scott cawley

SURVEYS TO RECORD BAT ROOSTS IN STRUCTURES IN PHOENIX PARK

PHASE 1 (2007)

FUNDED BY

HERITAGE COUNCIL

OFFICE OF PUBLIC WORKS

OPW
The Office of Public Works
Oifig na nOibreacha Poibli

The Heritage Council
An Chomhairle Oidhreachta

Acknowledgements

This project was funded by the Heritage Council under the Wildlife Grant Scheme 2007 and by the Office of Public Works.

Scott Cawley, Environmental Consultants would like to thank the following for their assistance and support during this project: Amanda Ryan (Heritage Council), Laura Farrell (OPW), Margaret Gormley (OPW), Gabriel Gleeson (OPW), Mairead Stack (Dublin City Council), Ferdia Marnell (National Parks and Wildlife Service), Brian Keeley, Caroline Shiel, Delia Hickey (OPW), Garda Siochana at Áras ná Uachtarain and Garda Headquarters, Sandra Devaney (Dublin Zoo), Staff at Civil Defence School and US Ambassador's residence and all those who assisted in gaining access to structures in Phoenix Park.

Front cover Photo: Leisler's Bat found grounded under tree roost near Dublin Zoo (reproduced by kind permission of Bernie McDonnell).

Introduction

1.1 Background

The aim of the project was to record bat roosts in selected structures in Phoenix Park, Co Dublin. Scott Cawley, Environmental Consultants, were awarded a Wildlife Grant from the Heritage Council in 2007 to carry out this project. The Office of Public Works has also provided funding for this project.

The rationale behind the project came from our experience in encountering many situations where historic properties were being restored or repaired and was found to be host to bats. As other consultants will testify, bats are often encountered at a very late stage in such works and as a result there is usually a great deal of inconvenience to architects and builders when works are held up on account of bats having to be ensured the necessary protection.

Such negative experiences are, unfortunately, still rather common and have led to bats receiving more than their share of bad press. Rather than being seen as an important element of biodiversity that warrant protection, they have been portrayed as problematic factors that cost time and money or even prevent development in its tracks. Such views are, thankfully, being combated with awareness-raising and an increasing realisation that such problems can be addressed by a little forward planning and an appreciation of bat ecology and the legislative background to their protection. In many cases that Scott Cawley dealt with in 2005 and 2006, owners of properties, developers and architects foresaw the potential for bats to be present and allowed mitigation of potential impacts upon roosts to take place.

Phoenix Park contains a diverse array of habitats in its 707 hectares of land. It includes over 200 hectares of woodland and small streams, lakes, ponds, wetlands, open grassland and scrub habitats. Phoenix Park contains over 60 groups of buildings and monuments ranging from the simple Tea Room building near Dublin Zoo, to the complex of grand buildings at Áras ná Uachtarain and the US Ambassador's Residence. Many are located close to woodland, water and to open pastures where bats are known to feed throughout the summer. The age and type of buildings around the Park make many of them suitable for roosting sites for bats. Scott Cawley were very aware of the numbers and types of buildings in the Park and were also aware of the difficulties of managing the fabric of such properties whilst ensuring that protected species would not be harmed.

Scott Cawley had been commissioned by the Office of Public Works to carry out the protection and preservation of a bat roost at Emo Court in Co. Laois in 2006. The roost of nearly 400 soprano pipistrelle bats (*Pipistrellus pygmaeus*) was threatened by proposed building works that would convert the unoccupied Dower House into Tea Rooms. The project was a success with equal numbers of bats returning and breeding in the following year. It brought to light the possible conflicts between historic property management and protection of bat species. With such a high density of such potential bat roosts in one area, it was proposed that a comprehensive study of bat roosts within Phoenix Park would help their overall integrated management.

1.2 Bats and their Roosts

This report does not aim to provide detailed information on the roosting preferences of Irish bats or their ecology as there are many other sources of information that deal with this subject alone. However, when discussing roosting

opportunities, roosting preferences and types of roost in Phoenix Park it is useful to outline the various types of roost used by the bats known to breed in Ireland.

All bats in Ireland may use buildings for a variety of purposes throughout the year and throughout the life cycle. Therefore a building can never, in reality, be presumed to be unused by bats at any time of year. However, surveys of bat roosts have indicated that certain species will prefer certain parts of buildings or building types for certain functions. This makes roost surveys and determining opportunities for bats much easier although with bats there are usually more 'exceptions to the rule' than rules.

Of the ten bats known to breed in Ireland, the lesser horseshoe bat (*Rhinolophus hipposideros*), is not likely to occur in Phoenix Park. It is only found in Cos. Kerry, Limerick, Cork, Clare, Galway and Mayo.

Table 1: Roost Preferences for Bats likely to be encountered in Phoenix Park

Species	***Summer Roosts (inc. maternity roosts)***	***Winter Roosts(for dormancy and hibernation)***	***Location within roost site***
Common Pipistrelle (*Pipistrellus pipistrellus*)	Found in widest range of buildings including modern buildings and flat roofs which are not often occupied by other bat species. Less often uses trees roosts.	Often moves around same building used for summer roost. Uses variety of crevice habitats.	Crevices, under tiles and slates when in small groups or singly. Breeding females in ridge tree and in corners.
Soprano Pipistrelle(*Pipistrellus pygmaeus*)	As above. Often more frequent near water than *P. pipistrellus* and roosts in greater numbers (>100 is common).	As above.	As above.
Nathusius' Pipistrelle (*Pipistrellus nathusii*)	Unknown but recorded in cavity walls in brick buildings and under slates.	Unknown.	Unknown.
Brown long eared bat (*Plecotus auritus*)	Prefers large open roof spaces with stable temperatures throughout year e.g. churches, closed barns etc. Also found in trees and in crevices. Usually in small numbers.	Hibernates in similar structures to summer roosts but more often in crevices.	Frequently observed roosting in open along ridge beam but also found in crevice habitats.
Leisler's Bat (*Nyctalus leislerii*)	Tree roosts, stone buildings, chimneys and roof spaces. Usually in relatively small numbers.	As summer roosts. Variable.	Crevice-loving but when breeding found in more open spaces. Regularly moves between roosts.
Natterer's Bat (*Myotis nattereri*)	Breeding roosts more often in buildings. Single bats often found in bridges and crevices in stonework.	Hibernates underground and in bridges, deep crevices in stonework etc.	Crevice-loving but when breeding found in more open spaces.
Daubenton's Bat (*Myotis daubentoni*)	Predominantly around lakes and rivers in buildings, stonework and under bridges.	Hibernates underground and in bridges, deep crevices in stonework etc.	Crevice-loving but when breeding found in more open spaces.
Brandt's Bat (*Myotis*	Predominantly around	Hibernates	Crevice-loving but

brandtii)/Whiskered Bat (*Myotis mystacinus*)	lakes and rivers in buildings, stonework and under bridges.	underground and in bridges, deep crevices in stonework etc.	when breeding found in more open spaces.

Figure 1: Leisler's Bat – Ireland's largest bat and frequently recorded feeding above open areas in Phoenix Park. (Bat photographed is not from Phoenix Park).

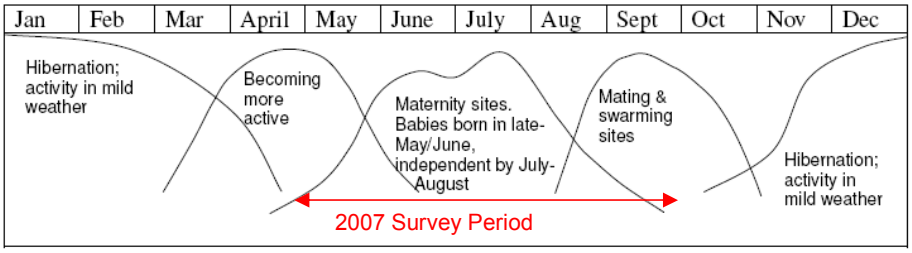
Figure 2: Brown Long-eared Bat roosting on the ridge beam in the church in St Mary's Hospital, Phoenix Park.

Figure 3: Gaps under lead flashing and under soffit boards can provide access for bats (US Ambassador's Residence outbuildings, Phoenix Park)

Figure 4: Hanging slate tiles and old slate roofs provide excellent crevice roosts for Pipistrelle species and other small bats (Magazine Fort, Phoenix Park).

Bat activity outside the roost in Ireland is primarily dependent upon the air temperature and the availability of food i.e. flying insects and arthropods. The maritime climate of Ireland usually prevents very cold nights for long periods and it is suspected that many bats may not hibernate in the physiological sense of the word. Bats may become dormant when temperatures are too low to justify active flight but may become active again on milder days. It is quite common to see bats flying in late autumn when the urge to mate and possibly to move to hibernacula is strong.

Figure 5: The Bat Year (taken from Bat Mitigation Guidelines for Ireland (2006))



Phoenix Park offers superb opportunities for bats in terms of undisturbed woodland and wetland areas and multiple roost opportunities in mature trees, roof spaces and stonework. It is therefore potentially an important part of the city's biodiversity and requires active conservation, protection and management.

1.3 Bats and the Law in Ireland

All bat species are protected under Irish Law in the form of the *Wildlife Act, 1976* and *Wildlife (Amendment) Act (2000).* These make it an offence to

- Intentionally kill, injure or take a bat;
- Possess or control any live or dead specimen or anything derived from a bat
- Wilfully interfere with any structure or place used for breeding or resting by a bat ;
- Wilfully interfere with a bat while it is occupying a structure or place which it uses for that purpose

However, the Acts permit limited exemptions for certain kinds of development.

At the international level, the Habitats Directive (*EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora*) is implemented in Ireland by the *European Communities (Natural Habitats) Regulations 1997-2005*. These regulations allow the Irish Government to designate sites for rare or vulnerable species. Special Areas of Conservation have been established under these regulations, for lesser horseshoe bats in Ireland and strict procedures regarding management of these sites is prescribed. All other bats species are also protected under the Regulations and unlike the Wildlife Acts, the Habitats Regulations cover all activities without exemption.

Offences pertaining to bats and their roosts are similar to that under the Wildlife Act. However with the Habitats Regulations, if a roost or bat is affected accidentally then this is not a defence in law. Whilst this may seem rather weighed against developers, the Regulations allow developers to obtain derogation from the Regulations to allow then, in certain circumstances, to disturb bats and their roosts. Such derogations are provided by the Minister for the Environment, Heritage and Local Government through the Species and Regulations Unit of the National Parks and Wildlife Service. Derogations are provided only where the applicant has provided evidence that the works being permitted will not affect the favourable conservation status of the bat species involved. Applicants have to provide proposals to mitigate for loss or disturbance to roosts and will be subject to monitoring and reporting requirements.

Furthermore as a signatory to the European Bats Agreement ('Eurobats') (*Agreement on the Conservation of Bats in Europe*) 1993, Ireland is required to protect their habitats, requiring the identification and protection from damage or

disturbance, of important feeding areas. All Irish bat species are listed in Appendix II of the Bern Convention (1979), as species requiring strict protection.

Finally, all but two bat species in Ireland are listed as '*internationally important'* in the Irish Red Data Book (1993). Natterer's and the whiskered bat are both listed as indeterminate. Brandt's bat status is not yet determined in Ireland.

The bat surveys undertaken in this study were carried out under a derogation licence issued by the National Parks and Wildlife Service. This derogation allowed bats to be photographed within their roosts under strict conditions for the purposes of this study. No other type of disturbance took place at bat roosts in the Park.

2.0 Objectives

The objectives of the study were as follows:

- To identify significant bat roosts within structures in Phoenix Park;
- To provide a recommended approach to protecting and managing these structures.

3.0 Methodology

Phoenix Park, as well as many of the structures in the Park are owned and maintained by the Office of Public Works (OPW). The recommendations for managing these properties are therefore specifically directed at the OPW and their staff. However, the lessons learned from these studies are applicable to owners and managers of similar historic properties in Ireland.

1. Identification of structures to be surveyed.

It was acknowledged at the outset of the project that the 2007 surveys could not feasibly address all structures in the Park. Therefore a list of structures that required repair and restoration works was provided by the OPW and was used by Scott Cawley to prepare a corresponding list of structures that required bat surveys as a matter of urgency. This list was agreed with the OPW and surveys were completed on the following structures in the period May to August 2007.

1. Áras Ná Uachtarain (including the Main House, Gardener's Lodge and outbuildings, Main Gate lodge, Garda Siochana Mounted Stables, Boathouse and activity surveys)
2. Bandstand
3. Castleknock Gate Lodge
4. White's Gate Lodge
5. Ratra House: Civil Defence School (training area)
6. Deerkeeper's Lodge
7. Garda Headquarters Gate Lodge
8. Knockmaroon Gate Lodge
9. Lake Cottage
10. Magazine Fort
11. Nunciature Gate Lodge
12. Nunciature's Flat
13. People's Garden Depot
14. St Mary's Hospital (church)

15. Bailiffs' (Superintendent's) lodge
16. Tea Rooms
17. US Ambassador's House (outbuildings only)
18. Whitefields Depot
19. Zoo (preliminary activity survey)

It is proposed to survey the remainder of the structures in Phoenix Park in 2008, subject to further funding.

2. Daytime Surveys of Structures

Following contact with the OPW and the property occupier, a visual assessment of the interior and exterior of each structure was undertaken during daytime hours by Scott Cawley ecologists. Health and safety risk assessments always preceded any entry to the properties to ensure that such risks were minimised and that safe working practices were adopted.

A full examination of the interior and exterior of the structures was undertaken to search for the presence of bats and identify potential roost sites. Bat activity is usually detected by the following signs:

- bat droppings (these will accumulate under an established roost or under access points);
- insect remains (under feeding perches);
- oil (from fur) and urine stains;
- scratch marks; and
- bat corpses.

Interior surveys were restricted to accessible areas and those that were safe to enter. These included roof interiors (referred to as attics or loft spaces), cellars, rooms and interiors of sheds and outbuildings.

The majority of buildings were surveyed to identify significant summer roosts and therefore there was an emphasis upon certain areas within structures such as attics and old outbuildings. Surveys of hibernation sites were not included in the 2007 surveys as they are very difficult to carry out with an acceptable level of confidence as bats often hibernate in deep crevices. In addition, the project timetable commenced in March when many bats would be emerging from hibernation and therefore occupied hibernation sites would not be detected. Nevertheless, during the structural surveys, the potential for hibernacula to be present was included in the scope of the analyses.

3. Dusk Emergence and Dawn Swarming Surveys

Dusk emergence surveys involved a surveyor observing a building to record bats leaving the roost to feed at dusk. The dusk surveys commenced immediately prior to dusk and for up to two hours after dusk. This time period is usually adequate to cover all emergence times for different species of bats. The surveyor searched for bats emerging from 'roost access points' and was assisted by ultrasonic detectors to identify bat species.

Bat detectors used included a heterodyne/time expansion (*Pettersson D240x*) detector which allows bat calls to be recorded and played back at slower speeds, which aids identification of the species with specialist software. Bat calls were recorded onto a *Creative Nano plus* Mp3 recorder and were analysed later with *BatSound 3.31*.

The dawn surveys were undertaken on the following mornings in a similar manner to the dusk surveys. In large roosts, bats will 'swarm' around entrances to roost sites prior to entering the roost. The aim of the dawn surveys was to identify roost access points, to count numbers of bats swarming around roost sites and to identify species re-entering any roost site. The dawn surveys were undertaken from up to two hours prior to sunrise to just after sunrise.

Figure 6: Recording Equipment used during detector surveys (L-R Pettersson D240x Time Expansion detector linked to Creative Nano Plus Mp3 recorder, Anabat SD1 Bat detector)

4. Activity Surveys

Surveys of bat activity throughout the night were carried out in a selection of properties in order to record the intensity of bat activity through the night and to determine the species using the area. These surveys were undertaken unaccompanied, using an *Anabat SD 1* passive ultrasound detector. Signals were stored on a memory stick and could be analysed using *Analook* software. The analyses allowed quantification of bat activity through the night and breakdown of bat activity by species.

Bat activity in the wider environs of structures was often undertaken after the dusk emergence surveys were completed and allowed mapping of bat activity in the Park.

This bat detector can also be connected to a handheld Geographic Positioning System ('GPS') which allows each bat call to be recorded alongside a geographic grid reference. By driving around Phoenix Park with the Anabat detector and the GPS Unit connected together on the roof of a vehicle, a map of bat activity was prepared. It must be noted that this survey was carried out in September and hence missed the optimum period for detector surveys (May to August). Nevertheless it did provide important data to assist in the knowledge of bat foraging in the Park.

4.0 Results

4.1 Previous Records of Bats in Phoenix Park

The surveys carried out in 2007 took cognisance of those carried out by Brian Keeley and the Dublin Bat Group in the 1990s. These previous records cover a large proportion of the Park and were a useful indicator of where bat species have been recorded in the past. However, these surveys did not include systematic examination of buildings. The previous surveys reported that the following bats were present in the Park:

Common Pipistrelle (*Pipistrellus pipistrellus*) - present throughout the Park,
Soprano Pipistrelle (*Pipistrellus pygmaeus*) - present throughout the Park.
Daubenton's Bat (*Myotis daubentonii*) – common at lakes and ponds
Brown Long-eared bat (*Plecotus auritus*) – recorded in woodland and near ponds;
Leisler's bat (*Nyctalus leislerii*) – recorded throughout the park;
Natterer's Bat (*Myotis nattereri*)– first record for Dublin City.

The distribution of these species throughout the Park as previously recorded is summarized as follows:

Table 2: Summary of pre-2007 Bat surveys of Phoenix Park.

Location	Pipistrellus spp	Daubenton's Bat	Brown Long-eared bat	Leisler's bat	Natterer's Bat
Áras ná Uachtarain	Roost nr Civil Defence boundary	Feeding over lake (now in Zoo)	Recorded	Recorded + mating calls	
OSI HQ	Roost	Recorded		Roost?	
St Mary's Hospital	Roost in Boiler Ho Chimney and dental surgery area.			Roost in Boiler Ho Chimney.	
Glen Pond	Feeding	Feeding	Recorded	Recorded	
Quarry Lake	Feeding	Feeding	Recorded		
Oldtown Wood	Recorded + mating calls			Recorded + mating calls. Roost in trees.	Dead specimen recorded
Dog Pond	Feeding	Feeding		Feeding	
Zoo	Feeding	Feeding		Possible roost	
US Ambassador's residence				Recorded	Possible
Peoples' Garden			Droppings in sheds.		
Machinery Pond	Feeding	Feeding			
Phoenix Monument				Feeding	
Civil Defence	Possible roost			Droppings in tower.	

Further consultation with B. Keeley and Dr C. Shiel, who have undertaken other surveys in the vicinity have revealed other records of bats including Whiskered Bat (*Myotis mystacinus*) near Parkgate Street (B. Keeley, pers. Comm.) and a Brown long-eared bat roost in the US Ambassador's residence. A Leisler's bat roost in the Garda Headquarters was also recorded previously.

All of these results have been combined into the overall survey of the Park.

4.2 Results of 2007 Structure Surveys

Table 3 show the summary of the structure surveys carried out in 2007. The surveys described buildings and their suitability for use by bats, any evidence of bats using the structures and, where possible, the species responsible for the evidence.

Table 3: Summary of Roost Surveys in Phoenix Park 2007

Location	Suitability for Bats	Signs of Bats in daytime survey	Species recorded in night-time survey	Roost confirmed?	Roost suspected?
Áras Na Uachtarain (Main house, Gardener's lodge and outbuildings, main gate lodge, stables, boathouse)	Floodlighting of buildings and recent renovation of roof space in main house prevents bat access. Other outbuildings and lodges recently re-roofed and not accessible for bats. Some availability of crevices and slate roost sites. Excellent roosting opportunities in trees.	Brown long eared droppings in OPW depot storage shed.	*P. pipistrellus, P. pygmaeus, P. nathusii, Plecotus auritus, Myotis mystacinus, M. nattereri, M. daubentonii, Nyctalus leislerii.* All noted feeding and flying in unlit areas to the northeast of the main house and in woodland.	No	Possible night or feeding roost in storage shed. Likely to be roosts in trees and under slates. Possible good hibernation roost availability in underground voids and cellars.
Bandstand	Internal examination not possible but access via large gap in ceiling boards is evident.	No signs.	Night survey not carried out due to safety concerns.	No	Low to Moderate likelihood.
Castleknock Gate Lodge	External examination only suggests good suitability, but few access points. Moderate.	No signs and resident did not note any signs of bats.	*None.*	No	Moderate likelihood.
Civil Defence School (training area)	Excellent suitability for crevice-dwelling bats. Many ruined stone buildings and mock church tower offering good roost opportunities.	Small bat droppings (*Pipistrellus* or small *Myotis*) under door frames of stone buildings. Leisler's droppings on top floor of mock church tower.	Unidentified *Pipistrellus spp (*probably *P. pipistrellus at 48.5kHz). Myotis nattereri*, *M. daubentoni* and *Nyctalus leisleri.*	Yes	High likelihood of summer and hibernacula in ruined buildings.
Deerkeeper's Lodge	Access only to shed behind house. Good access around house.	Brown long eared	*None.*	Yes	Possible night or feeding roost in

Location	Suitability for Bats	Signs of Bats in daytime survey	Species recorded in night-time survey	Roost confirmed?	Roost suspected?
		droppings in shed. Old.			storage shed. High likelihood in remainder of structure.
Garda Headquarters Gate Lodge	Suitable for bats but not good access. Former Leisler's roost in Officer's Mess now lost due to building works. Other buildings mostly renovated or offer few roosting areas. Moderate.	No signs.	*N. leislerii* passing over at dusk and dawn.	No	Low to Moderate likelihood.
Knockmaroon Gate Lodge	External examination only suggests good suitability with a few access points. Moderate.	No signs and resident did not note any signs of bats.	*None.*	No	Moderate likelihood.
Lake Cottage	Good roosting potential in roof, around chimney and access points under eaves. No access to interior.	No signs of bats on exterior.	*Myotis nattereri* and *Pipistrellus pipistrellus* feeding in low numbers around edge of woodland.	No	High likelihood.
Magazine Fort	Many excellent roosting opportunities in roofs and in main magazine but survey access restricted due to safety problems.	Pipistrelle droppings in old shower block.	*Pipistrellus spp* noted emerging from southern side at edge of slate roof. Small roost suspected. *Unidentified Pipistrellus spp.*	Yes	Other buildings have high likelihood and also potential for hibernation roosts.
Nunciature Gate Lodge	No access points but good roof structure for crevice dwellers.	No signs of bats.	*N. leislerii* roosting in trees to south.	No	Moderate likelihood.
Nunciature's Flat	Good access points to roof space and into cavity wall. Record of	No signs of bats.	*N. leislerii* passing over building at dawn and dusk.	No – but former roost	High likelihood.

Location	Suitability for Bats	Signs of Bats in daytime survey	Species recorded in night-time survey	Roost confirmed?	Roost suspected?
	previous roost in wall. Now abandoned for no obvious reason. Good.			still available.	
People's Garden Depot	Good bat access to sheds and roof above ladies toilet. No signs of bats in open spaces.	No signs but access difficult.	Night survey not carried out due to safety concerns.	No	High likelihood of bats using crevice habitats.
St Mary's Hospital (church)	Good. Access restricted by grilles but there may be spaces. Good internal space and crevices for range of bat species.	Brown long-eared roost with one bat sighted on ridge beam.	*Plecotus auritus* flying around tower at dawn suggest this is the access point although this is not confirmed.	Yes.	-
Superintendent's lodge	External examination and dusk survey indicate good suitability for bats. Previous records of pipistrelle roost though were thought to be larger.	2 x Soprano pipistrelle seen leaving roost on southern side.	*P. pygmaeus* roost in dormer roof	Yes	-
Tea Rooms	Good access and good internal roof structure. Lighting from ceiling lights may cause problems.	No signs.	Night survey not carried out due to safety concerns.	No	Low to Moderate likelihood.
White Gate Lodge	Several access points. Good slate roof not entirely accessible. Moderate-good.	No signs and resident did not note any signs of bats.	*None*	No	Moderate-high likelihood.
Whitefields Depot	Floodlighting of buildings and recent renovation of roof space prevents bat access. Poor.	None.	*P. pygmaeus* feeding to south.	No	Unlikely.
Zoo (preliminary activity surveys)	Several potential good roost sites in Director's house, thatched cottages and trees.	High levels of bat feeding activity. Known Leisler's roost to west of Zoo.	*P. pipistrellus, P. pygmaeus, P. nathusii, M. mystacinus/brandti, M. nattereri, M. daubentonii, Nyctalus leislerii* all recorded feeding around lakes in African Plains and throughout Zoo.	No	*High likelihood of several roost sites.*

4.3 Bat Diversity in Phoenix Park

Phoenix Park is one of Europe's largest urban green spaces and in Ireland is an important cultural and environmental resource. However, how does it rate in terms of biodiversity? Table 4 below summarises the status of species recorded in Phoenix Park in 2007 and by previous surveys in the context of their national distribution.

Table 4: Summary of Bat Species recorded in Phoenix Park.

Name of bat species	National Status	Status in Phoenix Park	Locations Recorded	Roosting Status
Common Pipistrelle (*Pipistrellus pipistrellus*)	Widespread across whole country in both rural and urban areas.	✓ Present in medium numbers. Distributed across the park but in lower numbers than *P. pygmaeus*.	Recorded mainly along the edge of wooded areas.	No confirmed roosts although suspected roosts in the Magazine Fort, St Mary's Hospital and the Civil Defence School.
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	Widespread across whole country in both rural and urban areas.	✓ Present in high numbers. The commonest species recorded.	Variety of habitats including dense woodland, open parkland and around buildings and lakes. Almost all areas except those floodlit.	Confirmed roosts in the Magazine Fort, Superintendent's Lodge. Maternity roost previously recorded in St Mary's Hospital and known roost in the Ordnance Survey Headquarters. Possible roosts in the Civil Defence School.
Nathusius' Pipistrelle (*Pipistrellus nathusii*)	Limited knowledge of distribution. Only confirmed breeding roost is in N. Ireland.	✓ Present in very low numbers.	Recorded feeding in Áras ná Uachtarain and Dublin Zoo. May occur in other wooded areas.	Possible roosts in Dublin Zoo and in Civil Defence School training area.
Brown long eared bat (*Plecotus auritus*)	Widespread across whole country in rural and particularly wooded areas.	✓ Present, likely to be in moderate numbers.	Recorded in Áras ná Uachtarain and around St Mary's Hospital.	Confirmed roost in St Mary's Hospital Church of a small number of bats (<10). Possible night roost in OPW shed at Áras ná Uachtarain and at Deerkeeper's Lodge.
Leisler's Bat (*Nyctalus leislerii*)	Widespread across whole country, particularly in Leinster. Irish population is high in comparison to limited distribution in mainland Europe and UK.	✓ Present, likely to be in moderate numbers.	Recorded flying generally in a north-south direction over the Park with much feeding along edged of treelines near open areas. The only bat seen flying in open areas at dusk.	Confirmed roost for small numbers of bats (<10) in trees to west of Zoo and in trees near Ashtown Gate Lodge. Confirmed roost in top floor of mock church tower in Civil Defence School. Known 'lecking' or mating trees in Oldtown Wood and also around Ashtown Lodge.
Natterer's Bat (*Myotis nattereri*)	Recorded across the country in mainly rural areas.	✓ Restricted to certain areas in small numbers.	Recorded feeding around Áras ná Uachtarain and Dublin Zoo.	Previous recordings in Oldtown Wood but no known roosts. Possible roosts in trees in Áras ná Uachtarain and in Civil Defence School.
Daubenton's Bat (*Myotis daubentoni*)	Widespread across whole country primarily in areas associated with lakes, ponds or rivers.	✓ Small numbers present.	Recorded feeding at all water features in the Park.	No known roosts although could use a variety of crevice habitats in buildings, walls and other stonework in and around Dublin Zoo, Civil Defence School and Áras ná Uachtarain.

Brandt's Bat (*Myotis brandtii*)	Limited records in Ireland, mainly in rural areas in Cos Kerry, Clare, Cavan.	? Possibly present but difficult to distinguish by bat detector so is often treated as 'Brandt's/Whiskered'. Very low numbers recorded.	Recorded in Áras ná Uachtarain and Dublin Zoo	No known roosts although could use a variety of roost opportunities in and around Áras ná Uachtarain.
Whiskered Bat (*Myotis mystacinus*)	As Brandt's Bat.	? As Brandt's Bat.	As Brandt's Bat.	As Brandt's Bat.
Lesser horseshoe bat (*Rhinolophus hipposideros*)	Western seaboard counties including Cork, Kerry, Limerick, Clare, and Galway.	Not present.	Not present.	Not present.

In addition to the ten species known to breed in Ireland, the vicinity of Phoenix Park has been the subject of suspected recordings of Noctule Bat (*Nyctalus noctula)* although this has never been confirmed (and probably could not be unless an individual of this species is captured as its call is very similar to a Leisler's). Relatively widespread in England and Wales, Noctule bats have not made it across in Ireland and its similar sized cousin, the Leisler's Bat has seemingly filled the ecological niche that is normally occupied by the Noctule. As a result, Ireland is Europe's stronghold for this species. It is very likely that Noctule bats can cross the Irish Sea and may have been mistaken for Leisler's bat in Ireland. Unconfirmed records of Barbastelle (*Barbastella barbastellus)* were made by detector in 1996 in Portumna Forest Park in Co. Galway but no further evidence of this species has ever been recorded since.

4.4 Bat Activity in Phoenix Park

Whilst bats are usually expected to be found in rural and suburban environments where their food source (insects, spiders and arthropods) are found and where there are suitable roost sites nearby. It would follow therefore that they would not be found where food and refuge are not readily available. However, experiences of surveying in Dublin City Centre has shown that bats will be found feeding in the most unusual and inhospitable areas. For example, feeding bats have been recorded along O'Connell Street, over the IFSC and docklands districts and in the Liberties areas (P. Scott., pers.comm). It is therefore rather difficult to predict where bats are likely to be found as their behaviour is complex and influenced by many factors.

Overall, the detector surveys carried out in the Park around structures (the dusk and dawn surveys) and the vehicle surveys to record activity did not reveal a great deal of activity in 'ideal' bat habitats. There could be lots of reasons for this lack of bat activity. 2007 was one of the wettest on record and there was a frequent absence of any insect life after dark during the surveys. Areas where there would be expected to be full of midges, mosquitoes, moths, crane flies and other flying insects were frequently lacking in any life whatsoever.

Nevertheless, not all possible bat feeding habitat was accessible by car in 2007 and there are other areas such as the Furry Glen and Oldtown Wood that will be surveyed in the future to detect more bat activity.

Table 6 summarises the results of the activity surveys that were undertaken in 2007. It is sorted by species and describes where each species can be found feeding and/or commuting to feeding areas and roosts.

Table 5: Bat Activity in Phoenix Park.

Name of bat species	Feeding areas	Commuting areas	Numbers recorded
Common Pipistrelle (*Pipistrellus pipistrellus*)	Possibly around Civil Defence School training area, along North Road, Upper Glen Road.	None noted.	Very low, often individuals.
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	South of Whitefields, Chesterfield Avenue, Upper Glen Road, Ordnance Survey Road, North Road.	Chesterfield Avenue , North Road, both in east-west direction.	1-3 bats on any occasion.
Nathusius' Pipistrelle (*Pipistrellus nathusii*)	Northern edge of Aras ná Uachtarain, Dublin Zoo African Plains.	None noted	Individual noted on occasions.
Brown long eared bat (*Plecotus auritus*)	St Mary's Hospital and perimeter woodland, Áras ná Uachtarain.	None noted*	Individual bats.
Leisler's Bat (*Nyctalus leislerii*)	Fifteen Acres, north of Magazine Fort, Odd Lamp Road, Ashtown Castle drive, Dublin Zoo.	Most areas, north-south over Ashtown Castle, Dublin Zoo and Papal Cross.	3-7 bats recorded each night in each location.
Natterer's Bat (*Myotis nattereri*)	Áras ná Uachtarain, Dublin Zoo, Civil Defence School.	None noted.	Moderate numbers in Áras ná Uachtarain. Low elsewhere.
Daubenton's Bat (*Myotis daubentoni*)	All ponds including Áras ná Uachtarain boating lake, Dublin Zoo lakes, Machine Pond, Quarry Lake, Citadel Pond.	Woods at Áras ná Uachtarain and Civil Defence School.	Moderate numbers in Zoo and Áras. Low elsewhere.
Brandt's Bat (*Myotis brandti*)/ Whiskered Bat (*Myotis mystacinus*)	Áras ná Uachtarain and Dublin Zoo African Plains.	Woods at Áras ná Uachtarain.	Low.
Unidentified Myotis bat**	North Road, Áras ná Uachtarain, Civil Defence School.	None recorded.	Low

*Brown long eared bats are notoriously difficult to detect using traditional ultrasonic detection and therefore are often seen and not heard. Therefore in darkness their detection is likely to be under recorded.

** Myotis bat calls are hard to distinguish and therefore this term is used where there is uncertainty over the genus.

Figure 3 show the key areas of activity recorded in 2007.

Legend

Pipistrelle Species

Leisler's

Brown long- eared

Myotis species

Figure 7: Activity Bat Activity recorded around Phoenix Park 2007.

5.0 Conclusions

5.1 Bat using Phoenix Park

5.1.1 Roost Status

Overall, the structures examined in 2007 showed a large numbers of buildings that are capable of being occupied by bats and are close to excellent foraging habitat. However, for a variety of reasons bat have not occupied these buildings and the number of occupied roosts, or previously occupied roosts is very low. Whilst bat activity was undoubtedly suppressed in the summer of 2007 due to inclement weather, the number of confirmed roosts was still lower than expected.

None of the roosts found would be deemed to be 'significant'. This term is often used in various ways and to help its interpretation the Heritage Council devised a rule-of-thumb as set out below:

Lesser Horseshoe	>50 winter roost >100 summer roost If present -	**Very significant** **Significant**
Whiskered	>10 If present -	**Very significant** **Significant**
Natterer's	>10 If present -	**Very significant** **Significant**
Daubenton's	maternity roost	**Very significant**
Leisler's	maternity roost	**Very significant**
Common Pipistrelle	maternity roost	**Significant**
Soprano Pipistrelle	maternity roost	**Significant**
Brown Long-eared	maternity roost	**Significant**
Nathusius' Pipistrelle	????	????

However the results need to take into account that the surveys have not covered several other potential roost sites (primarily due to time and labour constraints) all of which could be potential roosts. More surveys could reveal significant roosts inside the Park. Secondly, there could be lots of significant roosts outside the immediate boundaries of the Park that are not subject to floodlighting and disturbance which may prevent bats using them. In addition, the abundance of tree roosts has not gone unnoticed during the surveys. Whilst outside the scope of this project, it is clear that the number of mature trees containing cavities and potential roosts is very high in the Park. Such roost sites could be being used in preference to man-made structures. Note that tree roosts are given the same level of protection in law as roosts in buildings and therefore identification of known tree roosts would be advantageous in the long-term management of bat roosts in the Park.

It is important to note that the law in Ireland does not distinguish between significant and non-significant roosts. All roosts, occupied by one bat or one thousand bats, occupied or unoccupied are protected under Irish law.

Figure 13 shows the bat roosts (confirmed and suspected) recorded in Phoenix Park up to 2007.

5.1.2 Species Diversity

Whilst the results on the existence of roosts were not very positive, the outcome of the surveys regarding diversity was excellent. The 2007 surveys confirmed the presence of six species in the Park (possibly seven – Whiskered/Brandt's) and notably included Nathusius' Pipistrelle for the first time in Co. Dublin.

Nathusius pipistrelle has only been recorded in a few sites in the Republic and the nearest recording was at Blessington Reservoir in Co. Wicklow in 1997. It is possible that this species has been under-recorded as it is similar to other Pipistrelle species.

Its appearance in Dublin is a significant event for the natural history of the Park and emphasizes the important role of Phoenix Park and its habitat diversity in terms of regional and national biodiversity.

Other key findings include the recording of several Natterers' bat and Whiskered/Brandt's' bat in Aras Na Uachtarain and in the Zoological Gardens. Both are considered endangered in Ireland and have a restricted distribution. This is only the second time that Whiskered bats have been recorded within the Park and its environs.

5.2 Recommendations to protect roosts in the event of proposed works

5.2.1 Structures identified as bat roosts

- **All** staff involved in design works concerned with a known bat roost must be informed that the roost is protected under law and that certain activities may cause an offence unless derogation is received;

- All bat roosts will be clearly signed with approved signs within the roost and the owners/occupiers made aware of the presence of bats and their legal protection status.

- Proponents of all proposed works to buildings known to contain bats should ensure that the works receive design advice and are supervised by a qualified and licenced bat worker and shall be compliant with wildlife legislation;

- Approval from National Parks and Wildlife Service is required in all cases where bat roosts are involved.

- Precautionary measures should be incorporated into method statements to address the unforeseen discovery of bats during works.

- Known roosts within state-owned buildings should be monitored on an annual basis as part of an ongoing biodiversity monitoring programme. Bats are important indicators of biodiversity and can be easily monitored.

5.2.2 Structures suspected as bat roosts or deemed suitable for bats

- All proposed works to buildings deemed suitable for bats must be surveyed beforehand by a qualified bat worker. Note that some structures may need to be surveyed at specific times of year or need to be surveyed over a prolonged period (e.g. Leisler's bats frequently move between roosts and one survey may not coincide with roost occupancy).

- The Report from the bat worker must include advice as to whether derogation is required and should follow the *Bat Mitigation Guidelines for Ireland*.

- Pending the outcome of the surveys, management measures may follow 5.2.2 or 5.2.3.

5.2.3 All structures

For all structures, regardless of whether they contain bat roosts or are deemed to be unsuitable for bats, the following precautions should apply. Note that bats can be present in roofs, walls, window frames, cellars, sheds, chimneys and other parts of buildings. Therefore there is always a risk of encountering bats in any building works at any time of year.

- All proposed works shall assess the risk of impacts upon bats and if no data is available (or can be obtained) for the structure in question, then the precautionary principle should apply (i.e. it shall be assumed that bats may be present until proven otherwise).

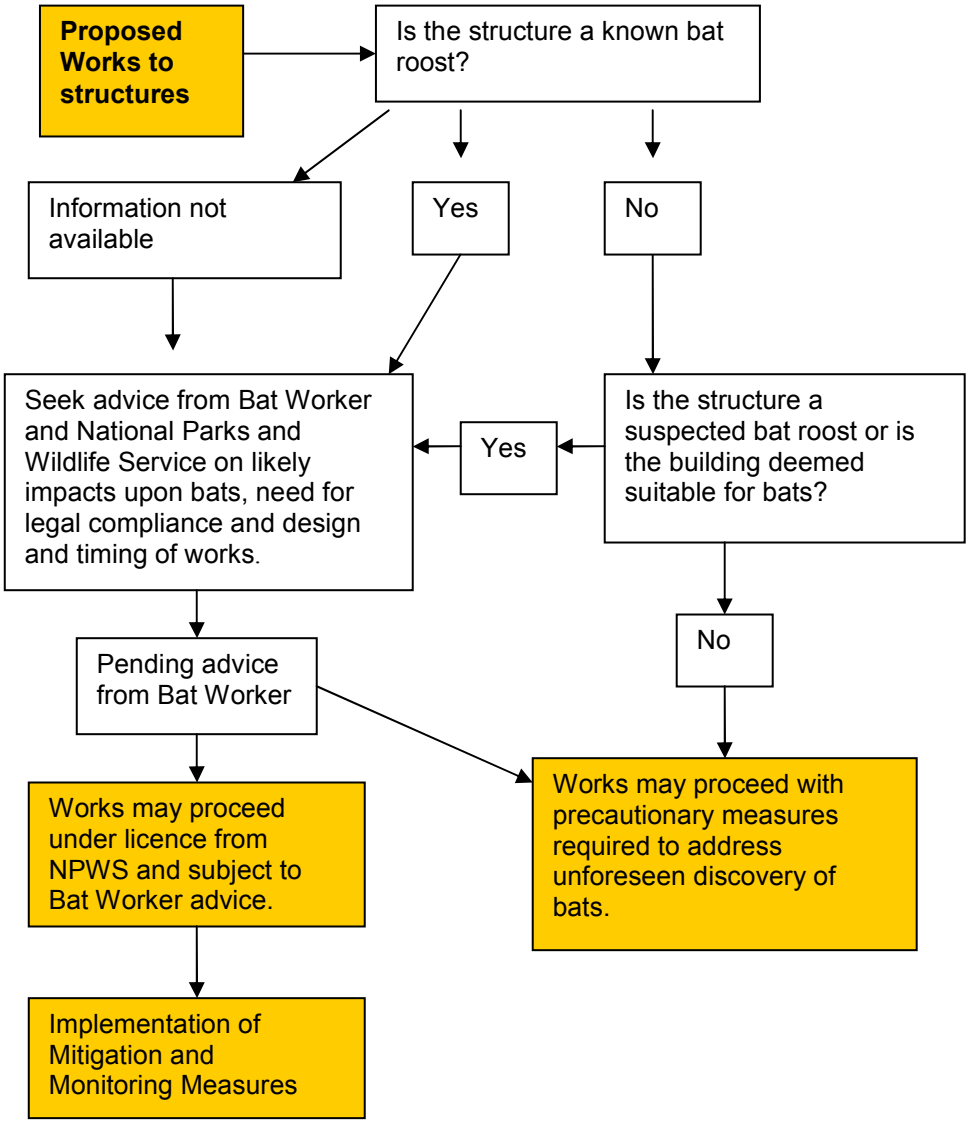
- Precautionary measures should be incorporated into method statements to address the unforeseen discovery of bats during works. These should include names and contact numbers of qualified bat experts who are licenced to carry out emergency removal of bats.

- Contractors should be made aware of their obligations and liabilities under Irish wildlife law with regard to protection of bats and roosts.

Generic advice on protection of bats, timing of works and provision of bat access has not been provided in these procedures as each structure often requires case-by-case treatment. Bat workers will be able to provide bespoke advice as to how to best proceed in each case. A decision-tree sets out how proponents of works to

structures in Phoenix Park should address impacts to bats. Note that in order to avoid legal redress and significant impact to bats and their roosts, advice should always be sought from qualified persons prior to the commencement of any works.

Figure 8: Decision-tree for screening proposed works to structures in Phoenix Park.



5.3 Mitigation Measures

There are various methods that can be employed within the method statement for proposed works to avoid direct impacts to bats. The *Bat Mitigation Guidelines for Ireland* outlines the overall approaches to mitigation and it is not intended to repeat the advice given in this document. However there are general principles that can be applied:

- **Avoidance: E.g.**
    - Avoid the periods during the year when bats are most likely to be present and when the impact would be greater. E.g. works in cellars and underground sites are avoided in mid winter when bats hibernate.
    - Avoid areas where bats are roosting. E.g. bats roosting in one area of a roof may be temporarily 'sectioned off' in some circumstances to allow works to be a carried out in another section of the roof.
    - Avoid use of chemicals known to be harmful to bats.
- **Minimisation: E.g**.
    - Minimise period of time spent near bats.
    - Minimise application of chemicals in bat roosts.
    - Minimise disturbance times and physical extent when they cannot be avoided.
- **Remediate/Compensate:**
    - Compensate for loss of former roost site by providing another in same location.
    - Provide artificial roost entry points: See Figure 9:

Figure 9: Artificial roost access slits under eaves suitable for Pipistrelle species (Bishop's Palace, Kilkenny)

    - Provide roosting zones where bats may roost and be controlled (e.g. removing droppings etc)

Figure 10: Plywood walls of bat roost zone allowing bats to roost undisturbed (Bishop's Palace, Kilkenny)

Figure 11: Wall of bat roost zone with plastic access hatch (Bishop's Palace, Kilkenny)

Figure 12: Bat roost zone with plastic sheeting and roost boards to control roost area and allow collection of droppings (Emo Court, Co. Laois).

5.4 Management Recommendations

The management of buildings in Phoenix Park is a continuous process that is necessary to preserve its historic fabric and culture. Maintaining buildings whilst allowing protected fauna and flora to persist is the objective of sustainable property management. Bats and humans can, and do, live alongside each other without ever causing adverse impacts to either party so long as the needs of both are taken into account. Legal protection of bats has been necessary due to the continuous loss of habitat and roosts sites around the country but need not be seen as a constraint upon development. In order to ensure that management of Phoenix Park buildings and protection and management of roosts can be successfully coordinated, the following recommendations are offered:

a) Copy of Roost Report Form to be held in association with plans of each structure so that the status of the structure with regard to bats is made clear;

b) Should works be proposed to structures that do not have a Roost Report Form, as a minimum, a daytime assessment of the structure should be carried out. A dusk emergence and dawn survey also need to be a carried out to check for concealed roost spaces;

c) All roosts to be signed with a notice to be placed within the roost space;

d) OPW to develop Protected Species Risk form that must be completed by a qualified person as part of the approval process for works to occur to structures;

e) All OPW staff and Park Rangers to be given toolbox talks on Bats and the Law, Bat Roost Maintenance and Protection of Roosts;

f) OPW ground staff to be given training on how to deal with Bat roosts in Trees. Such training should include identification of bat roosts, legal protection of bats and roosts, dealing with emergency felling and tree surgery and mitigating loss of roost.

g) Creation of new roost opportunities: Several initiatives are being explored with Dublin Zoo regarding the provision of new bat roosts within existing and new Park buildings. These will include a range of roost types including hibernation roosts, restoration of access to roof spaces where previous building works have closed off access and integration of new roost opportunities in new buildings.

Appendix 1
Survey Sheets

REFERENCES

European Communities (Natural Habitats) Regulations, 1997 (S.I. No. 94 of 1997).

Fossitt J.A. (2000) *A Guide to Habitats in Ireland*. The Heritage Council.

Hayden T. & Harrington R. (2001) *Exploring Irish Mammals*, Dúchas The Heritage Service.

Kelleher, C. & Marnell, F. (2006) Bat Mitigation Guidelines for Ireland. *Irish Wildlife Manuals*, No. 25. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

National Parks and Wildlife Service (Dept. of the Environment, Heritage and Local Government) Designated Site Information.

Whilde A. (1993) Irish Red Data Book 2: Vertebrates. HMSO, Belfast.

Wildlife (Amendment) Act, 2000 (S.I. No. 38 of 2000)