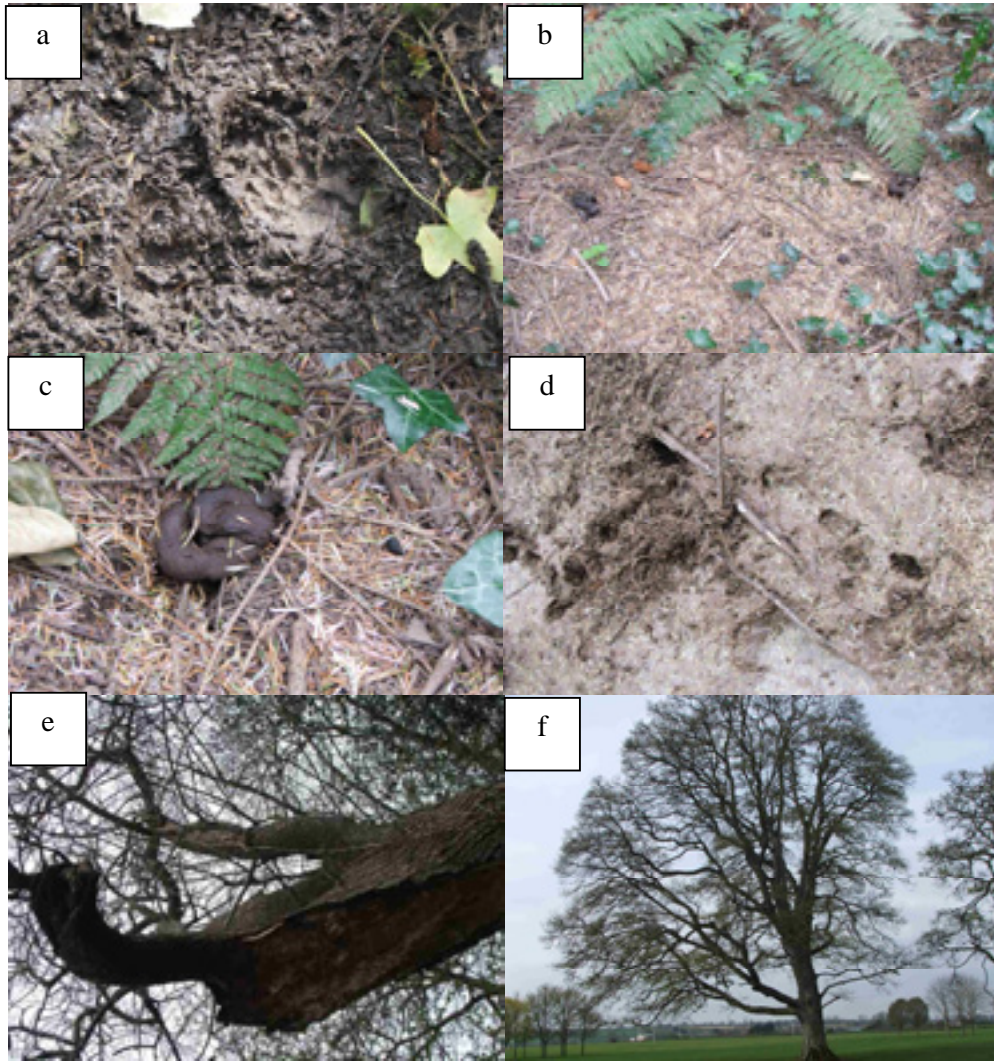


Figure 2: Mammals at Gormanstown

- (a) Badger paw prints in mud
- (b) Badger latrine
- (c) Close up of badger dung
- (d) Badger track through the wood (active)
- (e) Tree limbs with crevices offer good bat roost potential
- (f) The larger trees offer good mating roost vantage points

**THE MAMMAL FAUNA OF DELVIN
WOODLANDS, near STAMULLIN,
FINGAL**



**Brian Keeley B.Sc. (Hons) in Zool.
Mammalogist**

2006

Introduction

The woodlands lying to the rear of a nursing home at Stamullin on the Dublin Meath border are one of only a very few such sites in Fingal. The woodland is a mixture of principally broad leaf species including ash, beech, sycamore and oak, providing good potential for roosting bats, a variety of sites for rodents, rabbits and other mammals.

The level of disturbance of this woodland is quite low given its restricted accessibility except through the nursing home grounds. Most human activity here is to do with recreational walking and there is little evidence of vandalism or social gatherings.

Method of assessment of mammal fauna

The site was visited on two dates in May 2006, 3rd and 5th 2006 to identify signs of mammals throughout the woodland. Evidence from tracks, faeces, scratching was noted.

A separate nighttime evaluation was made for the presence of bats utilising ultrasonic receivers to identify to species level where possible (known as bat detectors). A combination of bat detectors was used for corroboration: a Pettersson D240X heterodyne and time expansion detector and a QMC Mini3 heterodyne bat detector. Observations commenced at 10.00 pm on the 6th July 2006 and continued until rain became too heavy to allow the bat detectors to function (12.45 am on the 7th July 2006).

Mammal species in and around the Delvin Woodlands

Badger

Meles meles

There are badger tracks passing through the entire woodland and emerging at the southern end at a dead tree (see Figure 1(d)) that crosses the River Delvin. This is a route taken by badgers living outside the woodland but availing of the site for feeding. There is a former badger sett within the wood that has been closed up with soil. This is a large structure that may have served as a main sett formerly; given the size of the overgrown spoil heaps (see Figure 1 (a) and (b)).

Fresh badger prints were noted during the three visits to the site in May and July 2006 including a print in cow dung (see Figure 1 (c)).

Badger activity was noted (from digging and prints through the middle of the wood and to the eastern end of the wood on high ground. Tracks lead out at the south-eastern end and at the southern end.

American mink

Mustela vison

Evidence of mink was available from a paw print in fresh cow dung at the northern end of the wood beside a shallow section of the river that serves as a fording point. Here, badgers and mink appear to cross or emerge from the river.

No other evidence of mink was available here but down river at Gormanstown College, more evidence of mink was available from paw prints and spraints.

Rabbit*Oryctolagus cuniculus*

A rabbit warren was noted towards the south-eastern end of the wood and other burrows along the edge of the wood are attributable to rabbits. Fresh droppings were only present at the south-eastern warren.

Fox*Vulpes vulpes*

Fox tracks were discernible in wet ground along the river bank and at one point along the river foxes must swim/ wade across the river as the track clearly entered the river. A fox scent was detectable in a number of areas often associated with the rabbit warrens.

Brown rat*Rattus norvegicus***House mouse***Mus musculus***Wood mouse***Apodemus sylvaticus*

Not surprisingly, there is evidence of mice and rats associated with the woodland and the nearby buildings. These species are ubiquitous.

Bats

The bat assessment undertaken on 6th July 2006 revealed the presence in and around the woodland of four identified species of bat and a fifth unidentified species. The species that availed most of this woodland was the brown long-eared bat while Leisler's bat was the only species that never entered into the woodland or flew below the canopy.

Soprano pipistrelle**Common pipistrelle****Brown long-eared bat****Leisler's bat*****Myotis* sp. (possibly Daubenton's bat)**

The two most common and widespread species of pipistrelle (and potentially the two most common bat species in Ireland) were present in similar numbers and were encountered on a similar number of occasions in and around the wood.

The first bat encountered at 10.19 pm was a common pipistrelle near to the nursing home. This species was noted three minutes later flying away from the home and among mature trees.

The first soprano pipistrelle noted was at 10.44 pm at the southern end of the wood.

This would indicate that this species is not roosting close to the nursing home while common pipistrelles may be within this complex.

Reports from nursing staff indicate that bats have entered into the home on a small number of occasions. These are most likely common pipistrelles.

Both species of pipistrelle were noted feeding within the woodland along the track used by humans and badgers (during heavy rain) as well as along woodland edge and over the river.

There was a high rate of encounter with brown long-eared bats and this species is either roosting in trees within the wood or in buildings scattered around the adjoining townlands.

The first long-eared bat noted was at 10.51 pm at the southern end of the wood.

The most sustained activity was from 11.40 pm to 11.54 pm around horses chestnut trees on the eastern side of the wood (within the wood) close to a rabbit warren/ former badger sett.

At 12.15 am, two long-eared bats chased through the small wood adjacent to the river (where there is a level walk) at a height of 4 metres under sycamore and horse chestnut.

The final observations of bat activity were of a brown long-eared bat in the area around the abandoned sett between 12.34 and 12.44 am.

The commencement of constant rain from 12.19 am onwards most probably encouraged bats to move deeper into shelter both within the woodland and possibly to forage in farmyards.

The presence of a soprano pipistrelle feeding along the middle of the wood at 12.33 am was confirmation of this.

A single observation of Leisler's bat activity was made at 12.09 am at the bridge at the start of the woodland. This bat was heard over a two minute period.

A bat was noted along the river along the southern edge of the woodland whereat there is a fallen tree (as in Figure 1(d)). This was of the *Myotis* group of bats but the species was not confirmed. It was flying low to the river but not directly above the surface. It was most probably a Daubenton's bat but the length of time for identification was too short to allow certainty. Daubenton's bats were abundant south of this area in the grounds of Gormanstown College.

Significance of the mammals of Delvin Woodland

There is clearly good mammal activity within this woodland and a number of bat species as well as fox, badger, mink, rabbit all are present.

The river here would offer some potential for holts for otters and otters were reported by the staff of Gormanstown College downstream. While this species was not encountered in either site by the author, it is possible that the species occasionally feeds here given the widespread nature of this species in Ireland.

The woodland is suitably open to allow bats to fly within almost all areas. This woodland has good potential for exploitation by species such as brown long-eared, whiskered, Brandt's, Natterer's, and where mature trees occur (such as the oak, horse chestnut and ash observed) Daubenton's bats.

The abandonment of a sett here may indicate historical disturbance or a shift in feeding area. There is clear badger movement through the wood and badgers may well be within nearby scrub.

Recommendations

This woodland offers good feeding for bats, badgers and a host of other species. It must be protected from any expansion of development activities in this area. Dumping of domestic and construction waste must be prevented. The water quality may be affected by construction and by agricultural animal waste. This is a feature of many farms and cow dung was noted beside a ford on the river close to the nursing home walk.

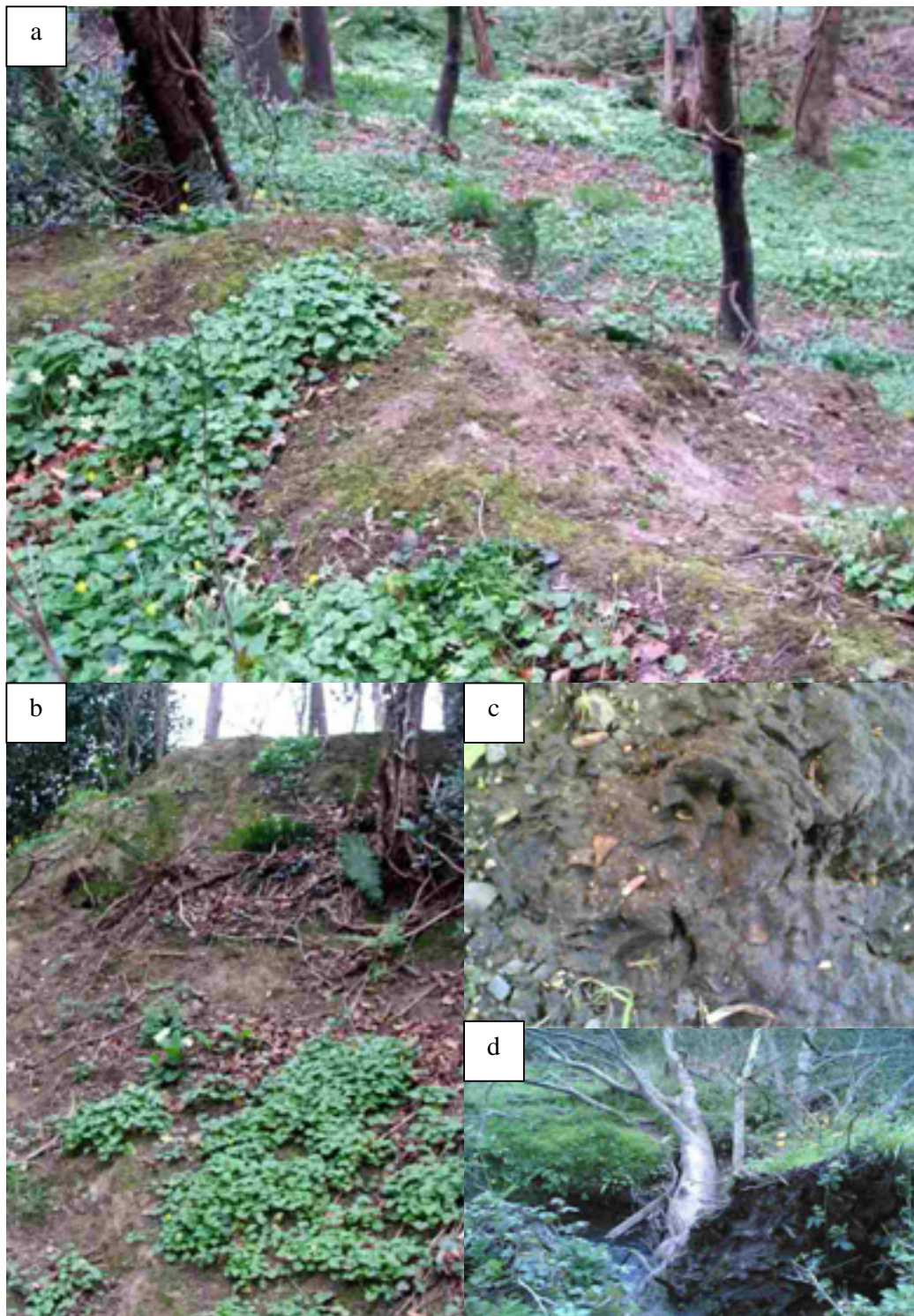


Figure 1: Mammal signs at Delvin Woodland

- (a) -(b) Abandoned, overgrown sett producing a steep hill, with no clear sett entrances
 (c) Paw prints in cow dung showing the presence of badgers and mink
 (d) Fallen tree over which badgers cross leading to a track through the entire wood.

**THE MAMMAL FAUNA OF MAMMAL CASTLE AND
DEMESNE, MALAHIDE, FINGAL
COUNTY DUBLIN**



**Brian Keeley B.Sc. (Hons) in Zool.
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2006

Method of assessment of Malahide Demesne for mammals

The ground mammal assessment was undertaken on 28th April 2006 and involved an examination of the entire demesne for evidence of mammal tracks, trails, abodes, faeces and diggings. All areas of the park were checked including enclosed maintenance areas and the gardens that were closed to the public at this time.

All burrows were examined for evidence of occupation and to identify the species present. Woodland was traversed repeatedly to determine whether species such as the red or grey squirrel were present.

A member of the park ranger staff, Mr Kevin Bowles was questioned on observations of mammals that he had made over the many years that he had worked within Malahide Castle and Mr. Bowles noted on the map where he had seen some species in recent times.

The estate was re-visited on July 5th to 6th 2006 to determine the bat fauna and to examine the site for badger activity.

Bats

Bats were identified by the flight pattern, size and most importantly the ultrasonic navigation and social signals emitted in flight. This involved the use of two bat detectors, a Pettersson D240X heterodyne and time expansion receiver with facility to record onto a Sony MZNH 600 Minidisc and a QMC Mini 3 heterodyne bat detector. All bats encountered were identified in the field and there was no requirement to examine signals at a later stage.

Bat activity was monitored from 10.00 pm on July 5th to 2.45 am on July 6th 2006. The buildings surrounding the Castle were initially observed and this was then broadened out to examine bat activity throughout the entire estate including the gardens, the walled garden, close to football pitches, in woodland and along the golf course edge.

Species of mammal at Malahide Castle and Demesne

Badger

There are a number of burrows within Malahide Castle that conform to typical badger sett structures. One of these is clearly a badger sett (Figure 1(a)) and is in use as such. One other sett is unoccupied (Figure 1(b)) and is overgrown. The third sett was in use by a fox during this study.

The main sett, of which four entrances are visible in Figure 1 (a), lies within woodland cover close to the gardens and gold course. Badger paw prints were seen in mud close to here (there was little wet mud apparent during this study as there had been little rain for several days) mixed in with dog paw prints.

Badger dung was noted close to the sett that appeared to be in use by a fox. Mr. Kevin Bowles observed three badgers in a group in summer 2005 close to this sett. A badger ran past the author on the night of July 5th – 6th 2006 from the golf course towards the woodland.

There are several tracks through the woodland that indicate that badgers traverse the estate. Evidence at the edge of the golf course, woodland and gardens all prove that badgers feed in all of these areas.

Stoat

A stoat was noted by Mr. Bowles in the area close to the golf course. This species is clearly widespread but signs are difficult to find and sightings are the main records for stoats. The stoat is most likely to be encountered in areas where rabbits are abundant. This is a major prey item but rodents and birds (and bats where accessible) will all be taken.

Stoats will den in stone walls, rock or tree hollows and even the warren of eaten rabbits.

Rabbit

This species was evident in the woodland areas around the playground and around the main badger sett (where droppings were piled suggesting that rabbits may be using part of the badger sett). There were few seen and it suggests that the species is not in a boom phase at Malahide Castle.

Fox

Fox tracks were seen around the woodland area whereat the badger setts occur and fox scent was detectable along woodland tracks. Malahide would be an ideal location for this species given the availability of suburban-type estates within which they could forage in addition to the park itself.

Brown rat, House mouse

Not surprisingly, these two species were noted and they are found wherever there is human activity.

Wood mouse

This species was not noted but it is certainly present given the woodland over here.

Hedgehog

Two dead hedgehogs were reported by Mr. Bowles within the past year. This is unusual given that there is little vehicular traffic in the areas concerned.

However, two live hedgehogs were seen together in the lawns around the house (where the brown long-eared bat was noted during the night). While there would appear to be evidence of a decline in Britain (in England more specifically while some of the Scottish islands have been culled of hedgehogs to safeguard seabird populations), this possibility has not been examined in Ireland. Anecdotally, the author has encountered more hedgehogs in 2006 than in several years of surveying, including in counties such as Cavan, Meath, Monaghan and Dublin.

Grey squirrel

This species is readily seen in mature trees along the main avenue or on the ground between these trees. The photographs in Figure 2 indicate that this species is present throughout the estate including the gardens.

Bats

The survey for bats was undertaken on a dry night and bat activity was relatively high. The buildings within the maintenance area were observed for any emerging bats and for signs of recent bat occupancy. Neither was evident. There was repeated Leisler's bat activity close to these buildings along the edge of the walled garden.

The following species were encountered within Malahide demesne:

Common pipistrelle

Common pipistrelle activity was noted around the castle itself (at 10.28 pm) as well as along paths in the park such as that past the golf course, at the west gate and along the Malahide Road boundary.

Soprano pipistrelle

This species was noted around the Castle relatively early in the night (10.23 pm) and throughout the period of observations. Individuals were also present in the gardens, in the walled garden, along tree lines and along woodland paths.

Soprano pipistrelles were noted along woodland edge and tree cover close to the small ponds in the western section of the park as well as more widely in the park.

Brown long-eared bat

This species was first encountered flying out of the church ruins adjacent to Malahide Castle at 10.44 pm. Examination of the roof here revealed a number of small crevices but none would be suitable for any more than one bat. Nor were there any droppings below any of these crevices. This is a typical and unmistakeable sign that would only be absent if a floor was prone to flooding or was regularly brushed (neither is possible in this case).

This species also fed around the castle in the lawns close to the church.

Brown long-eared bat activity was also noted along a woodland track to the west of the railway line that runs north –south past the walled garden and work area.

Leisler's bat

This species was calling persistently in the walled garden and along the edge of the gardens and maintenance yard. A previous contact was made from the housing adjacent to the grounds to a woman who had found a grounded Leisler's bat.

This species is almost certainly using the trees as mating roosts and may also be roosting in trees in the daytime or in the many buildings in the demesne or in neighbouring housing. Houses with large fascia and access to wall cavities are preferred but a range of roost types are known including old castles and farm houses.

Significance of the mammal fauna of Malahide Castle

There are a variety of species at Malahide Castle many of which are predictable. It is the only park or site in general in this study where there was visual confirmation by park staff of the presence of stoats even though it is probable that this species is found in most if not all areas.

Stoats are most often seen running along or across public roads and signs can be difficult to locate. They do not produce obvious communal latrines, routinely dig in the soil for prey, build easily detected shelters and are small and swift.

The badgers are seen within this park with more regularity than any of the other parks and the demesne appears to provide much of the required daily food and adequate territory.

Rabbits are present but not in abundance at present. Hares were not noted nor were there any clear signs of this species.

The species is known from various golf courses along the Fingal coastline and in parks such as Ardgillan and it is difficult to see why this park would not suit this species. A grass management programme would ensure that there is suitable cover for leverets and that the right mix of grass species is sown for hares.

Grey squirrels are an evident element of the park's fauna and are often a popular feature for families. The attractiveness and tameability of this American introduction belies the problems that this species may create such as bark stripping and ring-barking and displacement of the native red squirrel.

Dublin parks are ideal grounds for such a species and it is impossible to see a time when the red squirrel could re-establish itself on an island wide basis.

There was clearly repair and restoration work being carried out in the maintenance area and in the courtyard that houses a number of shops. No examination of any of these structures for the presence of bats had been carried out. All work was being carried out at a time when young bats would have been highly dependant upon mothers for sustenance and would have been unable to fly.

Recommendations

Examine structures for the presence of bats prior to major alteration

Any work on trees with deep hollows or crevices, buildings (including especially at roof level), must be carried out bearing in mind the possibility that bats are roosting within the buildings or trees. Bats may easily be inadvertently or wantonly killed during repair work or tree surgery.

Timber treatment and access

Timber treatment in buildings should be used preferably when bats are not present and certainly after bats have bred (from May to the end of August).

Bats should be provided with access to the roofs of buildings and sheds and access should be maintained in currently occupied buildings.



Figure 1: Badgers at Malahide Castle

- (a) Main sett within the estate
- (b) Smaller seasonal sett
- (c) Badger prints in mud
- (d) Fox prints in mud



Figure 2: Mammals at Malahide Castle

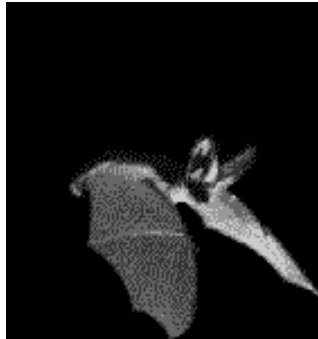
(a) Grey squirrels are abundant within the park

(b) Malahide Castle was one focus of bat activity while all buildings offer good roost potential to bats



Figure 3: Bat roosting (a) and feeding (b) opportunities at Malahide Castle
 Numerous crevices exist but whether these are available to bats given the presence of grey squirrel is one question on this

**A MAMMAL ASSESSMENT OF THE
FORESTRY AND WOODLAND
OF ST. ITA'S, PORTRANE**



Brian Keeley B.Sc. (Hons) in Zool.

September 2006

Introduction

This assessment follows on from an examination of the hospital grounds in summer/ autumn 2005 and aims to look at the bat fauna associated with the broadleaf woodland and the conifer plantations principally to the west and north of the hospital buildings.

Woodland is known to be a rich source of feeding and roosting sites for bats. It is essential to know to what level the remaining tree cover in Fingal is utilised by bats and to determine which areas harbour woodland dependant species, generally the less common species.

Methodology

The bat fauna of the wooded areas of St. Ita's Portrane was examined on the 7th and 8th July 2006 during the period 10.00 pm up to 2.30 am. Two bat detectors were employed (a QMC Mini 3 heterodyne bat detector and a Pettersson D240X heterodyne and time expansion bat detector) to ensure that bats were noted when present. This is especially important for quiet species such as the brown long-eared bat which may not be heard if only time expanded signals are analysed.

The initial point of examination was the main track through the plantations to the west of the hospital. The direction from which bat activity commenced was traced and all bat activity within this area was observed.

The dense plantations and woodland were traversed from 10.45 pm to 11.15 pm to determine what level of bat activity was present within this site. It was also crossed between the period 11.30 pm to 12.00 am.

Species of bat present in Portrane woodland

Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>
Common pipistrelle	<i>P. pipistrellus</i>
Leisler's bat	<i>Nyctalus leisleri</i>
Brown long-eared bat	<i>Plecotus auritus</i>

The most commonly encountered species of bat on woodland edge was the soprano pipistrelle. This finding concurs with the finding that soprano pipistrelle was the more abundant species along the Fingal coastline in 2004 (Brian Keeley for Fingal County Council, Parks Department). An examination of the hospital in September 2005 for Fingal County Council provided little evidence of soprano pipistrelles with the exception of a single individual at the main hospital.

Soprano pipistrelles were first noted along the main track between the forestry blocks to the west of the hospital at 10.22 pm and again at 10.24 pm. Another individual was noted at 10.26 pm on the edge of the woodland nearest to the closed hospital units. There was repeated observations of soprano pipistrelles at the derelict house south of this unit (10.33 pm and 10.44 pm) for a sustained period and to the east of here in a clearing (10.33 pm up to 10.42 pm).

The soprano pipistrelle activity was also noted along woodland edge nearer to the main hospital (11.24 pm and 11.26 pm) as well as along roadways (11.19 pm).

In the previous assessment of the hospital grounds, common pipistrelles were noted at street lighting. Again in this assessment, this was the case. Soprano pipistrelles were also noted close to lighting in this study.

Soprano pipistrelles were noted up to the time when surveying ceased at 2.30 am.

Common pipistrelle activity was extremely localized in this assessment and none were noted near to the woodland. All common pipistrelle activity was noted between 12.28 am and 2.30 am in the north-eastern corner of the study area along the road that is lit at night past a row of unoccupied houses. The most sustained feeding by any bat close to lighting was by common pipistrelles. One bat was present here between the period 12.28 am and 12.40 am unbroken. This species was again noted around the corner along the main road at 12.47 am, feeding here with a soprano pipistrelle.

Leisler's bat activity within the hospital grounds was confined to outside of the woodland. A Leisler's bat was noted over the grassland to the east of the disused units at 10.39 pm and briefly at 1.38 am. Two male bats were calling in the north-eastern section of the grounds adjacent to the abandoned school buildings at 12.10 am.

Leisler's bats use trees as mating roosts and one such roost was noted in 2005. This species avails of free-standing mature broadleaf trees (predominantly) with cavities and crevices. Oak trees are particularly suitable as roost sites.

Brown long-eared bats were noted within an abandoned school building in the north-east of the site adjacent to the small (mainly) broadleaf woodland. The number of bats was not counted during emergence but clearly more than three bats are roosting here and were seen within and re-entering the building. A brown long-eared bat was also calling within this building.

Brown long-eared bats were noted flying along the woodland edge at the disused hospital units (1.09 am and 1.11 am) and bats were observed returning to the school building from 2.10 am to 2.14 am.

No bats were noted within the plantations or woodland areas. Bats were only encountered along the woodland edge and along tracks. .

As for much of the Fingal woodland examined species such as Natterer's bat and whiskered bat are absent and only the more common species are encountered with any regularity.

Significance of Woodlands at St Ita's Portrane for bats

The woodland at St. Ita's provides shelter at which bats may feed upon invertebrate prey. Bats appear to benefit mainly from the perimeter of the woodland rather than the body of woodland itself. Bats typically avail of open glades within woodland, woodland paths and woodland edge. If there are sizeable gaps between trees, they will also feed throughout the woodland.

In densely planted conifers, there is often insufficient space for bats to fly as the branches from one tree often merge with the branches of the next tree, forming a dense mat.

In broadleaf plantations, this may be true during the early period of growth in relation to preventing bats flying below the trees but bats may also feed over the tops of the young trees where insects are often more abundant than over conifers in Ireland.

While trees are abundant around St. Ita's, in fact only a small fraction of this is available to bats as feeding areas. Brown long-eared bats will feed low along overgrown tracks but species such as Leisler's bat will not enter closed woodland and even species such as common pipistrelle and soprano pipistrelle are strongly associated with woodland edge and tree tops rather than low under dense conifer branches.

Open woodland is of much greater benefit to bats and this rules out much of the plantation here.

Recommendations

This woodland would be of much greater benefit to bats if there were clearings cut into it to allow light for undergrowth and to produce flight corridors for bats. The availability of a variety of roost sites in tree limbs would also make this a more attractive site for species such as whiskered bat and Natterer's bat.

This may be enhanced by the provision of bat boxes on suitable mature trees.



Figure 1: Bat opportunities in and around woodland at St. Ita's Portrane

- (a) and (b) Old school buildings adjacent to the hospital and woodland used by brown long-eared bats (a) Roost area (b) Area at which bats return to the building
- (c) and (d) Brown long-eared bats returning to the building (at top of (b))
- (e) Oak tree used by Leisler's bat as a mating roost
- (f) Limb with cracks suitable for roosting bats

THE MAMMAL FAUNA OF HOWTH DEMESNE, HOWTH, FINGAL



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Introduction

Howth and Sutton form a peninsula that is one of the most likely sites to face isolation from the rest of Fingal. Much of the mammal fauna may be already be separated from the rest of the district of Fingal. Increasing suburbanisation has reduced green links between this area and Baldoyle, Portmarnock and beyond.

It is of interest to determine which species of mammal occur within the woodland here and whether there has been any reduction in the mammal fauna may become apparent from such an examination.

Method of assessment of Howth Demesne for mammals

The Howth demesne was assessed during two separate visits for the presence of all mammals. The principal area of interest was the woodland to the rear of Deer Park Hotel but any other observations are included here.

Bats

A bat survey of Howth Demesne involved an examination of the site for suitable trees on 23rd May 2006 during daytime for evidence of occupation or of historical presence as well as a subsequent nighttime bat detector and visual survey of roost sites and feeding areas. A second examination of the demesne took place on August 25th 2006 including a second bat detector assessment.

The first bat detector assessment was undertaken on the night of 23rd May 2006 and involved the use of two bat detectors, a Pettersson D240X ultrasonic heterodyne and time expansion bat detector and a QMC Mini 3 heterodyne bat detector.

This allowed the identification of all bats encountered to species level with the corroboration of identification in the open based on visual cues such as height and mode of flight.

As there was a variety of areas to examine, it was considered appropriate to return to the site in August for a second evaluation.

Species of mammal at Howth Demesne

Rabbit

On the woodland edge, there is ample evidence of rabbits. Rabbits were visible sitting close to the gorse cover (see Figure 1 (a)) and droppings were obvious close to golfing areas.

Fox

Foxes are breeding close to the walkway leading to Deer Park Hotel. According to the hotel manager, Mr. David Tighe, the vixen was rearing two cubs at the time of study (May 2006). This species is highly successful in suburban areas and may benefit from food scraps intentionally or unintentionally left out in gardens or hotels, schools etc.

Fox tracks and scent were discernible throughout all woodland and along the laneway from Howth Castle towards the Deer Park hotel.

Brown rat

Pest control measures around the hotel indicate that this species is present. No rats were seen or noted during this survey.

Likely species

Hedgehog

This species was reported by the hotel manager as being extremely rarely encountered. It is very possible that this species can go unobserved for long periods and it is often as a road kill that it becomes known to occur.

House mouse

Wood mouse

Pygmy shrew

Pygmy shrews are very common throughout Ireland and there is no reason why they do not occur here in long grass away from the golfing area. Their presence is only ever betrayed by the high pitched squealing used in socialisation. They may also become trapped in bottles, jars, golf holes or pit fall traps laid for invertebrates.

Bats

Leisler's bat	<i>Nyctalus leisleri</i>
Common pipistrelle	<i>P. pipistrellus</i>
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>
Brown long-eared bat	<i>Plecotus auritus</i>

Observations on bats will principally relate to 23rd May 2006 unless stated otherwise.

Leisler's bat

The first bat species encountered was the Leisler's bat (23rd May 2006), Ireland's largest species. The bats were roosting within the roof of an east-west section of Mr. David Tighe's house (the manager of the Deer Park Hotel) in the courtyard of Howth Castle.

The bats began to emerge at 9.43 pm and individuals were still emerging when the house was re-checked at 9.54 pm. Three bats were seen to emerge in all. However, the bats were not counted in a complete manner as this would have distracted from the overall assessment throughout the rest of the grounds.

Mr. Tighe indicated that he typically sees 8 to 10 bats emerge during the summer. This is likely to be an underestimate as the general public rarely appreciate that bat emergence may continue for up to an hour.

Leisler's bat roosts would very commonly amount to approximately 25 individuals and may be much larger in suitable houses/ trees.

This species feeds over a wide area and may be found over lakes over woodland and farmland. Leisler's bats were heard over woodland between the hotel and Howth Castle at 10.23 pm and again over an open wood surrounded by golfing areas at 10.34 pm.

The weather was generally dry (23rd May 2006) but there were some periods of rainfall which may cause species such as Leisler's bat to return to the roost.

Leisler's bats were noted throughout the demesne and were present at the main entrance feeding around lights along with common pipistrelles that were also calling as well as feeding (especially on August 25th 2006).

Common pipistrelle

Common pipistrelles were first noted at 10.24 pm but their activity most probably commenced at around 10.00 pm if activity at other sites at the same time of year are applicable.

Another individual was heard in a small open wood (noted above) for a short period. Common pipistrelles were active within a deeper closed canopy wood at 11.28 pm. Social calls were repeatedly emitted here at this time.

Common pipistrelles are probably the most widespread species of bat in Ireland and possibly the most common species.

Common pipistrelles were noted within the woodland and to the rear of the hotel and were the most frequently encountered species of bat within the native and exotic trees (see Figure 1(b)).

Individuals of this species may avail of tree cavities (like Figure 1(c)) while all bat species on the east coast may avail of rock crevices as day roosts or for hibernation (Figure 1(d)).

The hotel adjacent to the woodland offers a variety of roost options for species such as pipistrelles and Leisler's bats (Figure 1(e)). The timber cladding that has been attached to the external wall in many places produces a perfect cavity for individual bats or for small numbers of bats. Evidence was available under one such site that a bat was in occupation within the cavity formed by the timber (Figure 1(f) and (g))

A common pipistrelle was noted flying through an archway attached to a derelict tower at Howth Castle at a time consistent with emergence time, given the cloudiness of the night (8.55 pm, August 25th 2006).

Soprano pipistrelle

This species of bat was first encountered at 10.45 pm on May 23rd and again at 10.46 pm within woodland on the perimeter of the hotel grounds leading to housing.

Soprano pipistrelle activity was continuous over the lake even after rain had commenced and was noted between 11.13 pm and 11.21 pm at different points along the lakeshore. A soprano pipistrelle was noted at 11.17 pm between the woodland and the lake.

This species is more strongly associated with water than the common pipistrelle and it may form considerable roosts in buildings near to lakes or rivers.

Soprano pipistrelle activity was not encountered within the trees to the rear of the hotel and there were only brief passes of this species in August 2006.

Brown long-eared bat

Brown long-eared bat activity was only noted twice in quick succession within the woodland adjacent to the lake, at 11.28 pm and at 11.31 pm. This species is easily overlooked as it has a weak echolocation signal that will not be picked up by a bat detector at similar distances at which pipistrelles or *Myotis* species are detectable (Natterer's bats have a relatively weak signal also).

A brown long-eared bat was noted at Howth Castle flying through an archway attached to a derelict tower. On August 25th 2006

Within this tower, bat droppings of this species were noted. The bat was seen twice during observations and it is probable that it is roosting within this building or the associated sections of the castle. The same arch was availed of by a common pipistrelle as a feeding site.

Brown long-eared bats will avail of tree cavities or crevices as well as bat and bird boxes and houses.

Significance of the mammal fauna of Howth Demesne

There is a number of bat species present within the demesne, all of which are common and widespread species. The most common species would appear to be the common pipistrelle. The woodland serves principally as a site for this species and for brown long-eared bats.

There would not appear to be badgers within the demesne and overall there was little evidence of mammals with the exception of foxes and rabbits. Clearly otter are very unlikely to be here and there is limited possibility for mink.

The variety of unmanaged sites adjacent to golf courses would appear to suit badgers but yet they are absent. This is difficult to explain given that this species occurs in urban areas including Dublin city and suburban gardens.

There are none of the rarer woodland species and it would appear that despite the tree cover, these species have not survived within the peninsula (if present formerly). There are few routes by which bat species could reach Howth without going through built up areas and hence the opportunity for (re-) colonisation is likely to be non-existent.

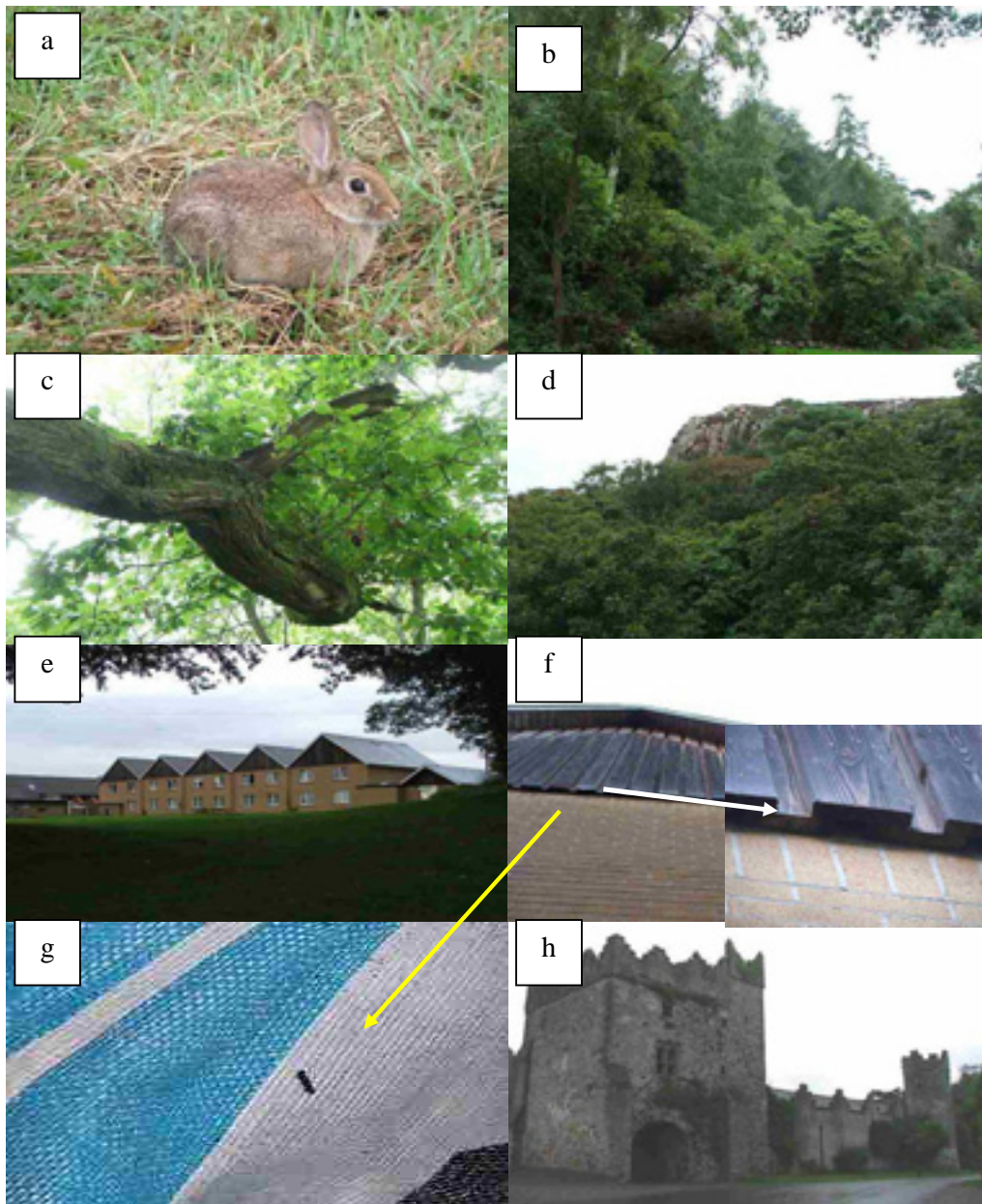


Figure 1: Mammal fauna of Howth Demesne

- (a) Rabbits are the most obvious mammal species around the woodland edge leading to gorse and the golf course
- (b) The mature native and exotic species form a tree line for feeding bats
- (c) Damaged tree limbs offer good roost sites
- (d) The rock face may provide good hibernation sites for bats
- (e) The timber cladding creates roost sites for bats that is being used by some bats
- (f) a roost site and (g) a bat dropping below it
- (h) Howth Castle appears to house common pipistrelles, brown long-eared bats while Leisler's bats roost in a neighbouring house

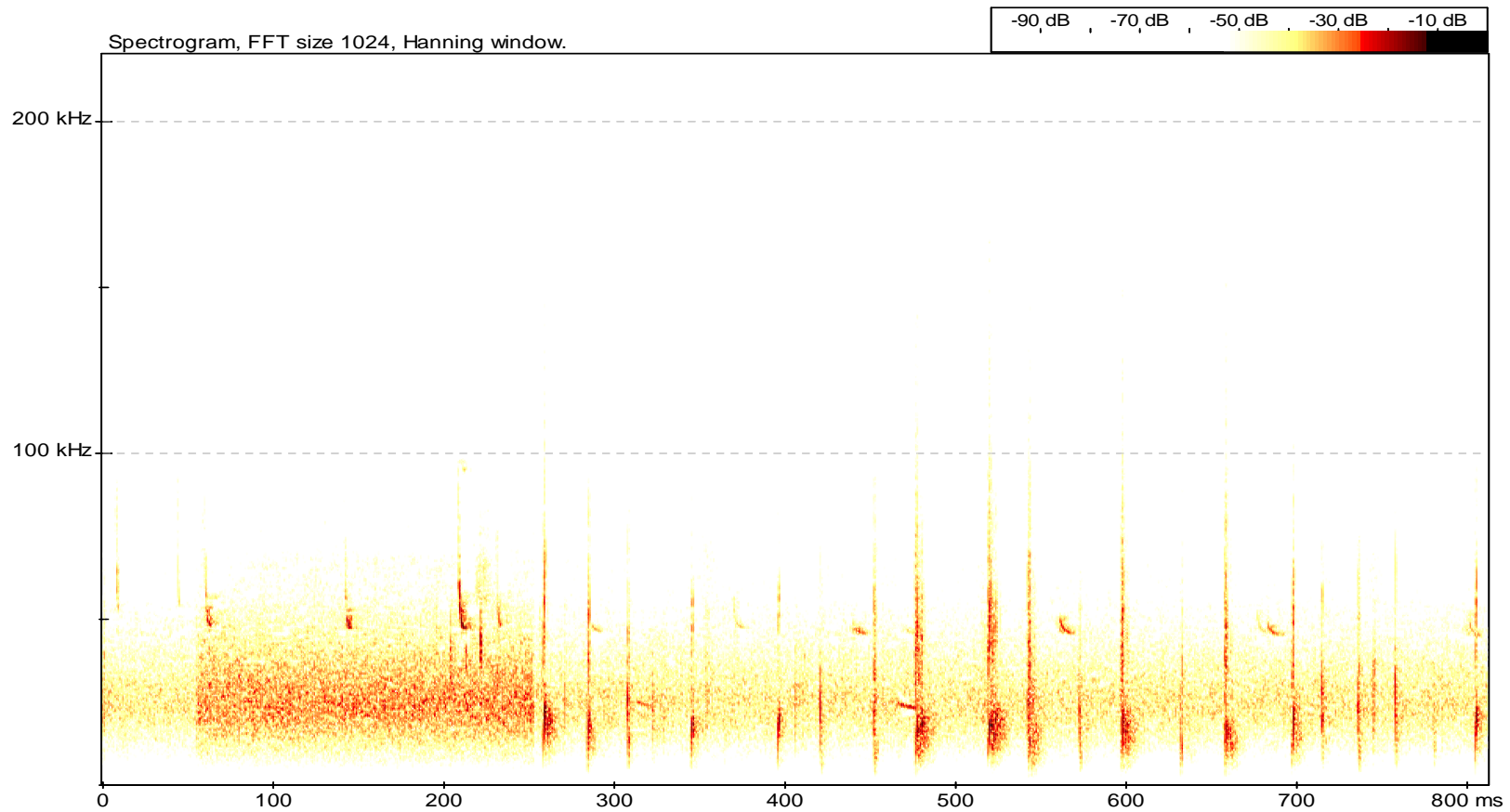


Figure 2: Spectrogram of main bat species encountered at Howth demesne

- (a) Soprano pipistrelle signal (affected by rain on the bat detector)
- (b) Common pipistrelle in semi-closed site and
- (c) Common pipistrelle around light accompanied by Leisler's bat (Vertical bars are caused by heterodyne signals)

THE MAMMAL FAUNA OF SANTRY DEMESNE, SANTRY, FINGAL



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2006

Introduction

In many respects, the mammal fauna and the park at Santry Demesne face a lot of challenges. These arise from a number of sources but all manmade. This area has undergone considerable change within the past decade including the creation of the park itself, the problems associated with the growth of housing and industry in former sections of the park and the pressures of suburban/ urban uses. These would include construction debris, accidental and wilful pollution, drinking groups of youths during hours of closure, the consequent litter and disturbance of the vegetation including fires and fire damage.

Notwithstanding such difficulties, there are many opportunities provided by a site such as Santry Demesne both as an amenity and recreational facility for local residents and visitors as well as an educational opportunity on natural and built heritage.

This report looks at the mammal fauna of the area and provides recommendations to create a better environment for this fauna in addition to proposals to take advantage of the park as a teaching tool for visitors to it.

The reduction in green areas in the north Dublin city/ Fingal border area increases the need to maximise any remaining sites in terms of the biodiversity and protection.

Method of assessment of Santry Demesne mammals

The Santry demesne area that has been modified into a public park was assessed during two separate visits for the presence of all mammals.

Bats

A bat survey of Santry Demesne involved an examination of the site for suitable trees on 12th May 2006 during daytime for evidence of occupation or of historical presence as well as a subsequent nighttime bat detector and visual survey of roost sites and feeding areas in June 2006.

The bat detector assessment was undertaken on June 2nd 2006 and involved the use of two bat detectors, a Pettersson D240X ultrasonic heterodyne and time expansion bat detector and a QMC Mini 3 heterodyne bat detector.

This allowed the identification of all bats encountered to species level with the corroboration of identification in the open based on visual cues such as height and mode of flight.

The bridge within the park is low lying and is well pointed and has no potential for bats. Any other buildings within close proximity were examined during the night time survey for returning bats.

The information collated by a colleague Dr. Niamh Roche during a bat survey in ;ds'vjdsa was also available to the author and records from the Dublin branch of Bat Conservation Ireland were available and are included herein.

Other mammals

All mammal signs were sought during a visit to the estate on May 12th 2006. This involved following all paths around the demesne, crossing through all woodland and examining at the base of all free-standing trees and following any mammal tracks that were encountered.

Any areas of scrub were checked by firstly seeking tracks from the perimeter inwards and then by walking through the scrub, following any tracks that were discovered.

All animal burrows were examined to establish the identity of resident species. All footprints, tracks, faeces were examined to species level.

The Santry River and constructed ponds, bridges, waterside rocks, pipes and logs were all checked for evidence of otters and mink and all banks were examined for holts.

Weather conditions were poor leading up to the assessment and many areas were close to flooding.

Species of mammal present at Santry Demesne

Rabbit *Oryctolagus cuniculus*

Brown rat *Rattus norvegicus*

The species most in evidence are rabbit and brown rat. These species are clearly widespread and abundant throughout Ireland and they benefit enormously from any human settlements and cultivation.

The rabbits are still present here albeit that they are not present in great numbers unlike the significant reduction in their presence in places such as Ardgillan and Malahide. These areas have shown a considerable decline in rabbit numbers, due most probably to the sporadic recurrences of myxomatosis.

This has not been as a result of any intentional operation in these areas in recent times but as a consequence of former efforts to control rabbits.

Rats are one of the key beneficiaries from urban settlement and the litter/dumping problems that may arise in areas close to such settlements. The adaptability of this species ensures that it is capable of surviving both in green areas and built areas and may as readily exist in a house cellar, shed or attic as in a riverbank or hedgerow.

Wood mouse *Apodemus sylvaticus*

The presence of some partially chewed hazel nuts indicates the presence of wood mouse. This is a widespread species, abundant in rural areas but it is found into towns and cities and on offshore islands. The species is known to be present in Ireland for at least 7600 years.

While the female occupies home ranges as small as 0.1 hectare during the breeding season, males may occupy home ranges of as much as 3 hectares although most are less than 1.5 hectare.

Fox *Vulpes vulpes*

Surprisingly little evidence of fox activity was noted. The presence of a single fresh fox scat was the only indication of this species. Foxes are especially numerous in suburban areas such as in cities like Dublin, Belfast, Cork and Galway and they may be as numerous as 5 family groups per square kilometre.

A family group may be comprised of one adult male, one breeding vixen and two non-breeding females. In such areas, territories may be as small as 20 hectares.

American mink *Mustela vison*

Two mink scats (relatively fresh) were noted under a new road bridge in the north-western edge of the park at the Santry River. The mink gains access to the park through a slightly displaced vertical bar in the fence separating the park from a further tree-lined section of the river.

Immediately past this point, a culvert/ drain emptying into the Santry River was discharging white spirits or a chemical with a similar noxious odour and (diluted) colour.

The smell was intense within the culvert and overpowering but the smell was still detectable 20 metres away from the mouth of the drain. A film could be discerned on the water surface and clearly the effects of this upon water quality cannot be beneficial.

Badger

No evidence of badgers was recorded from the park. Discussions with Wildlife Ranger, Terry Doherty of the National Parks and Wildlife Service of the Department of Environment, Heritage and Local Government were held to determine whether there were records of badger for this area prior to its development and alteration.

From this it appears that one sett was noted in the woodland cover along the Santry River with occasional or seasonal occupation. Furthermore, a badger was disturbed at Santry Stadium during works here a number of years ago.

It is Mr. Doherty's opinion that badgers have been resident within the demesne and that they may be still maintaining a presence by availing of protected sites for their setts.

For example, badgers may be within the vicinity availing of a suburban garden (under a shed or shrubbery) or sections of the former demesne outside of the study area.

Species such as the hedgehog are highly likely given the nature of the park and the widespread cover of this species. It is certainly a species known from Santry, Ballymun and St. Margaret's and its absence would be very surprising.

Leisler's bat

A Leisler's bat was discovered hibernating in a factory close to the demesne (on the southern boundary) c.1998.

This species is a regular feature of parkland as it will roost in mature trees, such as oak, ash, beech and possibly suitable mature conifers throughout the year including during the winter. Ample trees with apparent roost potential can be found within this park.

Leisler's bat activity has been noted here by the author on previous visits and by Niamh Riche during an assessment of this area.

Brown long-eared bat

An individual of this species was discovered in winter hibernating in a food ingredients factory close to Santry Demesne in previous years.

This species is often categorised as a woodland species and very often they roost in large attics, barns, castles etc. close to woodland.

No brown long-eared bats were present during this visit. This may be due to relatively poor weather conditions but it is also a bat that can be overlooked due to its weak navigational signal and low flight.

They have been recorded in a number of the sites examined on behalf of Fingal County Council (Parks Department) including Newbridge House, Ardgillan, Luttrellstown, Beech Park House, Clonsilla, Knockmaroon House and St. Ita's, Portrane.

Soprano pipistrelle

This species was numerous around the edge of the manmade pond that is fed by the Santry River. Individuals were noted all along the banks and at a number of other points within the park.

Common pipistrelle

This species was noted throughout the park in low numbers. This is a typical species of suburban areas and it is unsurprising that it is found here. It was noted along the paths from the main entrance to the pond/ lake, around the trees where the broken bat box hangs and occasionally in the woodland along the eastern edge.

Assessment of Santry as a site for mammals

The area of Santry Demesne that lies within the public park offers a range of opportunities for mammals. There is a river passing through it and a manmade pond/ lake along one edge. There are many old and very large trees with ample cavities and very suitable bark for the attachment of bat and bird boxes.

There is ground cover in some areas of the park that could accommodate badger setts and fox earths. However, the opportunities provided are countered in a number of ways by the layout of the park and the problems of disturbance by human activities.

The trees within the park with the best potential as roost sites for bats are isolated by the absence of any hedgerow leading to them and this in turn would reduce the availability of such trees to all but Leisler's bats and possibly pipistrelles.

The bat boxes erected at the inception of the park have been reduced in number possibly by vandalism and the presence of one with a broken cover indicates that this is the most likely cause of reduction (Schwegler bat boxes rarely break *in situ*).

While it is likely that much of the anti-social damage is carried out at night, it is almost certain that bat boxes must be damaged during daylight.

An abandoned burned motor bike and accumulations of beer cans all suggest a level of nocturnal disturbance that would affect mammal movements, while the destruction of bat boxes would additionally interfere with bat roosting behaviour and even lead to the death of bats.

The pollution of the River Santry by industrial or domestic sources cannot be beneficial to the mammal or bird life dependant upon the pond / lake. Nor can this river's eventual entry into Dublin Bay at the Bull Island enhance the quality of the UNESCO site.

Clearly, there is an effort within the park to provide less intensively managed areas such as the meadow towards the west, the retention of fallen trees (see Figure 1 (d)). This unfortunately does not provide enough land to provide species such as badgers with adequate foraging area. Additionally, the pollution of the river is detrimental to mammals availing of this area.

There was no evidence of badger activity through the park nor are there setts within the park. While this species is undoubtedly present in the area, it is not benefiting from the park. No evidence of hares was noted with the park. This species is known from farmland, Dublin Airport grasslands and St. Margaret's. Again, this species is not availing of the park as a feeding area.

Santry Demesne would appear to be less attractive to mammal fauna than prior to its conversion to a public park. This in itself is significant as it may be an indicator of the effects of park creation on the local fauna.

Santry Demesne was in many respects an estate in decline or neglect and this may have provided better conditions for some mammals than the order that would be desirable and required in a public park.

Recommendations

Planting of hedgerow

The provision of hedgerow would enhance the park for all mammals. It would increase food supply and shelter and connect up the entire park for mammals including badgers and bats.

Provision of inconspicuous timber bat boxes

The use of bat boxes that blend with the underlying tree may be advantageous at Santry. The use of rough deal boxes that have weathered or even ones that have been painted black but are a single piece (i.e. no cover with a different colour or suspended from a wire or chain) may be preferable.

Protection of the river from pollution

The river must be carefully monitored and protected from the discharge of industrial chemicals or domestic waste. A toxic water course will quickly affect any organism dependant upon it. The river may sustain otters along some of its route and this would lead to the poisoning of a highly protected mammal species in the European context (Annex II of the Habitats Directive)

Planting of fruiting bushes and trees

This may be seen as complementary to the planting of hedgerow. While it is not proposed that fruit that is commercially available is grown, (e.g. apples, pears, plums etc.), blackberries, “jonkers”, blackcurrants etc. would all be beneficial to wildlife and also allow for the visiting public to avail of them.

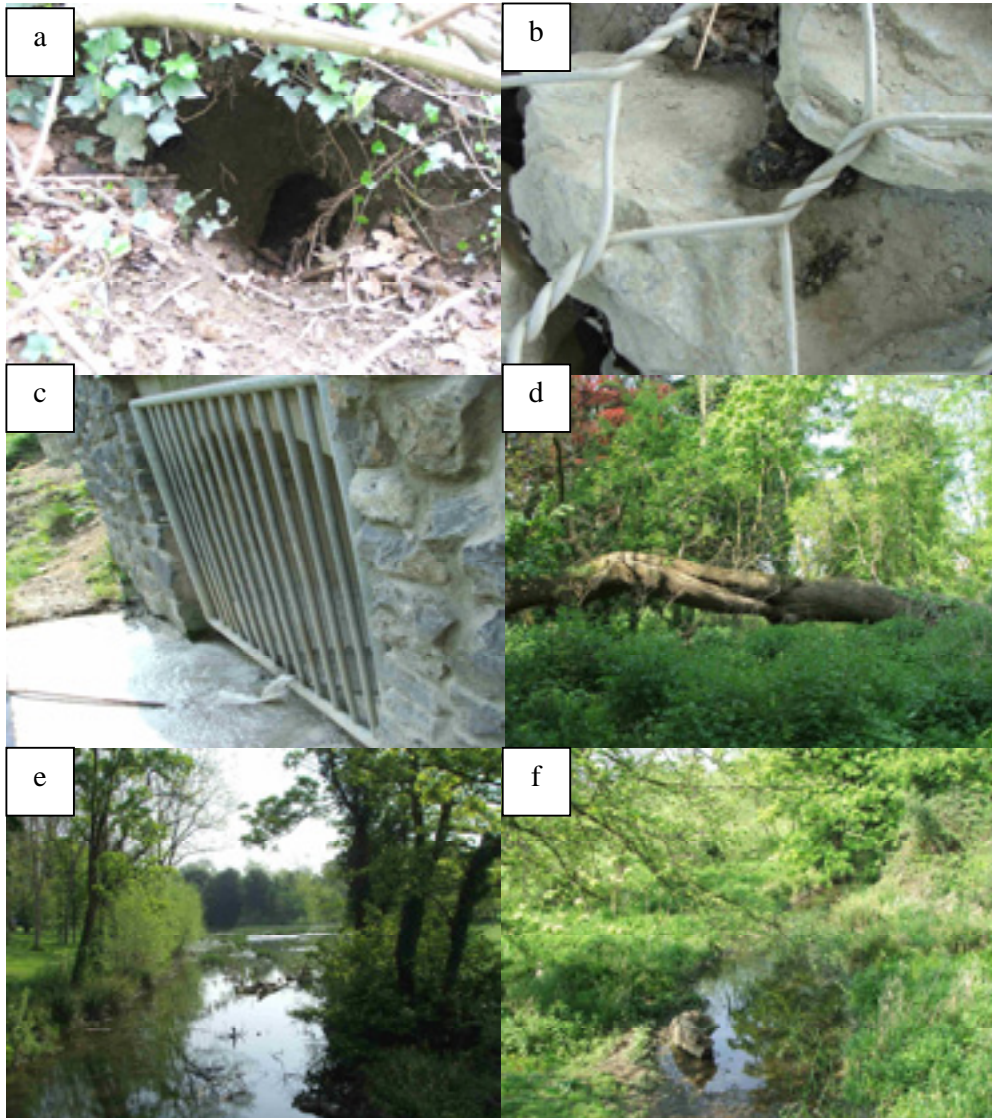


Figure 1: Mammals in Santry Demesne

- (a) Rabbit warren, (b) Mink spraint at western edge of park
- (c) Culvert with toxic chemical odour (spirits?), (d) Fallen tree in rougher ground
- (e) Pond over which most bat activity was noted, (f) Good potential sites for invertebrates

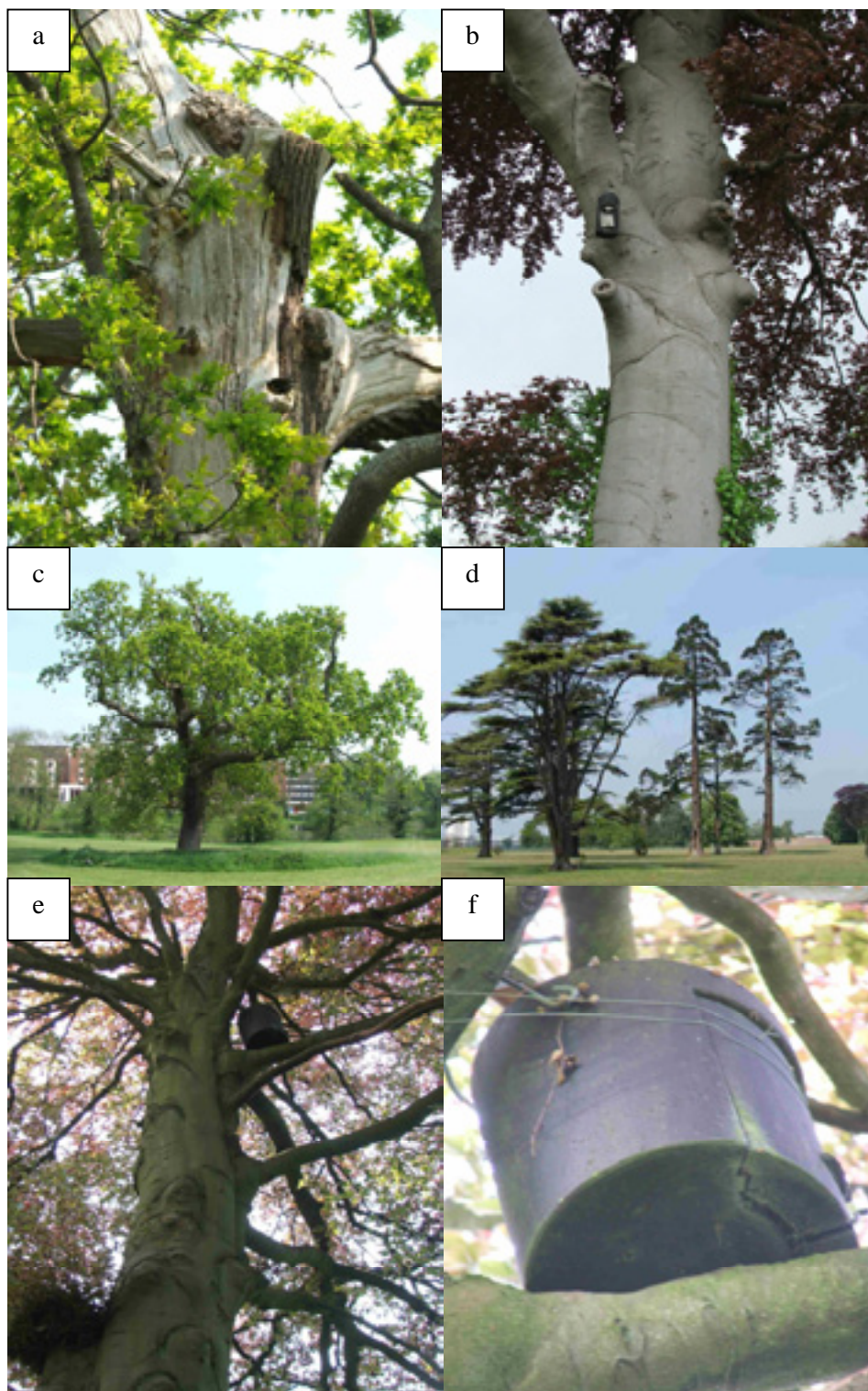


Figure 2: Trees with bat potential

- (a) Tree damage and rot allowing access for bats (b) Bat box on beech tree (vandalised)
- (c) Oak with high potential as a roost site and (d) Conifers with bat box suitability
- (e) Tree with bat hibernation box (f) Close up of the bat hibernation box

Discussion

Mammals and woodland in Fingal

Overall, only one uncommon mammal species was encountered in all of the study area, the whiskered bat (or potentially the less common Brandt's bat). This species has been included by Tony Whilde in the Irish Red Data Book for Vertebrates as of indeterminate status due to the scarcity of records. This situation is under constant revision as more bat studies are undertaken. Even given the much greater level of recording of this species, it is clearly one of the less common species of mammal in Ireland.

In Fingal, it has been encountered in areas such as Luttrellstown, Ashtown, Beech Park, Clonsilla, Knockmaroon and Somerton (along the River Liffey) as well as St. Catherine's Wood Lucan in addition to the record from Ardgillan in 2000 and the current record from Hampton.

This species selects darker woodland and forestry edge or woodland rides and paths. It is intolerant of light and is very uncommon in urban areas.

The survival of this species is of interest given the continuing changes to the Fingal landscape.

Woodland bat species as compared to generalist species of bat are rare in Ireland. Most Irish species will feed along hedgerow as well as in woodland and the more successful species will also feed in gardens and even close to street lights. In Britain and the European mainland, species such as Bechstein's and Barbastelle are considered more typical of ancient woodland. The absence of these species in Ireland may be

attributable Badgers Many of the areas examined in this study are prone to human disturbance on a regular basis either because they are public parks, they are adjoining schools or hospitals or are close to a town or village. The most markedly affected of these is Santry Demesne.

By its very demography, Fingal woodland is rarely removed from human disturbance such as social/ underage drinking, fires, litter. From evidence of human activity, the least disturbed area would most likely be Delvin Woodlands. Hampton, and Ardgillan are relatively undisturbed and Gormanstown experiences a level of disturbance from pupils and from (low level) night time drinkers.

Nocturnal disturbance is more likely to be detrimental than daytime human activity as mammals are predominantly nocturnal and would encounter humans while crossing the sites.

APPENDICES

Maps Depicting Mammals noted at:

A) ARDGILLAN DEMESNE

B) HAMPTON DEMESNE

C) GORMANSTOWN

D) DELVIN

E) MALAHIDE

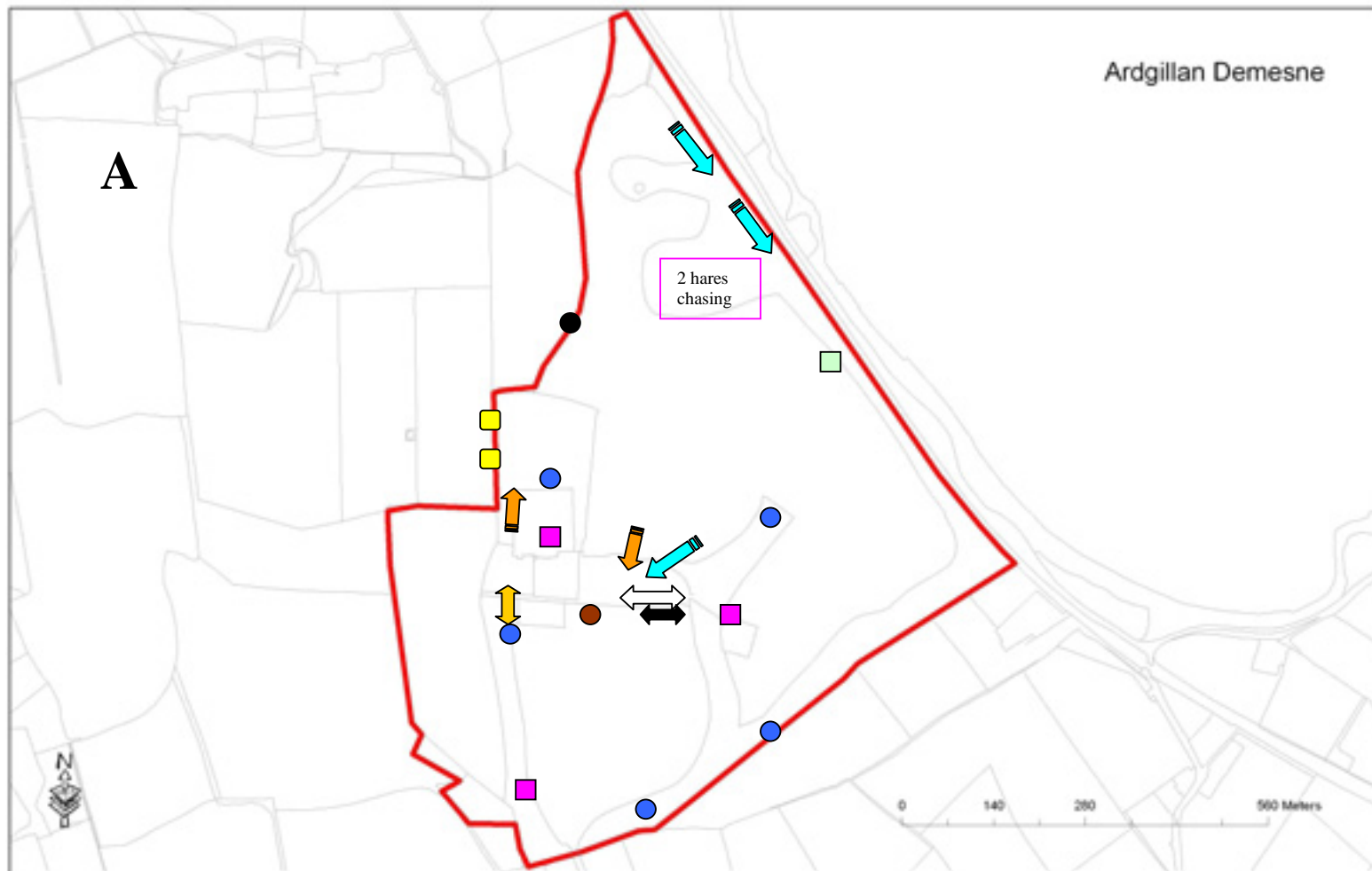
F) PORTRANE

G) HOWTH

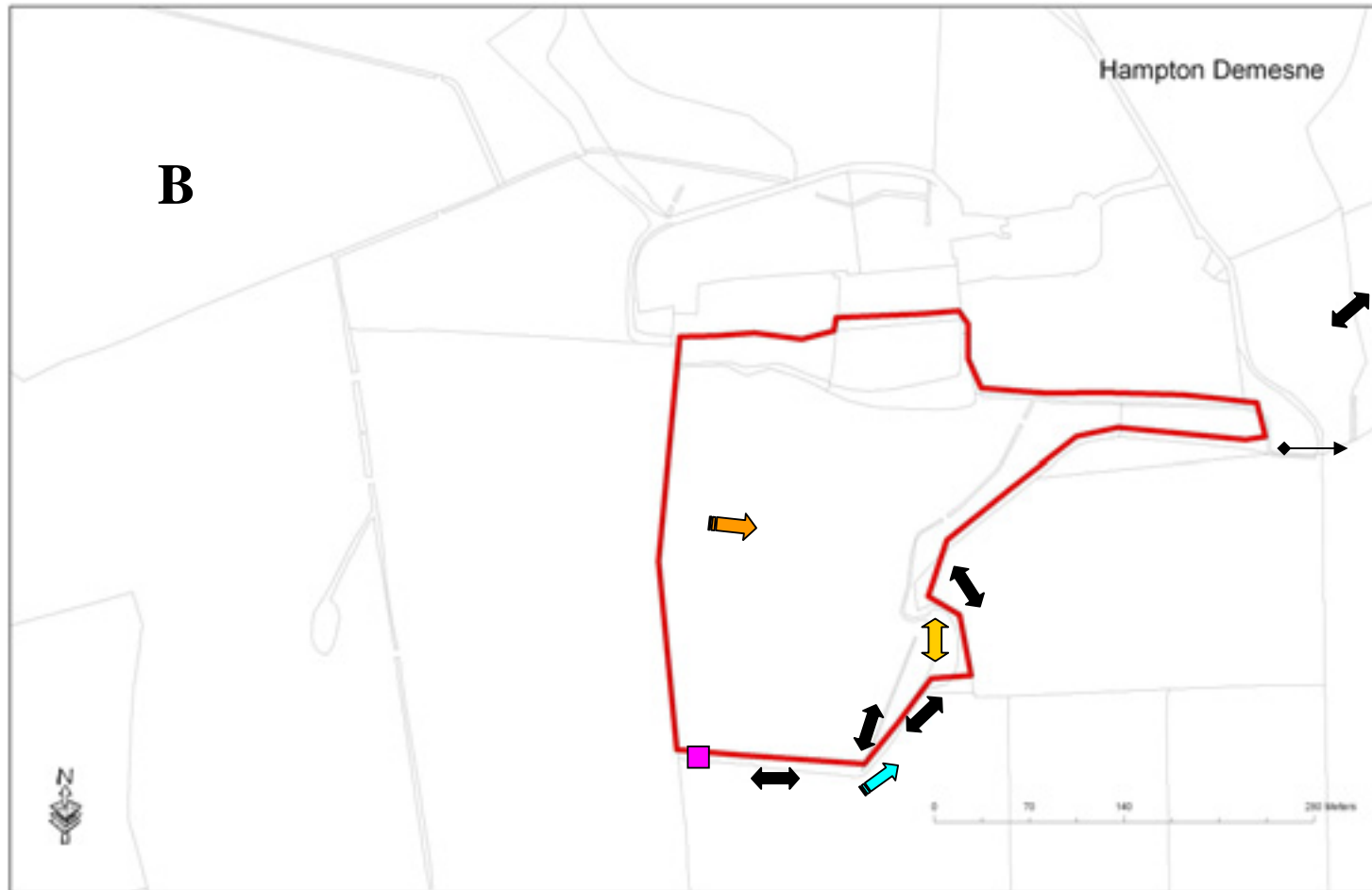
H) SANTRY

LEGEND TO ACCOMPANY ALL MAMMAL MAPS IN THE REPORT

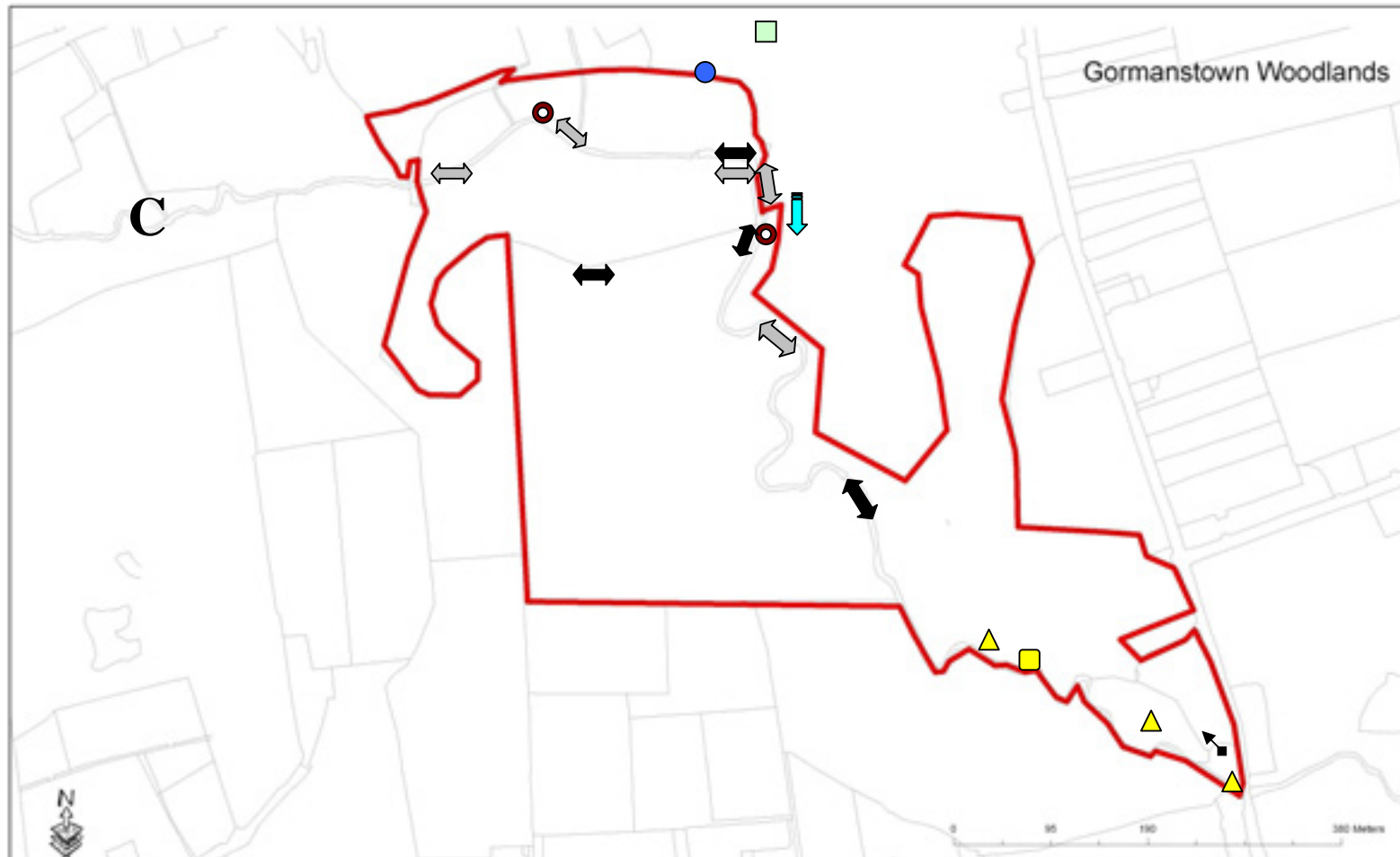
●	Fox earth
◆→	Fox track
■	Badger sett
▲	Badger tracks or dung
●	Rabbit warren
●	Wood mouse signs
□	Hedgehog
◌	American mink
◌	Grey squirrel
↔	Daubenton's bat
→	Brown long-eared bat
↔	Leisler's bat
→	Common pipistrelle
↔	Soprano pipistrelle
↑	Whiskered/ Brandt's bat



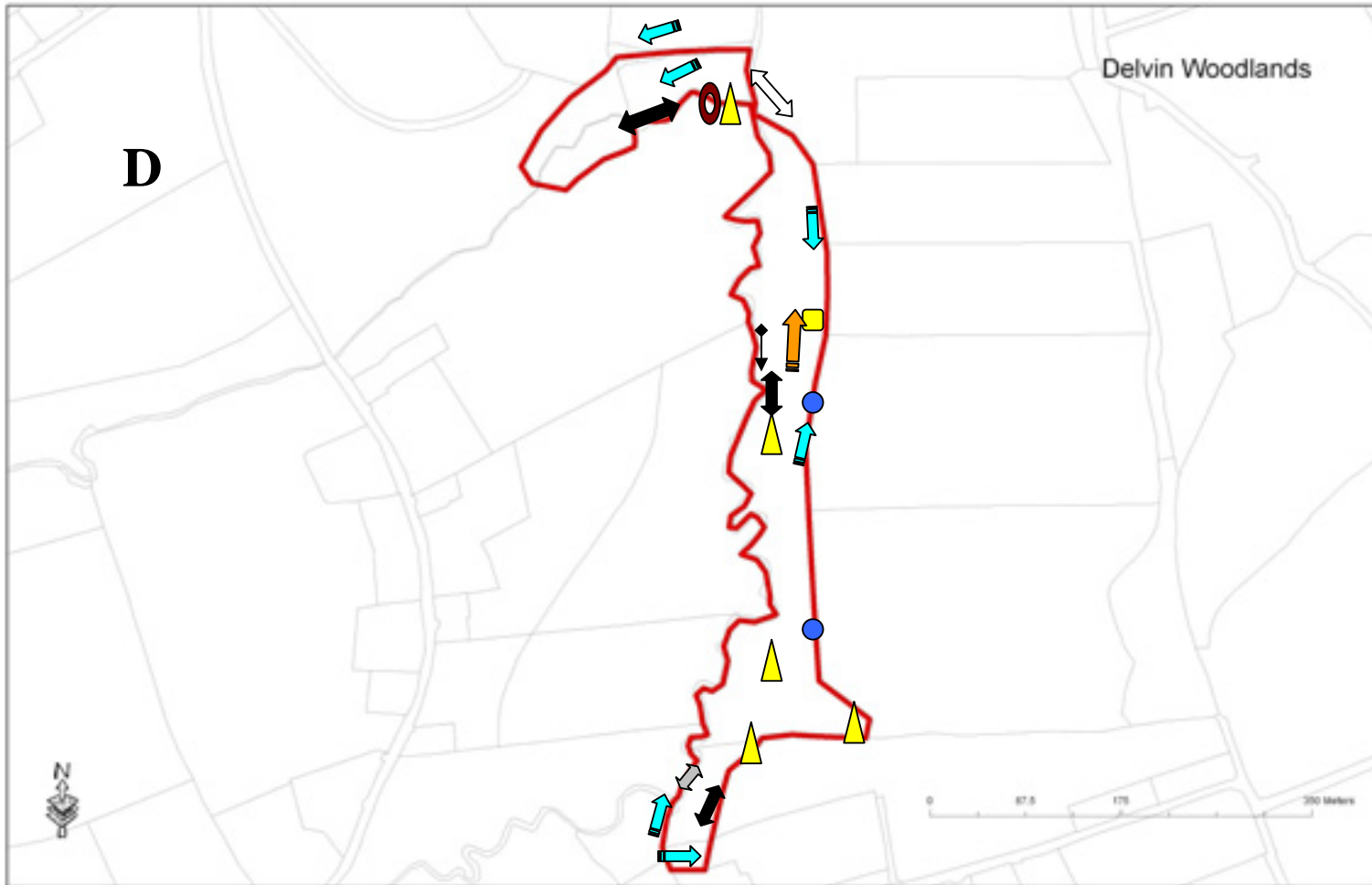
The Mammals of Ardgillan Demesne (See Legend for Details)



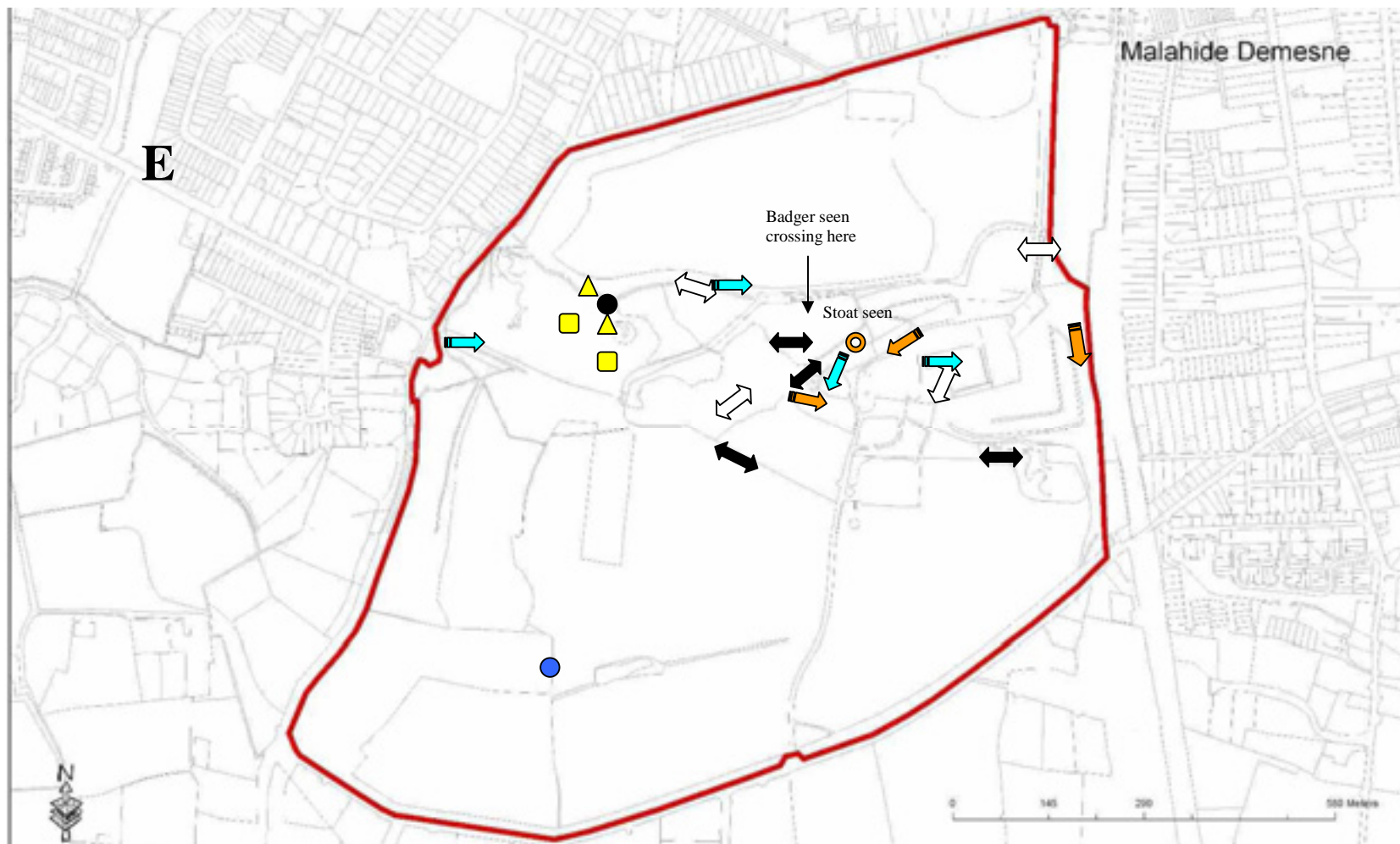
The Mammals of Hampton Demesne (See Legend for details of each symbol)



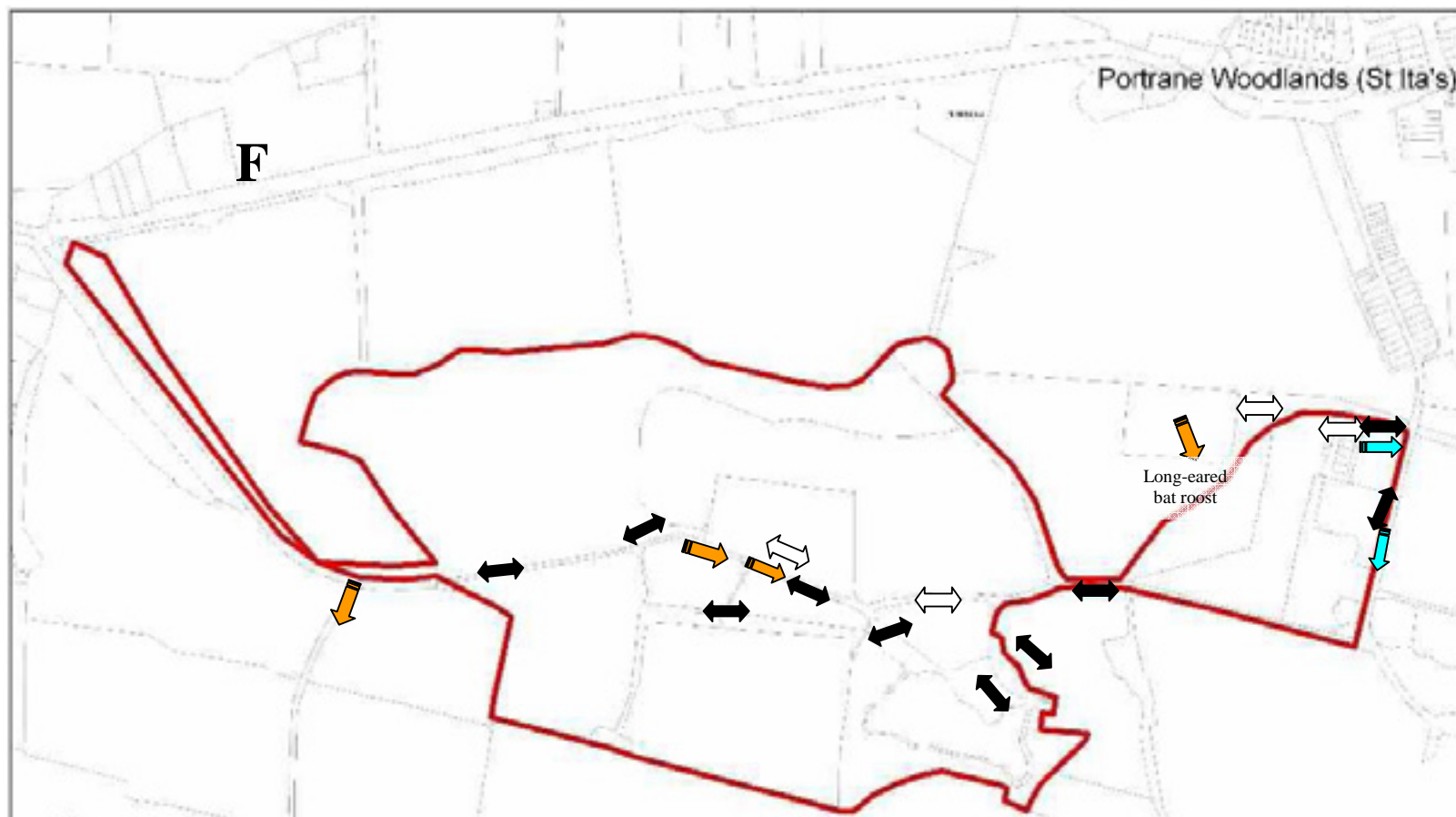
The Mammals of Gormanstown Woodlands. (See Legend for details)



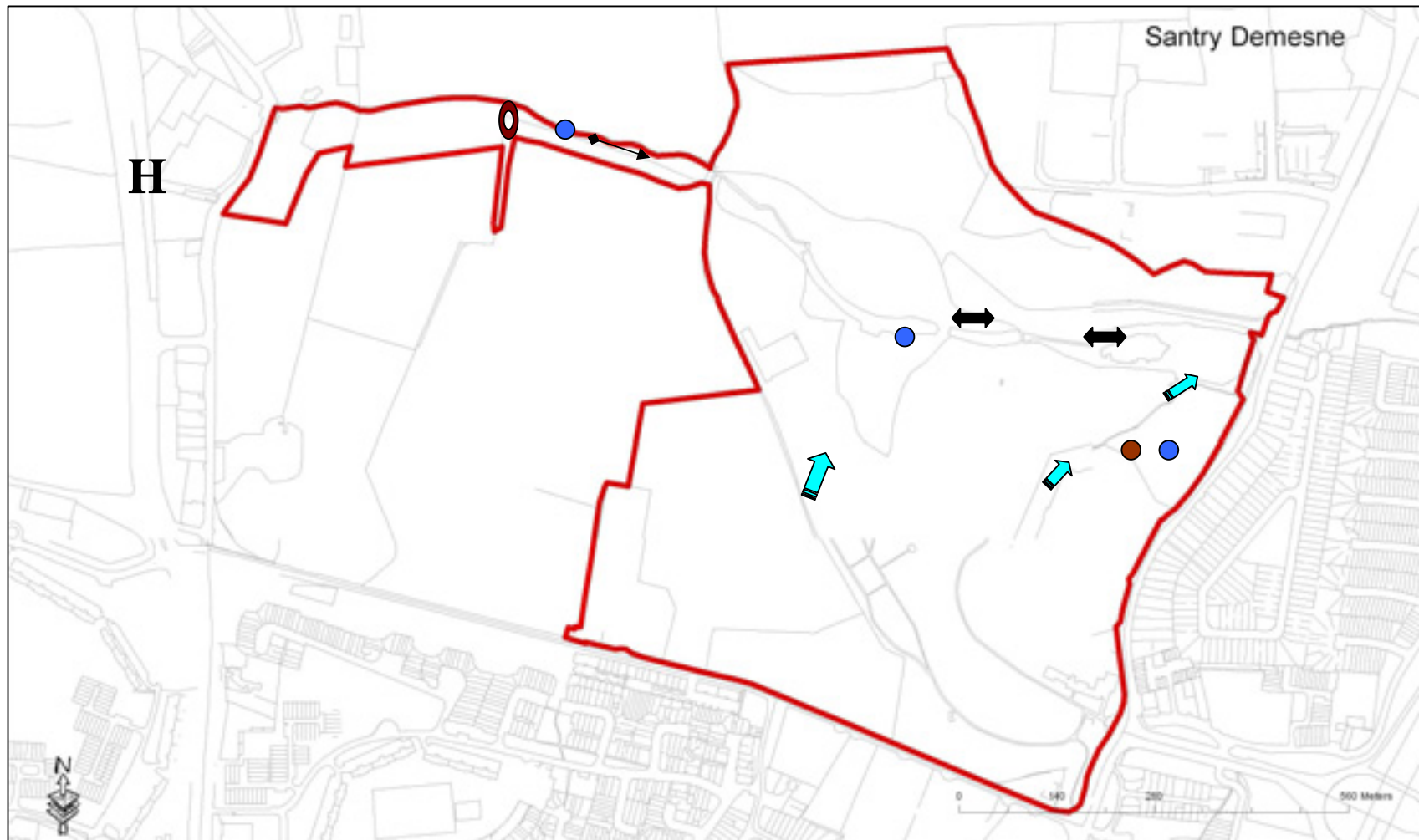
The Mammals of Delvin Woodlands (See legend for details)



The Mammal Fauna of Malahide Demesne (See Legend for details of each symbol)



The bats of Portrane Woodlands (See Legend for details of symbols)



The Mammals of Santry Demesne (See Legend for details of symbols)

SPECIES OF MAMMAL IN FINGAL WOODLAND AREAS IN THIS REPORT

Species	Latin name	Protection level
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	Annex IV, Appendix II
Soprano pipistrelle	<i>P. pygmaeus</i>	Annex IV, Appendix II
Leisler's bat	<i>Nyctalus leisleri</i>	Annex IV, Appendix II
Natterer's bat	<i>Myotis nattereri</i>	Annex IV, Appendix II
Daubenton's bat	<i>Myotis daubentonii</i>	Annex IV, Appendix II
Whiskered	<i>Myotis mystacinus</i>	Annex IV, Appendix II
/ Brandt's bat	<i>Myotis brandti</i>	Annex IV, Appendix II
Brown long-eared bat	<i>Plecotus auritus</i>	Annex IV, Appendix II
Badger	<i>Meles meles</i>	Appendix III
Stoat	<i>Mustela erminea hibernica</i>	Appendix III
Otter	<i>Lutra lutra</i>	Annex II, IV, Appendix II
American mink	<i>Mustela vison</i>	No legal protection
Fox	<i>Vulpes vulpes</i>	No legal protection *
Irish hare	<i>Lepus timidus hibernicus</i>	Annex V)
Rabbit	<i>Oryctolagus cuniculus</i>	No legal protection
Fallow deer	<i>Cervus dama</i>	Wildlife Act
Wood mouse	<i>Apodemus sylvaticus</i>	No legal protection
House mouse	<i>Mus musculus (domesticus)</i>	No legal protection *
Grey squirrel	<i>Sciurus carolinensis</i>	No legal protection *
Brown rat	<i>Rattus norvegicus.</i>	No legal protection *
Hedgehog	<i>Erinaceus europaeus</i>	Appendix III
Pygmy shrew	<i>Sorex minutus</i>	Appendix III

Annex refers to the Habitats Directive

Appendix refers to the Bern Convention

Please refer to the relevant legislation for details

Annex II = Requires the designation of SACs

Annex IV = Strict protection

Annex V = may be exploited but not to the extent that its favourable conservation is compromised

Appendix II = Strict protection

Appendix III = Protection

(* other than Acts dealing with cruelty)