

JANUARY 2007



South Lancashire Bat Group

Bat Activity Survey over millponds in South Lancashire

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ACROSS NORTHERN ENGLAND



**SOUTH LANCASHIRE
BAT GROUP**
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INTRODUCTION

The South Lancashire Bat Group is a large and active group working for bat conservation in and around the vice-county of South Lancashire, excluding Merseyside. The area includes Greater Manchester and the south-eastern parts of the present county of Lancashire.

This is a report summary of a survey initially covering 29 millponds in the Kirklees Valley, Tottington, Bury, as well as a number of additional ponds in the South Lancashire area that have not been previously surveyed to any degree by the Group. The project took three years to complete.

Initial surveys 1-3 were completed in the Kirklees Valley:

- Survey 1: 1994 - 1997
- Survey 2: 1998 - 1999
- Survey 3: 2003 Pilot Survey for LHI
- Survey 4: 2004
- Survey 5: 2005
- Survey 6: 2006

Bats were found at all the ponds in all the sites of the survey area. The survey results show how important it is to protect millponds, not only as historical features, as in many cases they are the last remaining fragments of the North West's industrial heritage, but also

as important wildlife rich areas. Since the start of the survey there has been a net loss of ponds, both in the Kirklees Valley, where some ponds have now been completely consumed by reeds and have dried out, and at sites like the East Lancashire Paper Mill, where ponds have been drained for development. The threat of draining and infill is ever present.

The following provides information on the methods used during the surveys, the changes recorded in Bat activity, changes at breeding and feeding areas, and proposes active lobbying for the conservation of bats and local heritage.



M.G. Prescott

*Martin Prescott
Chair, South Lancashire Bat Group*



The Kirklees Valley

Between 1994 and 2006 the following six/seven species have been detected in the Kirklees Valley:

45 KHz Pipistrelle (*Pipistrellus pipistrellus*), 55 KHz Pipistrelle (*Pipistrellus pygmaeus*) (Pp), Daubenton's Bat (*Myotis daubentonii*) (Md), Noctule (*Nyctalus noctula*) (Nn), Brown Long-Eared Bat (*Plecotus auritus*) (Pa), and Whiskered/Brandt's Bat (*Myotis mystacinus/brandtii*) (Mm). The Whiskered and Brandt's bats are inseparable when using bat detectors as they both sound the same. It is normal to bracket the two species together.

The average species richness for an individual pond was two; the pond with the highest species richness recorded during the survey was MK16, Island Lodge, in 2004, with four species. A significant positive correlation between both *M. daubentonii*, *M. mystacinus/brandtii* and pond size was found. The larger the pond, the better, for these bat species.

Other Sites Surveyed

Pyramid park in Bury gave evidence proving the importance of a water body. When the pond dried out, the numbers of bat passes fell dramatically. At the *East Lancashire Paper Mill*, after three ponds were drained, the bats moved to use the remaining pond. It is considered likely that bats displaced from a pond which has been lost, or where the quality of a pond is reduced, will only remain at a favourable conservation status in the area if there are alternatives within close proximity with suitable habitat connectivity to guide them.

There was a considerable increase in bat activity at the small pond in *Redisher Woods*, Ramsbottom, following some alterations to the pond which included raising the water level. The Wigan sites, especially the *Wigan Flashes* are a stronghold for Noctule bats in the South Lancashire area. The increase in *Myotis* (Whiskered Bat) activity on the River Spodden at *Healey Dell* is considered to be of importance for South Lancashire.

METHOD



Methodology used during bat surveys

PRELIMINARY SURVEY IN THE KIRKLEES VALLEY

A survey by map (Pathfinder 700, Bolton North & Horwich) and by walk-through was carried out to find where ponds survive or have been lost since the map data was collated. It was found that 10 ponds shown on the map (compiled 1953-1984) were already missing. One extra pond was found. Two ponds were considered inaccessible.

The valley was divided into 3 sections:

- Lower Kirklees (LK);
- Mid Kirklees (MK); and
- Upper Kirklees (UK).

Each pond was given a reference number with prefixes LK (12 ponds), MK (16 ponds) or UK (4 ponds) placing them in a particular section.

DAYLIGHT SURVEY

In 1994, the main habitat types around each millpond were systematically recorded within:

- 10 metres of the pond; and
- 50 metres of the pond.



They were recorded as a percentage of each of the following types:

1. Buildings, brickwork, bare ground etc.
2. Still water
3. Flowing water
4. Improved pasture and arable
5. Unimproved and semi-improved pasture, hay meadow
6. Hedgerow and scrub - less than 5m tall
7. Broadleaved woodland - more than 5m tall
8. Rank herbage, rough grassland
9. Marsh, reed bed
10. Parks, gardens, playing fields
11. Other- specified

An estimate of the degree of wind shelter (by valley sides, high banks, trees etc.) around the pond was made:

0 = exposed

1 = slightly sheltered

2 = moderately sheltered

3 = highly sheltered

The following were noted:

- Height above sea level
- Approximate area of open water
- A position from which to carry out the evening survey close to the pond edge with regard to accessibility, safety, and where possible to the south-east of the pond in order to make best use of the light north-western sky after sunset.

Above: Lodge at Kirklees

Right: Fishing on Island Lodge, Kirklees

OTHER PONDS AND WATER BODIES INCLUDED IN THE SURVEY

We decided to include other water bodies within the scope of the Project, specifically choosing those that may have been in danger of development, and those associated with industry, such as canals, and subsidence flashes. Requests from a number of organisations to survey millponds or lodges were made to the Group in order to collect data on bat activity. These were

- **The Parkers & Whitehead Lodges** – The Friends of Cockey Moor and Whitehead Lodges
- **Hollins Vale** – Hollins Conservation Group
- **Healey Dell** – Friends of Healey Dell
- **Cliviger** – Pond Conservation Trust
- **East Lancs Paper Mill** – Angling Club & Local Residents.
- **Wigan Flashes** – Wigan Countryside Service
- **Philips Park** – Bury MBC
- **Worsley Basin** – Salford MBC
- **Redisher Woods** – Friends of Redisher Woods and Bury LNR Officer
- **Pyramid Park** – Bury MBC

THE DUSK BAT SURVEY

In order to minimise the effects of large fluctuations in numbers of feeding bats such as may occur when young begin to fly in early and mid- summer, and when the autumn weather takes it's toll, late July to September was chosen as the survey period.

Each pond was surveyed avoiding heavy rain, high winds and unusually low temperatures.

On the survey evening, at 15 minutes after sunset, the following were recorded:

1. Temperature (Deg C) at waist height at the observation point.
2. Approximate wind strength (Beaufort) waist height at observation point.
3. Approximate wind strength (Beaufort) and direction generally.

At the same time, a Batbox III, Duet, or Petterson bat detector was tuned to 45 KHz, and turned to full volume.

The time of first contact with each bat species was noted. The details of any observed behaviour such as commuting or squeaking was also noted. Any identification doubt was noted. Bats were recorded to species level where possible, although genus was commonly used, especially for Pipistrellus bats.

Between 60 and 75 minutes after sunset the number of bat passes was counted for each species. In the case of continuous contact, a count of one pass was made for each 10 seconds of contact. Therefore, a continuous contact for 15 minutes would give a count of 90 (per species).

The survey ended 75 minutes after sunset.

COMMENTS ON METHOD

1. A tuning of 45 kHz will register all bat species likely to be found in the South Lancashire area, and it is possible, with practice, to identify these species with a fair degree of accuracy.

2. The period of time between 60 and 75 minutes after sunset was chosen for counting, as this is likely to be part of the most active time for foraging bats, including late emergent species.
3. It is almost impossible to count the number of bats foraging over a pond; less possible to measure the time each bat spends there, so counting every time a bat passes through the range of the bat detector was considered the best way of gauging bat activity.

The count numbers, therefore, do not directly relate to bat numbers but to the level of bat activity, which indicates the importance of the pond to bats during the counting period.

A suggestion that a count of feeding buzzes (that is a rapid increase in click rate heard as a "raspberry" on a bat detector when a bat homes in on an insect) be used as a gauge of bat activity was not taken up because:

- It may produce a bias in favour of bats hunting small prey items. A large prey item may be worth several passes, whereas a bat taking midges may produce several feeding buzzes in a single pass.
- The number of feeding buzzes would generally be less, often much less than the number of passes and would be statistically less significant.
- Ponds may be important to bats for reasons other than foraging, e.g. drinking, commuting, male breeding territories, social activities.

COMMENTS ON RESULTS



a



b



c



d



e



f



g



h

- a) **Common Pipistrelle** *Pipistrellus pipistrellus*
- b) **Soprano Pipistrelle** *Pipistrellus pygmaeus*
- c) **Daubenton's bat** *Myotis daubentonii*
- d) **Whiskered bat** *Myotis mystacinus*
- e) **Noctule** *Nyctalus noctula*
- f) **Brown Long-Eared bat** *Plecotus auritus*
- g) **Natterer's bat** *Myotis nattereri*
- h) **Serotine** *Eptesicus serotinus* - note: historical records only

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Species Distribution

THE KIRKLEES VALLEY

Common Pipistrelle *Pipistrellus pipistrellus* - found regularly throughout the valley.

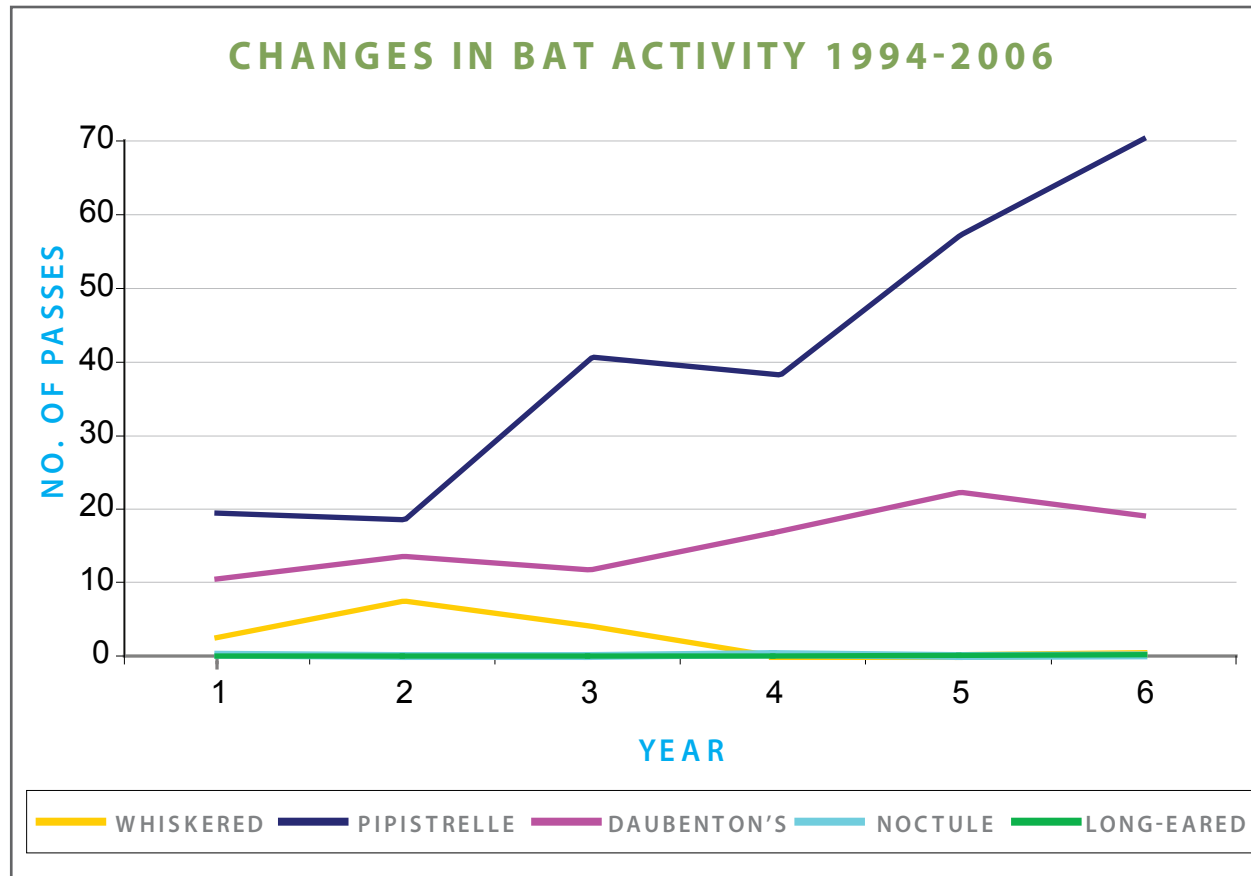
Soprano Pipistrelle *Pipistrellus pygmaeus* - detected in 2003, but not recorded in previous surveys as the two species were not split with any certainty at the time.

Daubenton's bat *Myotis daubentonii* - found to be common in most parts of the valley in surveys 1 and 2. 2003 showed a drastic reduction in numbers in the upper parts of the valley, however a roost was confirmed in the viaduct, which crosses 'Island Lodge', ref. MK16. In 2004 this trend was reversed with relatively higher amounts of Daubenton's bat activity.

Whiskered bat *Myotis mystacinus* - a strong concentration of records in the middle section of

the valley. Some of these contacts may be of Natterer's, *Myotis nattereri* or more likely Brandt's Bats *Myotis brandtii*, which are closely related to, and almost indistinguishable from, Whiskered Bats. In 2004 only 1 record of Whiskered bat was made at MK16, and this was an individual bat feeding over the Kirklees Brook next to the main lodge.

Noctule *Nyctalus noctula* observed at UK01 at 5.56% in 1996, then not again until 2004 in mid valley (MK16 and MK22) at levels below 5%.



CHANGES IN BAT ACTIVITY OVER TIME

Due to difficulties in identification for Pipistrelle bats, these were determined to genus level only (abbreviated to Pp). *M. mystacinus* and *M. brandtii* are collectively abbreviated to Mm due to similar difficulties in identification to species level.

Over the survey period *Pipistrellus* spp. were the most abundant species throughout the valley. However it should be taken into consideration that the data does include the two species, *Pipistrellus pipistrellus* and *Pipistrellus pygmaeus*.

The above graph illustrates that the greatest increase in activity from 1995 to 2006 was in

Pipistrellus spp. An increase in mean bat activity from 19.48% to 70.3% was observed.

M. daubentonii was the only other species to have increased activity levels, from a mean of 10.49% to 19.1%.

In order to determine whether the differences in bat activity between survey periods one to six were significant, the Kruskal-Wallis test was applied using the SPSS statistics package.

***Pipistrellus* spp.**

The calculated chi-squared value (46) exceeds the critical value (15.09), (at 5 df., and at $P = 0.01$). It can therefore be concluded that there is a highly significant difference in *Pipistrellus* spp. activity between periods one to six.

Although these results do not allow the assumption of which years are significantly different from each other, it can be said that overall, there has been a significant increase in activity over the survey period.

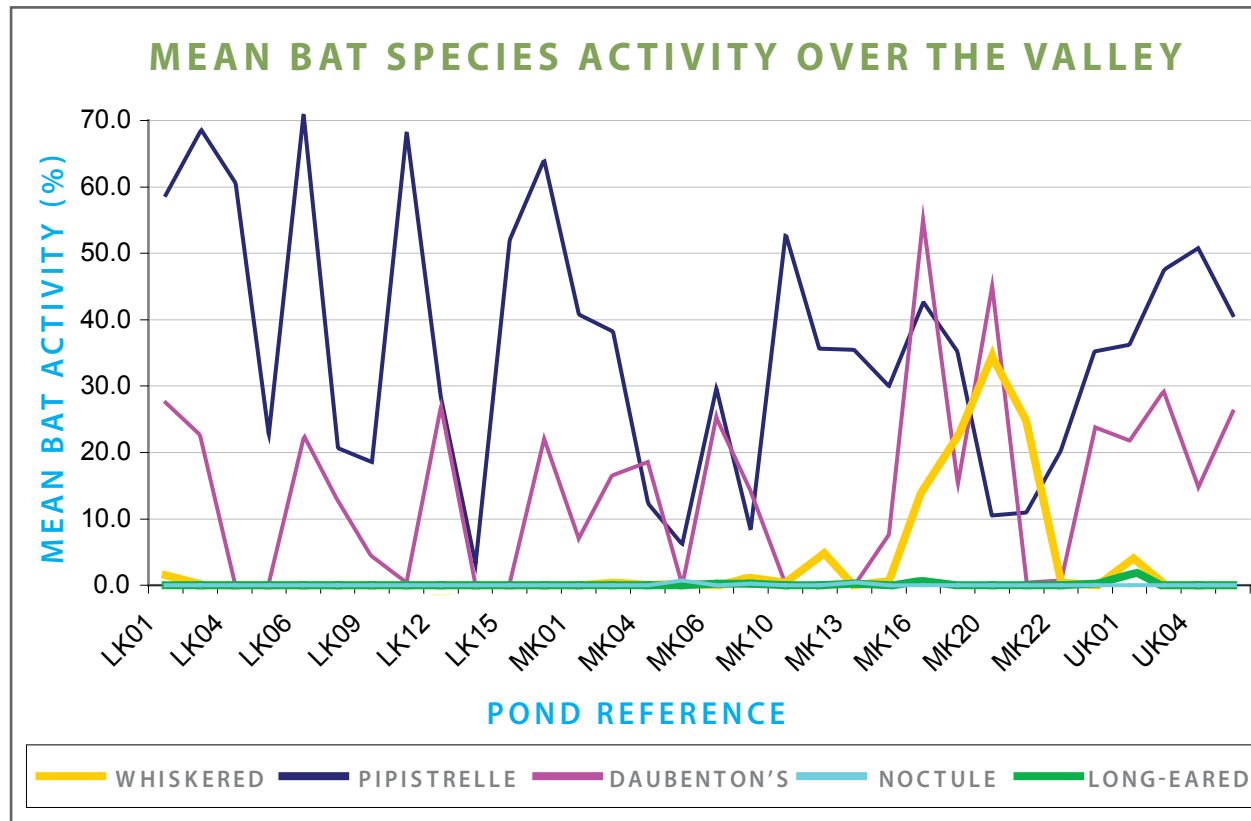
M. daubentonii

The calculated chi-squared value (4.8) is less than the critical value (11.07), (at 5 df., and $P = 0.05$), therefore it can be concluded that there is no significant difference in *M. daubentonii* activity over the six years. This implies that the observed increase in activity in graph one is not significant.

Activity levels for the other species in the study were found not to vary significantly.

It should be noted that at the start of the study 32 ponds were present/accessible, and by 2006 only 24 of these were present.

COMMENTS ON RESULTS



BAT ACTIVITY THROUGH THE VALLEY

The above graph shows the mean bat species activity at each pond throughout the valley, in an attempt to highlight any differences from lower (LK) through to upper (UK) areas of the valley.

Relatively higher levels of Pipistrelle activity can be observed at ponds in the lower valley, compared to the areas in the middle and upper valley.

The middle valley appears to be particularly important for *Myotis mystacinus/brandtii* than other areas. There is also a concentration of *M. daubentonii* in the middle area of the valley.

SUMMARY OF RARER SPECIES

During survey periods four and five, no *M. mystacinus/brandtii* activity was recorded, apart from 1.1% at MK16 in 2004.

Plecotus auritus (Brown Long-Eared) were only recorded in 2004, 1.1% at MK05, and 2005, at 2.22% at MK13.

In survey period six (2006), Noctules and Brown Long-Eared bats were again observed in the middle of the valley, however at levels below 5%.

DIFFERENCES IN BAT ACTIVITY BETWEEN INDIVIDUAL PONDS

Ponds were subject to Kruskal-Wallis analysis in an attempt to see whether there was a significant difference in mean bat activity between ponds for *Pipistrellus* spp. and *M. daubentonii*.

Pipistrellus spp.

The calculated Chi-square value (54.7) is less than the critical value (55.76), (at 32 df., and $P = 0.05$).

It can therefore be concluded that there is no significant difference in mean *Pipistrellus* spp. activity between the ponds.

M. daubentonii

The calculated Chi-square value (76.6) is greater than the critical value (63.69), (at 32 df and $P = 0.001$), indicating that there is a significant difference in *M. daubentonii* activity between the ponds.

The greatest difference in activity levels for *M. daubentonii* occurred between the following surveyed ponds:

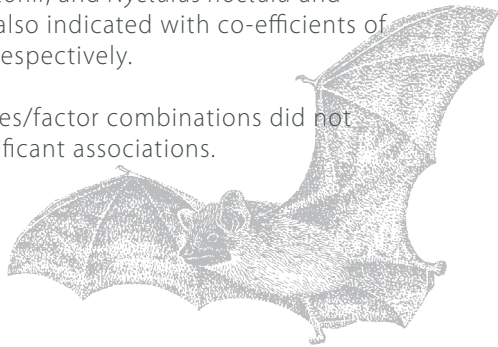
MK16 (mean of 55%) and LK04, LK05, LK11, LK14, LK15, MK05, MK10, MK12, MK13, MK21, and MK22 (all had a mean of below 1%).

POSSIBLE FACTORS AFFECTING BAT ACTIVITY

Along with data on bat activity levels, measurements of temperature, amount of shade, pond size, and wind at time of survey were also recorded. Abiotic factors such as these are known to affect biotic factors including insect abundance, which in turn may possibly affect bat activity levels. In order to ascertain whether bat species activity levels were associated with any of the recorded factors, correlation coefficients were obtained.

The calculated Spearman's coefficient between Pipistrelle activity and temperature of -0.44, exceeds the critical value (0.43) at $P=0.01$, thus indicating a significant negative correlation. A significant positive correlation between both *Myotis daubentonii*, and *Nyctalus noctula* and pondsize was also indicated with co-efficients of 0.54 and 0.44 respectively.

All other species/factor combinations did not show any significant associations.



Above: Pipistrelle Bat chasing moth
Above Right: Lodge at Kirklees
Right: Island Lodge Bridge
Far Right: Lodge at Kirklees.



KIRKLEES LODGES MAP



THE IMPORTANCE OF HISTORIC RELICS

A BRIEF HISTORY OF KIRKLEES VALLEY



Kirklees Mill

The first written records of Tottington and the area of the Kirklees Valley were written in the 12th and 13th Century, when the area was mainly regarded as a place for hunting of deer and wild boar in its forests. Land was cleared for agricultural use, and as the forested area diminished hunting was gradually confined to prescribed areas known as parks.

The first record of a mill in the valley (found in accounts drawn up in 1295 and 1307) were corn mills owned by the Lord of the Manor, which were later passed to the Greenhalgh family, the hereditary bailiffs of Tottington, who let the mill to a miller. By 1660, spinning and weaving wool had begun, but by 1780 water powered cotton spinning mills came into existence.

One of these mills, existing in 1811 was Gorton's cotton spinners and manufacturers at Kirklees and Tottington Mill. The survey of 1794 shows the presence of Tottington Mill. By 1800 it had been converted to the process of spinning, weaving and bleaching for the cotton industry. The printworks

themselves played an important part in the trade. It was the first to use an 8 colour printing machine.

At the height of the industrial revolution it was said that Lancashire clothed the world and cotton was king. Industry demanded vast amounts of water and mill ponds were built in their hundreds. Most of this industry has long gone, but a diversity of millponds remain, maintained as a matter of safety, many looked after by fishing clubs, others allowed to gradually fill with vegetation.

The mill closed down in 1928, and little now remains apart from a number of unsealed cellars and factory foundations. There are now just a few filter beds which are in a bad state of repair and mill lodges; originally 6, now only 4 remain.

During the Second World War the remains of the site were used by the Home Guard as an open air shooting range. By June 1976 the Department of the Environment had sent representatives to survey the area, who agreed it would qualify for a reclamation grant, *"being one of the most attractive areas in the Borough, and as such a significant asset and a landscape worth maintaining and enhancing, the area around Island Lodge being like a magnet for many people, attracted by the water, trees, buildings and artefacts, the sense of remoteness and enclosure giving a feeling of peace and seclusion, all these factors being sufficiently strong motivators to over-ride the sense of dereliction"*.

The impressive 9 arch viaduct 33 feet high across the western end of Island Lodge carried the railway, which was completed in 1882. The other large mills to the south of Tottington Mill were Kirklees Mill and the Kirklees Printworks, the latter

surviving only until 1824. The Kirklees printworks had 6 waterbodies that stored the water needed for its processing. Now only 4 remain.

Other mills in the valley which used millponds for water storage and treatment were the Stormer Hill Bleachworks, Mill Lane Tottington. This is the pond we have labelled MK18. Britannia Mill closed completely in 2005, most recently in use as a paper mill by the company Olives Activecraft. This site, and the site of the Woolfold Paper Mill at Champale, very near Crostons Road, Bury, is now being developed for housing; ponds at the latter are used currently for recreational angling. The ponds at the former Britannia Mill will be retained when the work is completed on the development.

OUR HERITAGE

Millponds are not only an obvious reminder of our industrial heritage, but have become remarkable refuges for wildlife. Water from the millponds had to have a certain standard of purity to make it useable during the lifetime of the factories (the streams would have been horribly polluted) and would have allowed some wildlife to hang on.

BAT HEAVEN

Taking full advantage of the facilities we have left behind are those most intriguing of mammals; bats. All British bats feed on insects, and where there is water and plenty of vegetation there are plenty of insects. Nearby houses provide perfect roosting places for our most numerous bat, the Common Pipistrelle, and old culverts and cellars produce ideal conditions for hibernation and roosting. Bat heaven indeed!

COMMENTS ON RESULTS

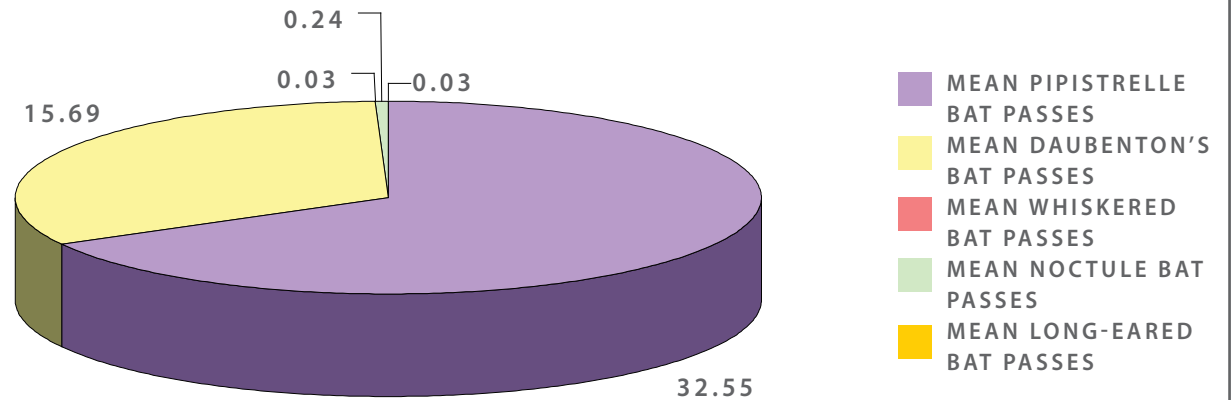
POPULATION AND HABITAT CHANGES

In the past 13 years, 4 millponds have been lost and 3 others have become noticeably smaller. This trend is likely to continue if nothing is done to restore and protect these ponds.

Total numbers of bat passes have increased consistently over the first 3 surveys, but this is mainly due to an increase in Pipistrelle records. The 2004 survey showed a drop in total passes although the numbers of Daubenton's bat passes increased 50% on the previous year. This overall drop in passes may be due to the relatively poor weather conditions and variability of weather.

Brown Long-Eared and Noctule numbers are so low that they are not statistically significant.

BREAKDOWN OF BAT ACTIVITY IN KIRKLEES VALLEY 2006 BY SPECIES



COMMENTS ON RESULTS



Worsley Delph, Worsley, Manchester



Jumbles Reservoir, Bolton



Yarrow Valley, Chorley

OTHER SURVEY SITES

Data was collected in previous pilot surveys in the Kirklees Valley allowing trends to now be visible, however under the remit of the **'Conserve Bats, Conserve Heritage'** project the South Lancashire Bat Group was able to survey ponds and water bodies outside of the Kirklees Valley.

It was decided to include other water bodies within the scope of the project, specifically choosing those that may have been in danger of development, and those associated with industry, such as canals, and subsidence flashes.

During 2006 an additional 13 sites were also surveyed due to increased volunteer surveyors.

In time it may be possible to look at a pond and make a judgement on bat foraging activity, simply by comparing the attributes of each pond.

SITE	NUMBER OF PONDS
Wigan Flashes, Wigan	7
East Lancashire Paper Mill Radcliffe, Manchester	4
Cliviger, Todmorden	1
Starmount Lodges, Bradley Fold, Bury	4
Burrs County Park, Bury	4
Moses Gate Country Park, Farnworth Bolton	2
Jumbles Reservoir, Bolton	1
Pilsworth Fisheries, Bury	7

SITE	NUMBER OF PONDS
Whitley Reservoir, Wigan	1
Worsley Delph, Worsley Manchester	3
Hollins Vale, Bury	1
Yarrow Valley, Chorley	2
Philips Park, Whitefield Manchester	2
Pyramid Park, Bury	1
Ponds at Haigh Hall, Wigan	2
Redisher Woods, Ramsbottom Bury	3

CONCLUSIONS



THE KIRKLEES VALLEY

- The string of millponds in the Kirklees Valley provides one of the most important foraging sites for bats in South Lancashire Bat Group's area.
- Bats were recorded on every millpond. Bats use ponds whether they are sheltered or exposed, large or small, well vegetated or bare, in a group or relatively isolated.
- Areas of long-standing industrial dereliction are vital refuges for bats in largely urban and intensively farmed rural areas.
- Whiskered and Daubenton's bats were confined to certain areas of the valley, however in most recent years Daubenton's bats were spread throughout the valley which has contributed to the 50% increase in activity overall. The disturbance of a roost site may have accounted for the decline in Daubenton's bat records in the northern part of the valley in 2003.
- Noctule activity is low in the count period, however they are recorded before this period. This is likely to be due, at least in part, to the fact that Noctule bats emerge early from their roosts, just after sunset, and commute elsewhere. Although foraging records are occasionally made, it is likely that the Valley is used as a commuting route to a main foraging site.
- Millponds are still being lost at an alarming rate.

Above: Brown Long-Eared bat gleaning a moth from a tree

Above Left: Walkers enjoy Kirklees Valley.

OTHER SURVEY SITES

Surveys have now been carried out at other survey sites for three consecutive years (2004, 2005 and 2006) using the same methodology.

Wigan Flashes

During the three years of survey three species of bat have been recorded: Noctule, Common Pipistrelle and Daubenton's bat. Of exceptional significance was the huge amount of Noctule activity, during the 15 minute count. It was noticeably greater than any recorded at other surveyed sites in the whole project.

Yarrow Valley Park, Chorley

A total of four species of bat have been recorded at the Yarrow Valley survey site including 45 KHz Pipistrelle, Daubenton's bat, Noctules and Whiskered bat. Importantly, Yarrow Valley is the only surveyed site outside the Kirklees Valley which supports four bat species.

Jumbles Reservoir, Bolton

In 2004 the recorded bat passes for Daubenton's bat and Pipistrelle were fairly high and almost equal, however in 2005 Daubenton's bat appeared to be more active during the survey period but Pipistrelle less so than in 2004. 2006 saw a reversal of fortunes with a low Daubenton's bat count, well down on 2005 with a slight recovery of Pipistrelle activity.

Philips Park, Whitefield

Common Pipistrelle and Daubenton's bat were found. At (PP1) the activity of Pipistrelles was highest in 2003 and in May of 2004, but decreased dramatically by 2005 and 2006.



Wigan Flash

Daubenton's bat numbers followed a similar pattern. One factor that may account for this decline is the proliferation of water weed over this time period, resulting in less open water.

Redisher Wood, Ramsbottom

During 2005 Noctules, 45 KHz Pipistrelles and Daubenton's bat were detected. Noctules were absent the following year however the number of Pipistrelle passes and Daubenton's bat passes increased for the site as a whole.

Starmount Lodges, Bradley Fold, Bury

Pipistrelle bats were recorded on all four ponds. The number of passes during 2004 and 2005 were virtually identical, however dramatically dropped in 2006.

During 2006, Daubenton's bats were recorded for the first time at the site, since the survey began, albeit in small numbers.



Pilsworth Fisheries

Healey Dell Rochdale

Three species of bat have been recorded, although the recorded bat activity has varied between years and between the different ponds.

East Lancashire Paper Mill

During 2005 the survey showed increased Pipistrelle activity, all being 45 KHz Pipistrelles, with a very high count of 85 passes. Daubenton's bat activity had also increased from no passes the previous year to 34 passes, whilst the surprise was a foraging Noctule bat which made 67 passes.

Burrs Country Park, Bury

Only Pipistrelle bats of the 45 KHz variety and Daubenton's bats were recorded at the site. All positions surveyed had very high numbers of Pipistrelle passes. In 2006 both Daubenton's bats and Pipistrelle bats were recorded feeding over the River Irwell; Daubenton's bats had not been recorded here for some time.

PROJECTS

POND QUALITY PROJECT

One of our members, Jennifer Lord, has now completed a University degree course. For her dissertation she elected to compare the Pond Conservation Trusts system for indexing 'pond quality' against the data the group collected during this millpond project.

In this experiment 6 ponds were selected, two in each section of the Kirklees Valley, each displaying different physical attributes such as area, percentage shade and altitude.

A number of readings were taken to determine the physical characteristics, and these are displayed in the table opposite.

The millpond survey techniques were then used on a number of nights to determine the number of passes and compare the results. They indicated a positive correlation between number of aquatic plants and *Myotis* spp. bat activity. Other correlations, relating to Noctule bats, were discounted as this species was so rarely encountered during the survey period that the statistics would be skewed.

Extrapolating this data to include the survey results from the whole of 2004 and the previous Kirklees surveys, we were able to compare additional factors with the activity of foraging bats. This full data set highlighted a positive correlation between foraging Daubenton's activity and altitude. Interestingly when just these 6 ponds were compared a significant correlation between the foraging activity of Daubenton's bat, Whiskered bats and Noctule bat, and the factors of pond area and pH, was found. Pond area and

PHYSICAL CHARACTERISTICS OF KIRKLEES PONDS

Pond Ref	LK01	LK02	LK12	MK02	MK10	MK16	UK02	UK06
Grid Ref	SD796114	SD796115	SD790122	SD784131	SD781135	SD779136	SD760144	SD761144
Altitude (m)	100	100	105	120	120	125	190	190
Area (m²)	1200	2000	2000	6000	700	9500	900	1800
PH	7.44	7.33	7.05	6.68	6.72	8.34	7.2	7.32
Conductivity	489.8	563.4	289.9	200.6	270.6	320.3	166.2	159.6
Shade (%)	17	5	8	2	65	15	4	25
Inflow	1	1	1	1	0	1	1	1
% Margin Grazed	0	0	0	0	0	0	0	0
% E. Plant Cover	4	20	3	4	3	3	6	5

pH also appear to have a direct positive correlation on total bat activity on these ponds. The percentage of emergent plant coverage was also compared as it was expected that this could be a contributing factor to the activity of foraging bats, because the bats' prey, emergent insects, feed on and cling to, these plants. More emergent plants could indicate higher abundance of emergent insects, and this increased amount of prey could support a larger number of foraging bats. The results from the ponds surveyed, showed that this was possibly not the case, the exception being a positive correlation between pipistrelle activity and percentage of emergent plant cover.

AQUATIC INVERTEBRATE SURVEY

An aquatic invertebrate survey was undertaken in August 2006 by members of the South Lancashire Bat Group of three mill lodges and a section of the Kirklees Brook, as part of a greater project to investigate the importance of mill lodges for bats.

The purpose of the survey was to see if there was any correlation between the numbers and species of bats recorded at each lodge that comprise the Kirklees Valley, a potential new local nature reserve, and the numbers and variety of aquatic invertebrates found in the lodges.

CURRENT PROJECTS



The **Conserve Bats, Conserve Heritage** project has enabled the Group to survey large areas of South Lancashire and the project itself has brought in many new members and volunteers who have become involved in the survey work. For some volunteers this has led to a wider appreciation of bat conservation issues, therefore we have undertaken training sessions to enable members to extend their interest.

The project enabled us to hold 33 training sessions, ranging from an Introduction to Bats, to Bat Detector Workshops and Injured Bat Care courses.

Some members have continued to gain experience and have decided to train for their *Roost Conservation Licence* which allows them to handle and disturb bats in roosts, and provide advice through Natural England to householders.

In addition to the training event, during the course of the project, we also held 22 bat talks, to which, nearly 700 people attended. More popular than the talks, were the bat walks held throughout the summer months, at many of the sites that were surveyed. Approximately 1500 people attended the 30 bat walks held over the three years. Even more people attended the 26 public shows, and we even arranged to hold six bat box making sessions, again with many boxes being erected at the survey sites.

Above Left: Bat Boxes provide ideal shelter
Above Right: Bat Detector's help identify species
Far Left: Bat Identification training for members
Left: An injured bat receives medical attention.



FURTHER WORK



DAYLIGHT SURVEY

The original daylight survey undertaken in 1994 needs updating with a current reassessment of habitat before further dusk surveys to search out possible overgrown ponds in daylight and to assess the changes in surrounding habitat types and degrees of shelter.

FURTHER SURVEYS OF THE SITES

Most of the mill ponds will continue to be surveyed annually, continuing the work of the **Conserve Bats, Conserve Heritage** project.

SURVEY METHODS

Surveys of other similar valleys, isolated lodges, canals and even rivers would make interesting comparisons. It will be useful to continue the survey within different habitat areas surrounding Island Lodge, generally choosing a night when

sufficient numbers of surveyors are available to determine whether bats are using the ponds in preference to other areas, such as woodland or pasture or meadows within the confines of the valley.

We know that this is the case for Daubenton's bats, with their affinity to water, however, it would be good to check if, over time, Pipistrelles select in the same manner, perhaps separating the Pipistrelle species too.

This will enable us to determine if the bats are continuing to select the ponds as preferred feeding sites, rather than other features of the valley. If this is the case the significance of protecting these ponds will increase.

Selecting different times of year on a few ponds should allow us to compare bat activity throughout the year, apart from winter when bats will be hibernating.

Although bats are known not to favour strong winds and heavy rain, bats have been observed foraging on nights of very poor weather in the mid section of the Kirklees Valley. To determine the effects of weather on foraging activity and behaviour, we hope to survey under different weather conditions.

Due to funding from the Local Heritage Initiative/Heritage Lottery Fund, we have been able to purchase more advanced equipment to help with this. We now are able to use Petterson D-230 frequency division bat detectors, which allow differentiation of the two species of Pipistrelle.

It is also intended to look at emergent insect abundance in a number of ponds to determine if there is a correlation between this factor and bat foraging activity.

It would be useful to continue the invertebrate survey to determine, if, over time, bats are selecting those ponds with high numbers of emergent insects.



LOBBYING

It would be well worthwhile lobbying to prevent any further loss of millponds and even restore lost ponds in a sensitive manner where there is no adverse ecological impact. It is of note that Ordnance Survey maps produced in 1851 show the presence of 40 mill ponds, and numerous filter beds. To our knowledge only 2 sets of filter beds now exist, and only 29 ponds are left in the valley. The publicity gained from the present project, funded by the Heritage Lottery Fund, which aims to involve the public in bat survey over water bodies, will help us achieve this aim.

Bury MBC are considering Local Nature Reserve status for a large part of the Kirklees Valley; including most of the mid and lower sections. The Bat Group needs to continue to be involved in this process to prevent any undue 'improvements' and 'tidying', and push for the conservation, restoration and careful management of these important mill lodges.

PUBLICITY

In order to gain support for our lobbying it will be helpful to publicise present and future results. This was the main aim of the **Conserve Bats, Conserve Heritage** Project.

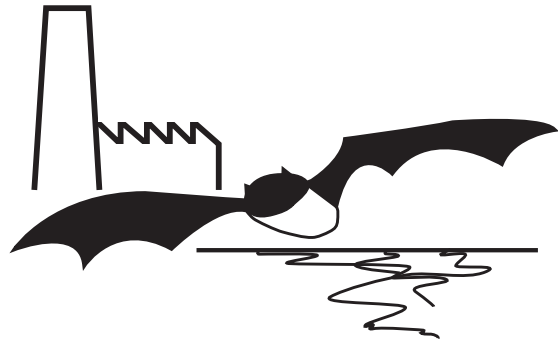
This will involve the wider membership of the South Lancashire Bat Group, the public and other interested groups (e.g. heritage groups, fishing clubs) in the surveys to raise a general awareness of the value of these areas to wildlife.

It also involves distributing as widely as possible the final report and leaflet on the results of the surveys. It will also mean giving presentations to interested parties. Some presentations have already taken place and more are planned for the future.



Above Left: Injured Bat training
Above Right: Bat talk at Martin Mere
Left: Countryside Live exhibition.

FURTHER INFORMATION



**SOUTH LANCASHIRE
BAT GROUP**

Registered Charity Number 1109519

FURTHER INFORMATION

More information on the Conserve Bats, Conserve Heritage is available on our website at www.slbg.org.uk

More information of the Local Heritage Initiative can be found at www.lhi.org.uk

The Local Heritage Initiative has now been superseded by the Heritage Lottery Fund www.hlf.org.uk

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- The Friends of Healey Dell
- The Rochdale Countryside Service
- Bury Metropolitan Borough Council
- Pond Conservation Trust
- East Lancashire Paper Mill Angling Club

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- Bury Anglers
- Champale
- Bury Countryside rangers

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