



**The car based bat monitoring scheme for Ireland:**  
**Summary report for Northern Ireland 2007**  
Research and Development Series 08/06

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A report commissioned by the Environment and Heritage Service.

# The car based bat monitoring scheme for Ireland: Summary report for Northern Ireland 2007.

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**This report should be cited as follows:** Niamh Roche & Tina Aughney. The car based monitoring scheme for Ireland: Summary report for Northern Ireland 2007. Northern Ireland Environment Agency, Research and Development Series No 08/06

**EHS contract number:** CON 2/1(146).

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**The opinions expressed in this report do not necessarily reflect the current opinion or policy of Northern Ireland Environment Agency.**

## Introduction

This project aims to be the primary tool for monitoring roadside populations of common pipistrelle, soprano pipistrelle and Leisler's bats in Ireland. The project protocol was initially devised and piloted by The Bat Conservation Trust (BCT) in 2003 as an initiative of The Heritage Council and undertaken in the Republic of Ireland (Catto *et al.*, 2004). Funding was provided by the Environment Heritage Service (EHS) in 2006 and 2007 to carry out surveys within Northern Ireland as part of an overall All-Ireland survey for the two countries under the management of Bat Conservation Ireland (BCIreland). Data from the Northern Ireland surveys is specifically the subject of this brief report. Within the context of monitoring aims, i.e. to use monitoring data to detect Amber and Red Alert declines of selected populations, the data collected from Northern Ireland alone would not be sufficient to provide statistically robust data.

Bats in Northern Ireland are protected under the Wildlife (Northern Ireland) Order 1985. The EU Habitats Directive (92/43/EEC) lists all Northern-Irish bat species in Annex IV and, as such, these require strict protection. The European Bats Agreement (EUROBATS) is an agreement under the Bonn Convention and Ireland and the UK are two of the 30 signatories. Devising strategies for monitoring of populations of selected bat species in Europe is among the resolutions of EUROBATS. Ireland, including Northern Ireland, holds important European populations of Leisler's bat (Stebbing, 1988).

The present report summarises the main results for Northern Ireland in 2007. For detailed analysis of all-island data see Roche *et al.* (2008).

## What is a Car-Based Bat Monitoring Scheme?

This protocol is a method of monitoring bats while driving. Monitoring is carried out using a bat detector which picks up the

ultrasonic (high pitched) echolocation calls made by bats and converts them to a frequency audible to the human ear. For this scheme, time expansion detectors are used, which essentially make short recordings of a broad range of ultrasound and replay the sounds at a slower speed. The monitoring is carried out along mapped routes, at a specific time of year, while driving at a prescribed speed. All sounds are recorded to minidisc for analysis at a later stage.

### Overall Aims of Car-Based Bat Monitoring Scheme

1. Provide a method of monitoring that can be implemented by relatively few surveyors and that does not require highly trained individuals.
2. Provide a method of data collection that is
  - objective
  - easily repeatable
  - cost effective.
3. Ensure sufficient data is collected that will allow early recognition of Red and Amber Alert declines in certain Irish bat species' populations.
4. Record other vertebrate wildlife during survey periods.
5. To extrapolate information on bat activity within survey squares to determine 'hotspot' areas, and/or areas of high bat diversity.

### Methods used

This Car-Based Bat Monitoring Scheme was designed by BCT in 2003. To date much bat monitoring work has been done in other countries by foot-based trained volunteers (e.g. the UK National Bat Monitoring Programme (NBMP)). In Ireland, however, a paucity of trained bat workers until 2006 has meant that such monitoring work has not been feasible or has not been carried out to a large extent. The car-based method ensures that large areas can be covered in one night and the use of a time-expansion detector means that volunteers do not need to be highly skilled in bat identification to collect the data accurately.

Training of surveyors has been carried out in summer prior to Survey 1 each year. In June 2007, training by BCIreland of new and existing surveyors for Northern Ireland was carried out in EHS offices in Belfast. Training materials were provided and a tailor-made training CD was supplied along with information about data to be collected in relation to street lights located along survey routes. Recording sheets were also provided.

Starting 45 minutes after sundown, surveyors carried out surveys of a mapped route within a defined 30km **Survey Square**. Every route covered 20 x 1.609km (1 mile) **Monitoring Transects** each of which was separated by a minimum distance of 3.2km (2 miles). Surveyors were asked to carry out the survey on two dates, one in mid to late July (Survey 1, S1) and one in early to mid-August (Survey 2, S2). Each of the 1.609km transects was driven at 24km (15 miles) per hour while continuously recording from a time expansion bat detector on to minidisc. Minidisks were forwarded to BCIreland for analysis.

Each track was downloaded to Bat Sound™ and calls were identified to species level where possible. Species that can be identified accurately using this method are:

- Common pipistrelle (*Pipistrellus pipistrellus*)
- Soprano pipistrelle (*P. pygmaeus*)
- 'Pipistrelle unknown' (50kHz) - pipistrelle calls with a peak in echolocation between 48kHz and 52kHz may be either common or soprano pipistrelles
- Nathusius' pipistrelle (*P. nathusii*)
- Leisler's bat (*Nyctalus leisleri*)
- Brown long-eared bat (*Plecotus auritus*) social calls
- *Myotis spp.* These are sometimes recorded but are assigned to the species group since they could be any one of a number of similar species – Daubenton's, whiskered, Natterer's or the recently discovered Brandt's bat (*Myotis daubentonii*, *M. mystacinus*, *M. nattereri*, *M. brandtii*).

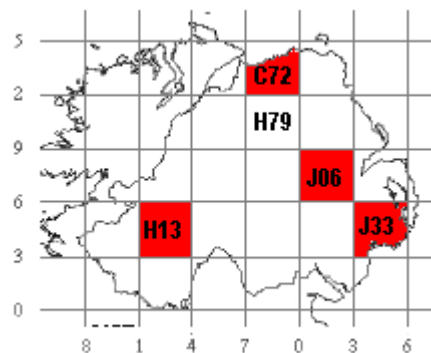
For quality control purposes a number of randomly selected .wav files from 2007 were forwarded to Jon Russ of the BCT for analysis.

### Other Vertebrates

Other vertebrates were also recorded by surveyors. In 2007 surveyors were asked to note all vertebrates including cats on their record sheets. In addition, observers had the facility to record whether each specimen was living or dead and whether each was observed during or after the transect. This means that recorders were observing living and dead vertebrates, other than bats, along a 58mile (93km) route on each survey evening.

### Results for Northern Ireland

In 2007, 11 surveyors, mainly EHS staff members, along with their team partners, mapped and/or surveyed four routes in Northern Ireland. Each survey was carried out twice. An additional route that had been surveyed in previous years (H79) was not successfully surveyed in 2007. The four surveyed squares cover parts of Fermanagh/Tyrone, Antrim and Londonderry and include two new squares, J33 and C72 that were mapped and surveyed for the first time in 2007.

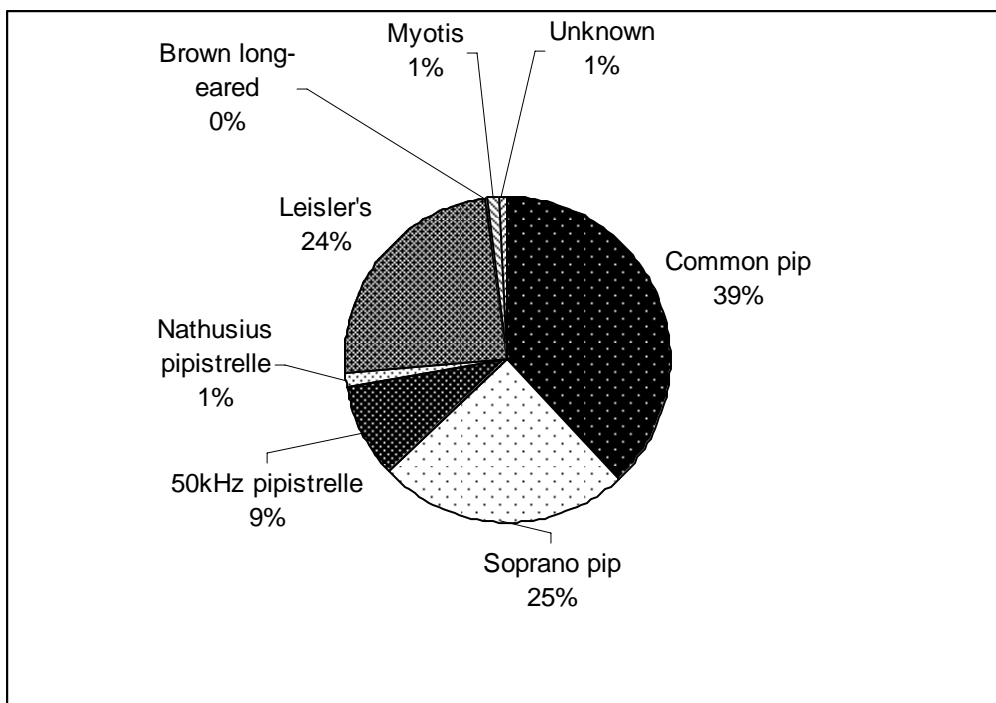


**Figure 1:** Locations of Survey Squares, surveyed for bats in Northern Ireland as part of the car-based bat monitoring scheme in 2006. **Red** squares were surveyed twice and the uncoloured square was surveyed in previous years but not in 2007.

Approximately 239.7km of monitoring transects were covered in Northern Ireland in 2007 (160.9km in 2006). Utilisable bat data was derived from all of these transects. Sound recordings made by the Northern Ireland survey teams were of high quality. Approximately 746km of roads were surveyed for vertebrates other than bats.

A pie-chart illustrating overall proportions of bat species encountered in Northern Ireland is shown in Figure 2.

A detailed break-down of results for each survey square, not corrected to number of bat encounters per hour or per square, is shown in Table 1. Average encounter rates for Northern Ireland in comparison with the whole island are shown in Table 2. As can be seen from Table 2 the average encounter rate for most roadside bat species is lower in Northern Ireland than in the island as a whole, excepting *Nathusius' pipistrelle*, which is slightly higher.



**Figure 2:** Proportion of bat species encountered during the 2007 survey in Northern Ireland Survey Squares (n=354). 'Unknown' refers to a number of calls that could definitely be ascribed to bats but could not be identified to species or species group. 'Unknown pipistrelle' refers to pipistrelle calls between 48 and 52kHz that may

be either common or soprano pipistrelles but it is impossible to state which. Excepting social calls of Leisler's bats and brown long-eared bats, which are unlikely to be mistaken for those of other species, bat social calls were noted during sonogram analysis but are not included in the above pie chart.

**Table 1:** All bat encounters from Northern Ireland car-based bat monitoring survey squares, 2007. Note: This is raw data not corrected to encounter rates per unit time or distance.

Square - Survey	Common pip	Soprano pip	Unknown (50kHz) pip	Nath pip	Myotis spp.	Leisler's bat	Brown long-eared	All bats
C72 – 1	4	4	1	0	0	1	0	10
C72 – 2	5	4	1	0	1	5	0	16
H13 – 1	16	8	4	0	0	3	0	31
H13 – 2	31	14	6	0	3	12	0	66
J06 – 1	21	15	5	1	0	30	1	75
J06 – 2	18	11	3	3	0	33	0	69
J33 – 1	16	17	7	0	0	0	0	40
J33 – 2	24	15	6	1	0	1	0	47
<b>Total</b>	<b>135</b>	<b>88</b>	<b>33</b>	<b>5</b>	<b>4</b>	<b>85</b>	<b>1</b>	<b>354</b>

**Table 2:** Average encounter rates (per hour) in 2007 in Northern Ireland (n=8) compared with the whole island (n=47).

	Common pip	Soprano pip	Unknown pip	Nath pip	Myotis spp.	Leisler's bat	Brown long-eared	All bats
Northern Ireland	13.35	8.81	1.60	0.48	0.40	7.81	0.08	34.48
All-Ireland	27.31	10.19	3.96	0.22	0.56	9.60	0.29	52.32

A particularly low average common pipistrelle encounter rate (4.5) was recorded in square C72 in 2007. This compares with an island-wide average of 27.31 and an average for Northern Ireland of 13.35. Since the common pipistrelle appears to be more abundant towards the south of the island (e.g. see Roche *et al.* 2008), very low encounter rates with this species may be anticipated in the extreme north, where C72 is located.

A particularly high Leisler's encounter rate (per hour), 22.2, was recorded from square J06 in 2007 compared with the island-wide average of 9.6.

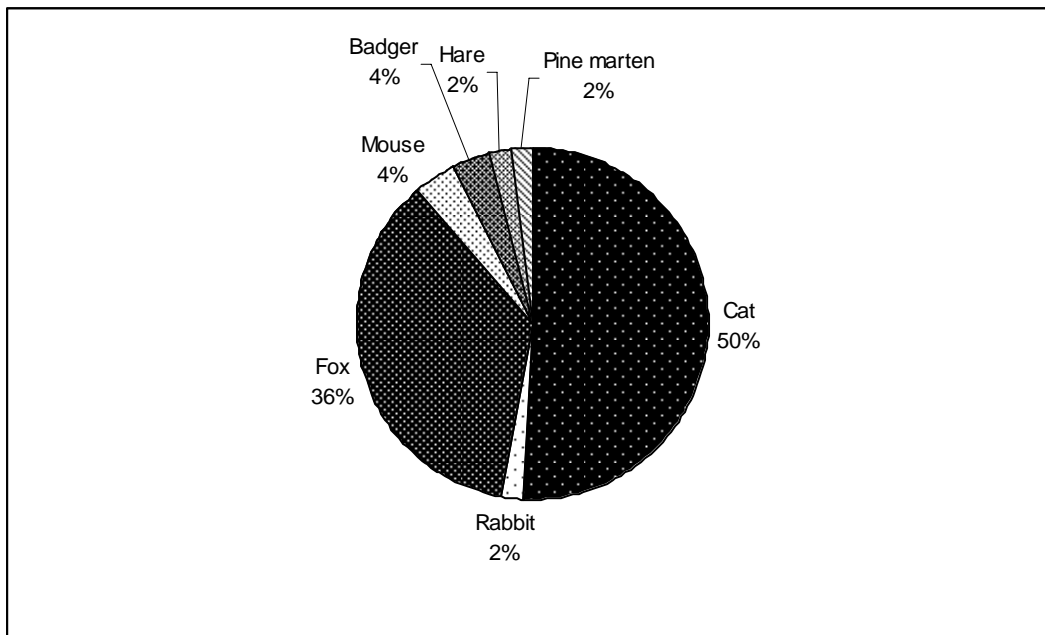
As expected, Nathusius' pipistrelles were encountered in Northern Ireland again in 2007. The highest encounter rate with this species

was from J06 where the species was encountered once during Survey 1 and three times during Survey 2. Overall, however, average Nathusius' encounter rates were lower in 2007 than in 2006. Random variation may account for such fluctuations, or they may be the result of cooler, wetter weather in July and August 2007 compared with 2006 (e.g. see Roche *et al.* 2008). A simple linear model applied to the all-island Nathusius' pipistrelle population indicates that this species is on a significantly increasing trend although more years of surveying are necessary before this trend can be verified (see Roche *et al.* 2008).

### Bat Records

All bat records derived from the car-based bat monitoring scheme for Northern Ireland for 2006 and 2007 have been forwarded to both CEDaR and BCT.

### Other Vertebrates



**Figure 3:** Living vertebrates, other than bats, observed during Surveys 1 and 2 in Northern Ireland, 2007, n=53.

Domestic cats were the most frequently encountered vertebrate species during the car surveys (n=27). Foxes were the second most frequently encountered species (n=19). Just three dead

vertebrates were recorded by surveyors – two dead badgers and one fox.

## Conclusions

Results from the car-based bat monitoring surveys successfully carried out in Northern Ireland in 2006 and 2007 are very encouraging. Relative distribution patterns of different species within the province compared with elsewhere on the island, e.g. Leisler's high abundance in J06 (the species was also abundant here in 2006), are of particular interest. As more data are gathered it may be possible to determine the extent to which such differences are due to random variation or otherwise.

On the whole, average roadside encounter rates for most species (excepting *Nathusius' pipistrelle*) are lower in Northern Ireland than on the island as a whole. This may be due to higher latitudes, cooler climate and/or differing habitat types in the North.

Continuing climate change will undoubtedly have increasing impacts on many species in Northern Ireland and elsewhere on the island. The bat fauna of Northern Ireland may change in composition and structure in the near future – bats with a more southerly distribution may migrate to or increase in abundance in the North. Continued surveying using the present protocol and other monitoring methods, ensures that we will be able to detect and monitor future changes to the bat fauna of Northern Ireland.

## Proposals for 2008

- Continue car-based bat monitoring in Northern Ireland in 2008 as per methodology described.
- Include temperature data for Northern Ireland in future statistical analyses, average monthly temperature has been found to correlate significantly with encounter rates of several species in the Republic (Roche *et al.* 2008) so Northern Ireland weather data should be included in the dataset.

## References

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## Acknowledgements

Many thanks to:

Eric Bann

Stephen Carters

Donna Cassidy

Reggie Cunningham

Catherine Higgins

Gareth Grindle

Steve Langton

Deirdre Lynn

Fidelma Maher

Ferdia Marnell

Melina McMullan

Michael McNamara

John Milburne

Georgina Thurgate

Kathryn Turner

Front cover image © LAURIE CAMPBELL

1367 - 1979 print  
1751 - 1796 online

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