

The Bats & Roadside Mammals Survey (iBatsUK)



people's trust for
endangered species
mammals

Bat Conservation Trust



Aims of the Survey

SURVEYING

- Increase number and distribution of bat/other mammal records
 - Geographical variation
 - Seasonal variation
 - Identify road designs and roadside features that impact on mammal populations
 - Make records available to all



MONITORING

- Long-term method for monitoring populations for selected species at the local and regional level

Car Based Survey



Method

An ultrasonic acoustic recording is made from a car along a roadside transect using a time-expansion ultrasonic acoustic detector and a minidisk recorder (Fig. 1). The acoustic transect is simultaneously spatially referenced using a GPS device to record positions along the route (Fig. 2).



Fig. 1. Time expansion detector and minidisk recorder continually record bat calls



Fig. 2. GPS used to record spatial data along the route

Acoustic recordings are analyzed with BatSound and call characteristics, abundance and species identification is recorded for 3.5 second sample of the transect (Fig. 4).

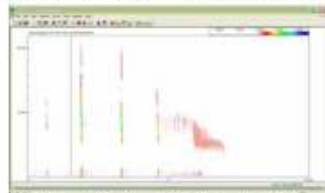


Fig. 4. The bat calls are identified using BatSound

Each transect is driven at 25 km/hour an hour after sunset for approximately 40 km, collecting 3.5 second snapshots of time-banded acoustic recordings (Fig. 3).

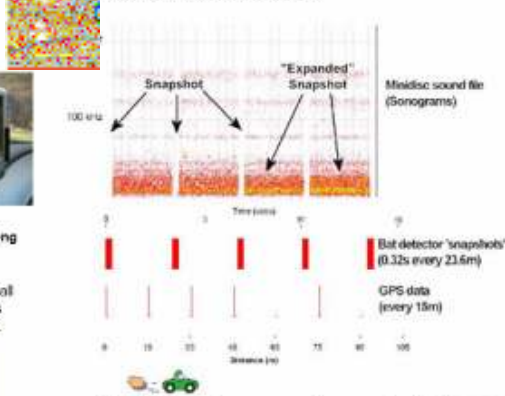
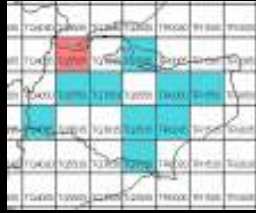


Fig. 3. During each car survey a time-expansion bat detector records 0.32s "snapshots" of high frequency sound along the route every 3.5s. If the car is traveling at 25kph then the detector records sound every 23.6m. After each snapshot, the sound is stretched out (time-expanded) by a factor of ten. This stretched or 'expanded' sound is subsequently recorded onto a minidisk.

Planning the Survey - Selecting a route

- Routes selected from 15km² survey 'blocks'
- Each survey approximately 25 miles (approx 1 ½ hrs) in length
- Survey starts 30 mins after sunset



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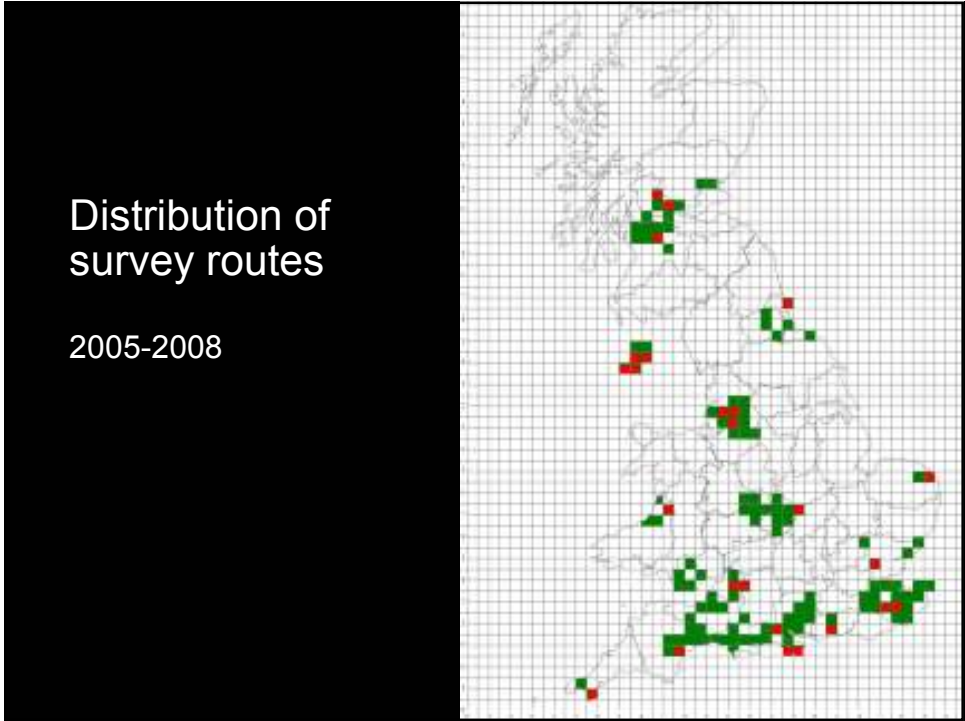


- Surveys: May – Sept
- Monitoring: July & Aug

Surveying Routes

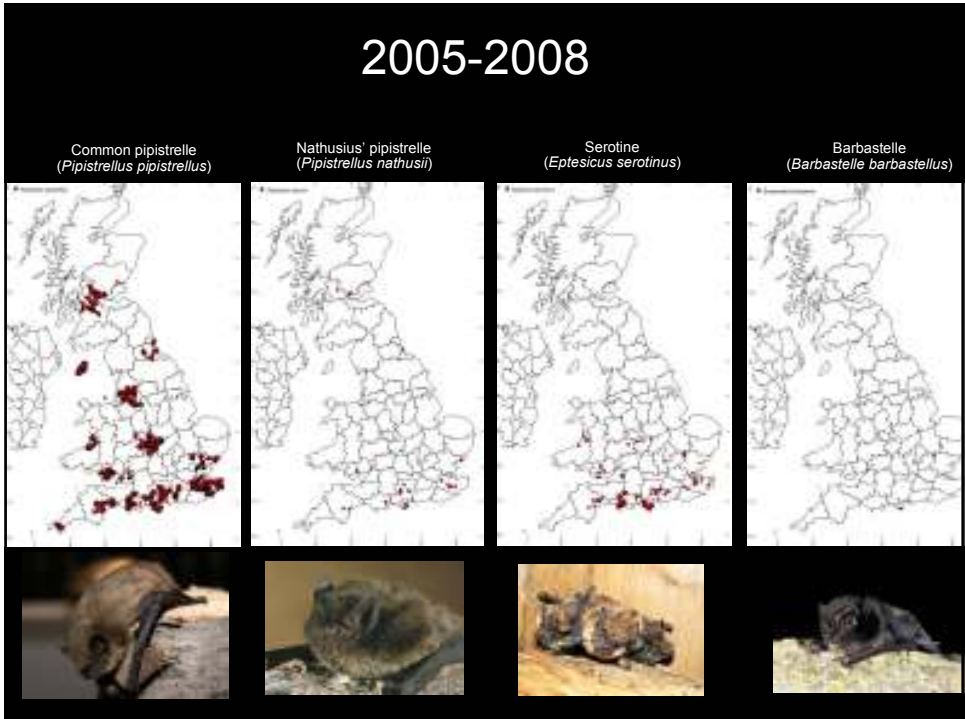
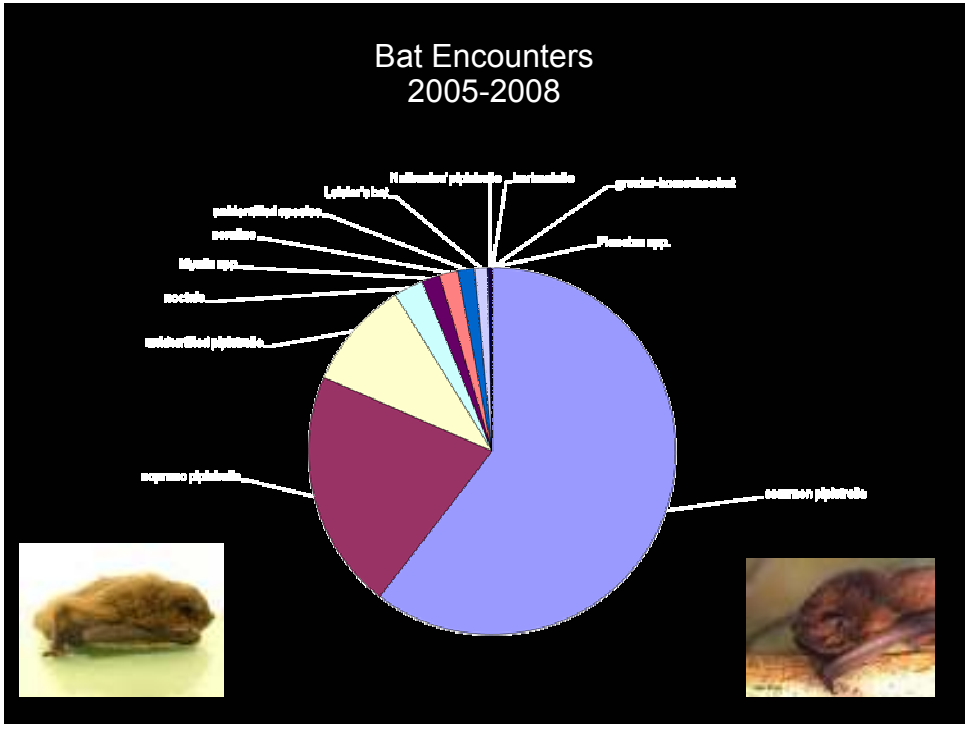
Monitoring Routes

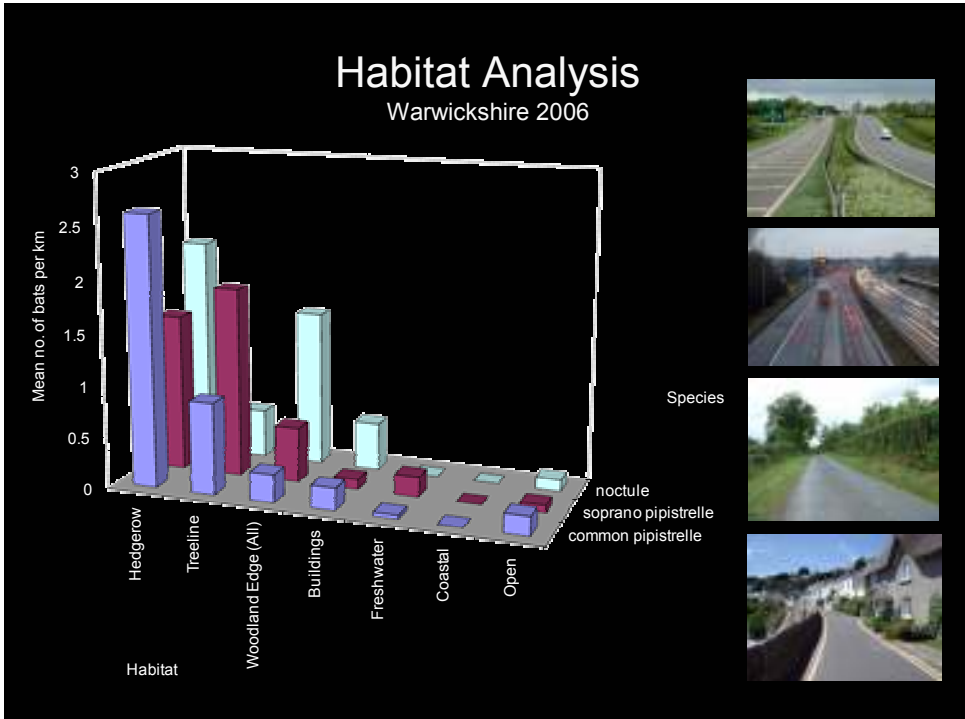
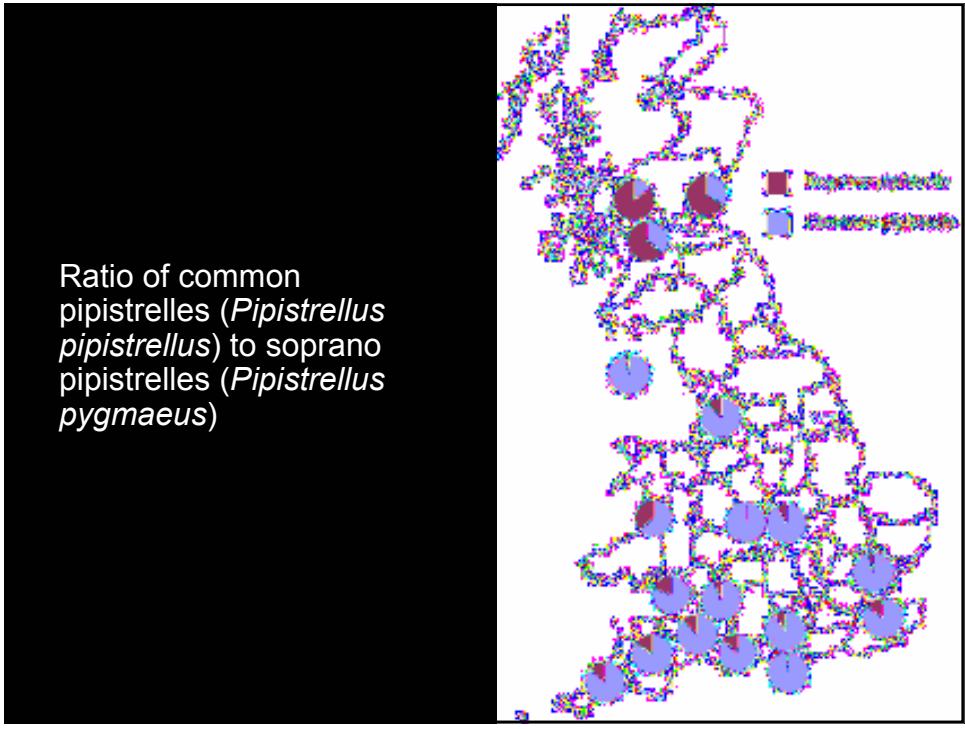
April
May
June
July
August
September
October



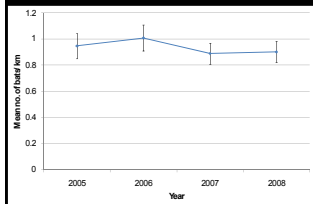
Transects Surveyed 2005 - 2008

Year	No. of Bat Groups	No. Of Transects	Total Distance (miles)	Total Number of Bats	Total Number of Other Mammals
2005	10	74	3573	4719	399
2006	14	89	3338	5428	511
2007	17	80	3012	3839	416
2008	18	72	2895	4975	378
TOTAL	59	315	12818	18961	1704

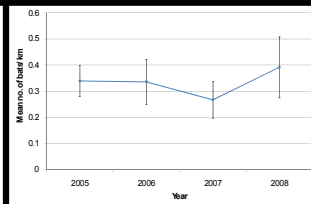




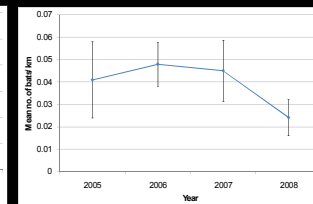
Yearly variation 2005-2008



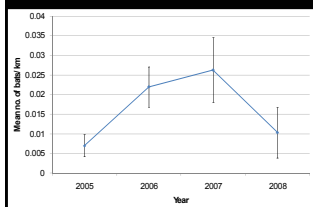
Common pipistrelle



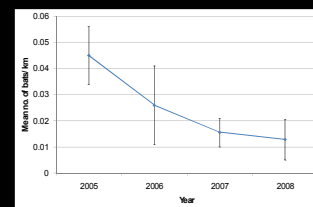
Soprano pipistrelle



Noctule



Leisler's bat



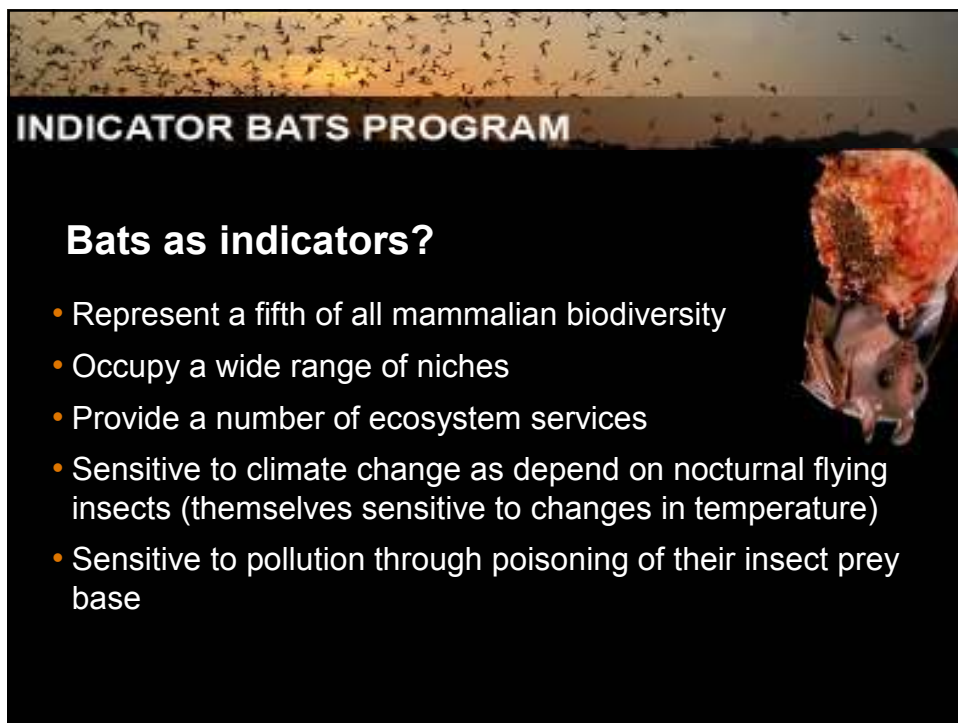
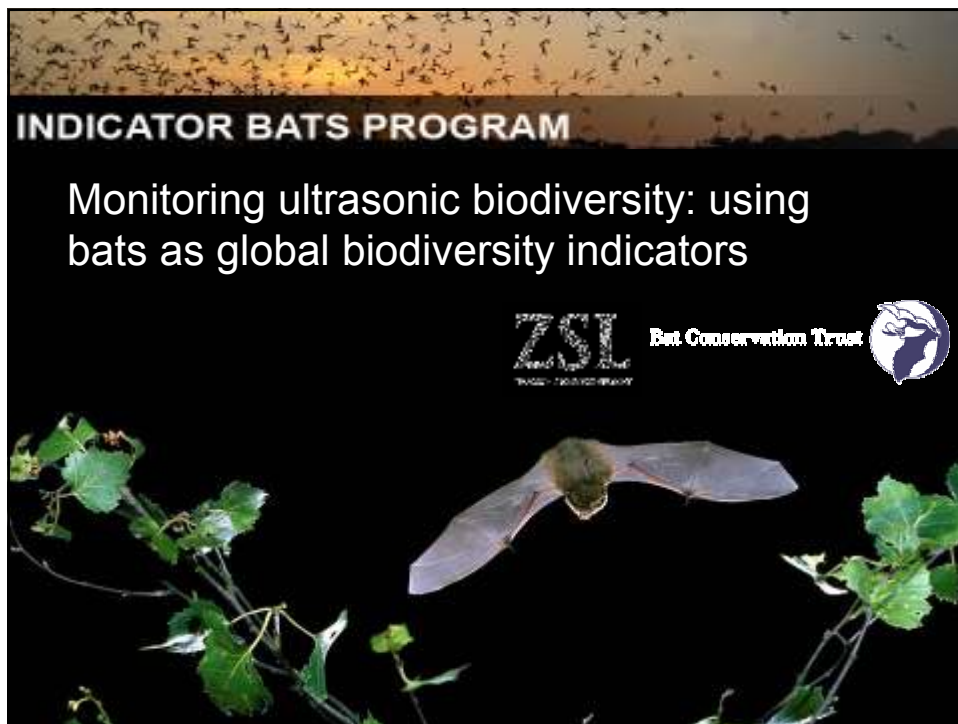
Serotine

Conclusions

- Reliable and effective method for surveying bats along roads. Relatively small amount of volunteer effort in comparison with other surveys.
- A wide variety of bat species encountered.
- Seasonal and geographical variation in bat encounters revealed.
- Habitat analysis ongoing.

Problems encountered


- Equipment complex to use
- Data management/handling can be time consuming
- Sonogram analysis time consuming and a lot of variation between analysers – influences monitoring power
- Regional monitoring



INDICATOR BATS PROGRAM


Aims

- To generate monitoring data on bat species distributions and abundances across the world to evaluate the effect of global change on biodiversity loss.



- Collaborate with **existing** national and international bat monitoring **projects**
- Initiate **new** bat monitoring **projects**
- Develop and implement novel monitoring **protocols**
- Provide a centralised common **database** to store and analyse global bat monitoring data
- Disseminate protocols and results through an interactive **web portal**

INDICATOR BATS PROGRAM - Web Portal



Date	Route Name	Data Owner	Complete	
07/05/2005	S03020	John Harrison-Bryant	Y	Details
07/05/2005	S03020	John Harrison-Bryant	Y	Details
08/05/2005	S08002	John Harrison-Bryant	Y	Details
30/05/2005	S10002	John Harrison-Bryant	Y	Details

Project Report

Select your project from the list below to progress


Project Report


Select a project:

Project Summary


Project statistic	Count
Total number of events	212
Total number of routes	365
Total number of monitoring events	215
Total number of registered volunteers	153
Total number of routes volunteers	30
Total information stored	21465.96

Event Locations





INDICATOR BATS PROGRAM - Eastern Europe





Romania
79 participants (62 survey)
2006 - 16 transects (520 km)
2007 - 52 transects (1884 km)
2008 - 58 transects (2018 km)

Bulgaria
54 participants (36 survey)
2007 - 74 transects (2733 km)
2008 - 88 transects (3362 km)

Hungary
6 participants (13 survey)
2007 - 8 transects (299 km)
2008 - 7 transects (265 km)

Croatia
2007 - 1 transect (32 km)





INDICATOR BATS PROGRAM



Family	Species	Romania N = 107/126	Bulgaria N = 153/162	Hungary N = 13/15	Croatia N = 1/1	
Miniopteridae	<i>Miniopterus schreibersii</i>	39 (0.010)	52 (0.009)	4 (0.006)	2 (0.063)	
Molossidae	<i>Tadarida teniofa</i>	9 (0.002)	18 (0.003)	0 (0)	2 (0.063)	
Rhinolophidae	<i>Rhinolophus euryale</i>	0 (0)	1 (0.000)	0 (0)	0 (0)	
Vespertilionidae	<i>Borbolestes barbastellus</i>	1 (0.000)	5 (0.001)	0 (0)	0 (0)	0.001
Vespertilionidae	<i>Eptesicus nilsonii</i>	203 (0.054)	113 (0.020)	23 (0.047)	1 (0.032)	
Vespertilionidae	<i>Eptesicus zelandicus</i>	65 (0.023)	226 (0.040)	21 (0.043)	1 (0.032)	0.026
Vespertilionidae	<i>Hypugo savii</i>	96 (0.026)	314 (0.055)	6 (0.016)	14 (0.442)	
Vespertilionidae	<i>Myotis</i> spp.	320 (0.085)	151 (0.026)	31 (0.064)	6 (0.253)	0.032
Vespertilionidae	<i>Nyctalus lasiopterus</i>	559 (0.149)	169 (0.029)	28 (0.057)	0 (0)	
Vespertilionidae	<i>Nyctalus noctula</i>	499 (0.133)	734 (0.127)	34 (0.070)	2 (0.063)	0.048
Vespertilionidae	<i>Pipistrellus kuhlii</i>	52 (0.014)	246 (0.043)	0 (0)	10 (0.316)	
Vespertilionidae	<i>Pipistrellus pipistrellus</i>	435 (0.116)	1179 (0.205)	2 (0.004)	18 (0.569)	1.009
Vespertilionidae	<i>Pipistrellus pygmaeus</i>	179 (0.048)	70 (0.012)	11 (0.023)	6 (0.253)	0.337
Vespertilionidae	<i>Vesperugo murinus</i>	231 (0.062)	322 (0.056)	23 (0.047)	3 (0.094)	
Uncertain		5609 (1.492)	5649 (0.981)	449 (0.920)	95 (3.002)	
Total		6311 (2.213)	9251 (1.607)	634 (1.299)	164 (5.182)	

Number of encounters (encounters per km) for 14 species or species groups in 4 countries recorded in 274 transects (10,032 km) from 2006-2008. N = number of transects analysed out of total number surveyed. Total number of encounters = 18,360.

INDICATOR BATS PROGRAM - Participants



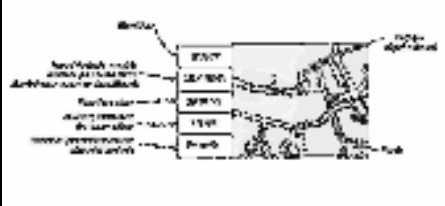




Year	Events	Km Driven
2006	31	1137.02
2007	155	5179.76
2008	237	7120.31
2009	270	13223.02





INDICATOR BATS PROGRAM - Future

- New equipment – iPhone
- Website improvement
- Ecological niche factor analysis
- Automatic detection of the calls within the recordings
- Automatic identification of calls to species
- Global call library



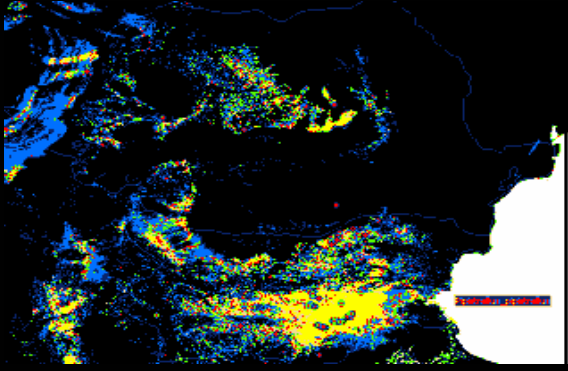
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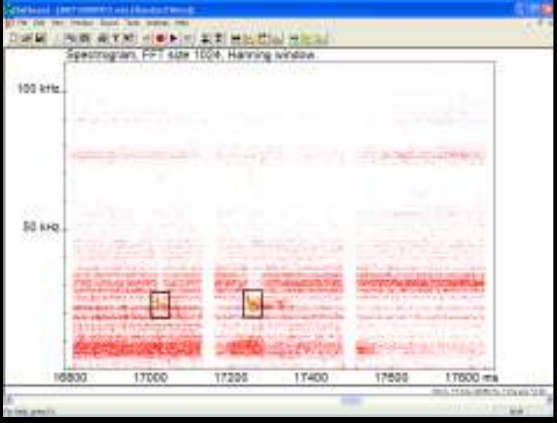


Alice Hughes
Bristol University




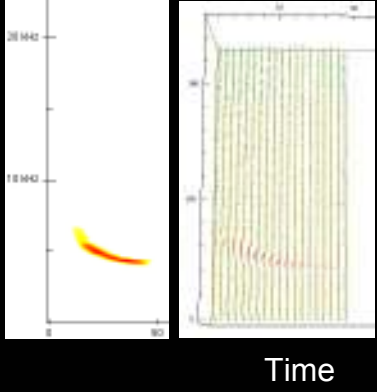
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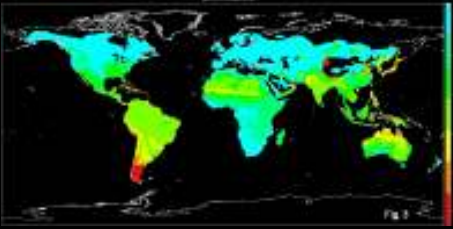
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EchoBANK - Global call library and web portal



Highest % coverage
Lowest % coverage

308/950 species (32%), 89/160 genera (56%), 17/19 families (89%), n = 15 individuals/labs



Thanks to.....



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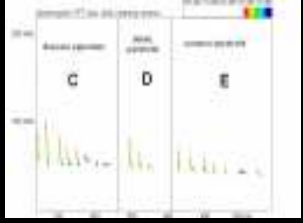




Global ultrasonic monitoring

Equipment

Training

Monitoring





INDICATOR BATS PROGRAM - SWOT

Strengths

- Simple & standardized protocols
- Public involvement in biodiversity monitoring
- Can deliver global monitoring at low cost

Weaknesses

- Technical & analytical development needed, biased sampling

Opportunities

- Understanding global distributions of bats and future threats
- Systems for automatic identification and analysis

Threats

- Unsustainable monitoring – not enough power to detect trends



	routes	20	30	40	50	70	100
species	Alert type						
pip45	amber	16.5	13.7	13.2	10.4	7.5	7.1
	red	6.8	6.8	5.0	3.9	3.5	<3yrs
pip55	amber	>25yrs	>25yrs	>25yrs	23.4	23.0	19.3
	red	17.3	15.6	14.5	11.7	6.7	7.2
noctule	amber	>25yrs	>25yrs	>25yrs	>25yrs	26.7	20.7
	red	23.5	17.2	16.9	14.2	10.7	10.4

Table 3: number of years to achieve 80% power with different numbers of routes, each surveyed twice per year, for amber (25% decline over 25 years) and red (50% decline over 25 years) alerts.

INDICATOR BATS PROGRAM - Monitoring Power

Projects	Events in July or August	Routes surveyed in July or Aug	Routes surveyed in July & Aug	Years required to detect trend: Amber/Red (each route done once)	Years required to detect trend: Amber/Red (each route done twice)
Romania	30	25	9	21/9 yrs (n=25)	24/11 yrs (n=9)
Bulgaria	55	28	26	20/9 yrs (n=28)	15/7 yrs (n=26)
Across region	85	53	35	16/>7 yrs (n=53)	13/6 yrs (n=35)

Table 4. Details of routes surveyed in 2007 in Romania and Bulgaria, with estimated time it will take to deliver statistically robust trends at current rate of effort each year.

- Establish a core set of routes done every year in July and August (either done twice or twice as many once)
- Romania - focus energy on transects in July and August

UK Bats and Roadside Mammals Survey



- Following pilot in 2004, ~10,000km surveyed between 2005- 2007 (average 3308km per yr).
- 14704 bat records (average 4901 per yr) from 10 bat species/species groups
- Bats recorded: common, soprano and Nathusius' pipistrelles, Leisler's bats, noctules, serotines and Myotis spp.

Bat Conservation Trust



Source: Bats and Roadside Mammals Survey
(BCT, Mammals Trust UK)

INDICATOR BATS PROGRAM

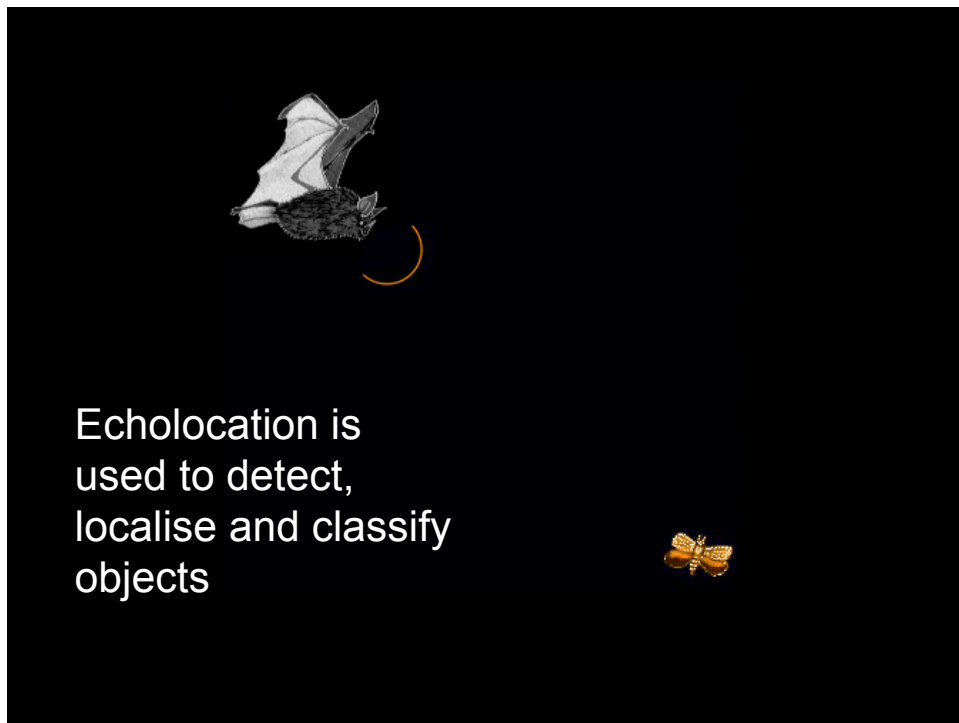
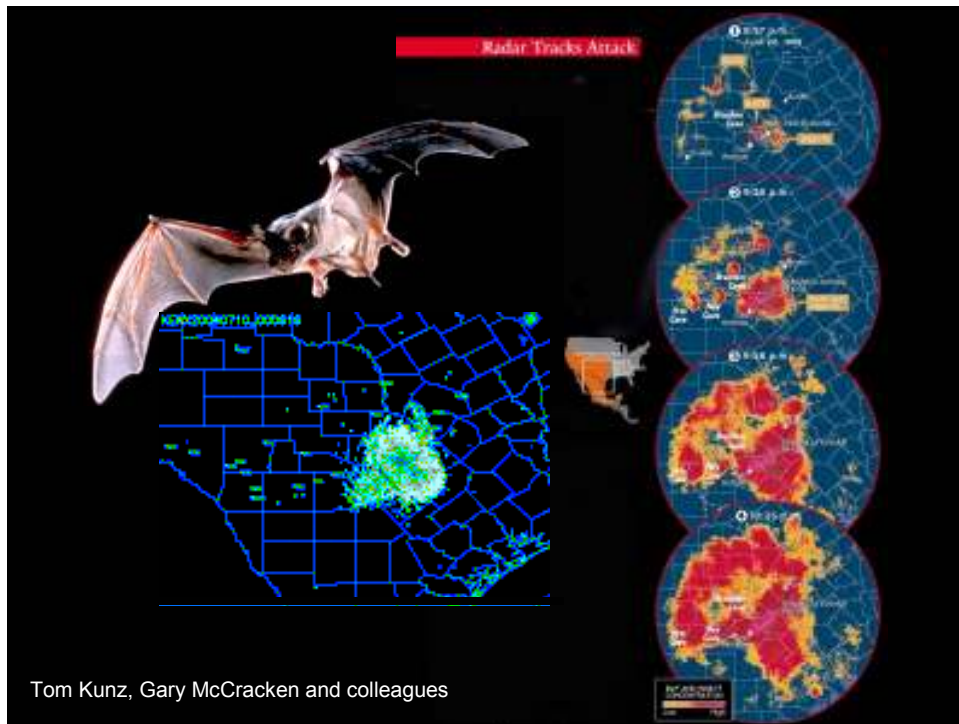
Extinction: past, present and **future**


- We need to move beyond recognising threatened species, to monitoring, modelling, prediction and to designing preventative actions.

Reactive

Proactive

Observing Monitoring Modelling Predicting Managing





Bat Conservation Trust

Biodiversity Monitoring Network

Participation in NBMP Surveys: 1999-2006

Number of volunteers

Total number of volunteers

Number of repeat volunteers

Number of new volunteers

Foot and Mouth Outbreak

United Kingdom

Source: ICT

Main

- 1. Biodiversity
- 2. Biodiversity Indicators
- 3. Assessment Indicators
- 4. Assessment Indicators
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- 100. Assessment Indicators

1c. Bat populations: widespread bats

Local Area: Status and trends in the components of biological diversity

Open Data Indicator

Summary

Figure 1c(i). Trends in widespread bat populations, 1999-2007

United Kingdom

Index (1999=100)

Year

Source: Bat Conservation Trust - National Bat Monitoring Programme

Index (1999=100)

Year

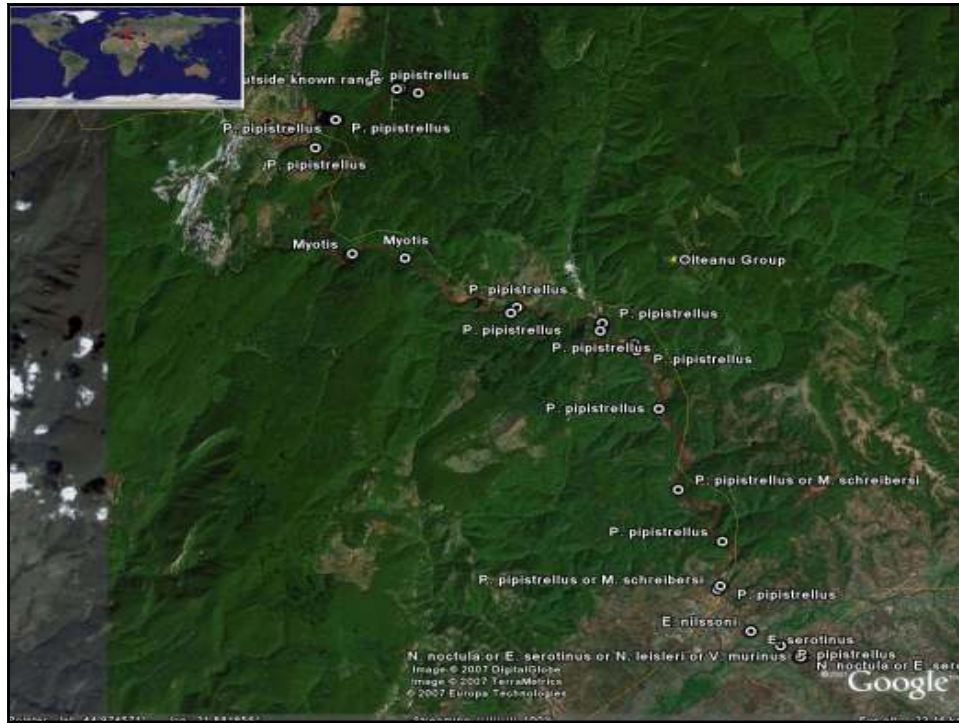
Source: Harris S, Platts R, Whay S, & Hatten D, 1993. A review of British mammals: population estimates and conservation status of British Mammals other than cetaceans. JNCC, Peterborough

Note: The main chart shows a composite index of six species: Daubenton's bat, noctule, lesser horseshoe bat, common pipistrelle and common pipistrelle.

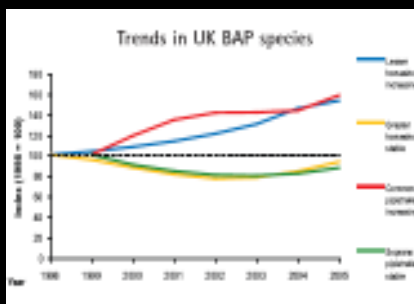
The smaller chart shows a historical dataset (R. E. Stables pipistrelle colony counts reproduced from Harris et al., 1993) to put the recent positive trend in the context of longer term declines. Note that the two charts are not directly comparable because the National Bat Monitoring Programme's data comprises a broader range of species and survey methods. The data collected by R. E. Stables's data were from before the two pipistrelle species were separated and are drawn from a smaller sample size.

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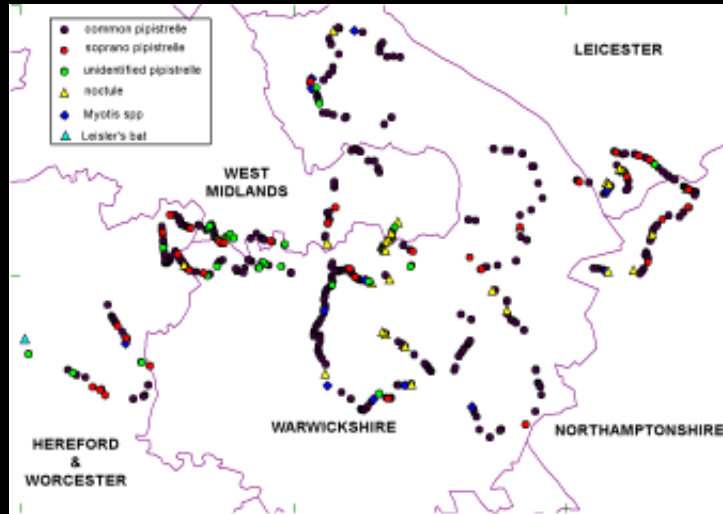


species	Alert type	20	30	40	50	70	100
pip45	amber	16.5	13.7	13.2	10.4	7.5	7.1
	red	6.8	6.8	5.0	3.9	3.5	<3yrs
pip55	amber	>25yrs	>25yrs	>25yrs	23.4	23.0	19.3
	red	17.3	15.6	14.5	11.7	6.7	7.2
noctule	amber	>25yrs	>25yrs	>25yrs	>25yrs	26.7	20.7
	red	23.5	17.2	16.9	14.2	10.7	10.4

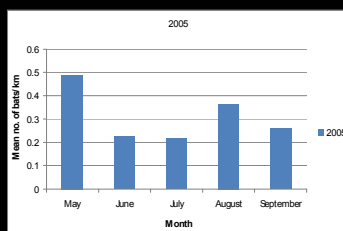
Table 3: number of years to achieve 80% power with different numbers of routes, each surveyed twice per year, for amber (25% decline over 25 years) and red (50% decline over 25 years) alerts.

Langton (2008)

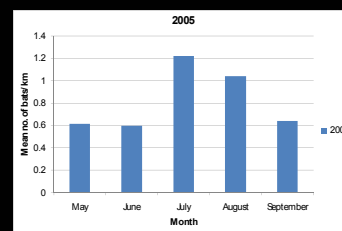
Warwickshire Records - 2006



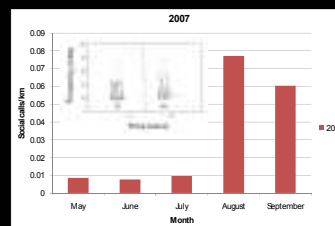
Monthly variation – Pipistrelle bats



Soprano pipistrelle



Common pipistrelle



Pipistrelle social calls