

## APPENDIX III

### Guidelines for carrying out surveys of bridges for bats

#### Preparation

##### Pilot studies

First determine if there are potential bat roosting sites in bridges. Virtually all watercourses passing beneath roads shown on 1:50,000 scale O.S. maps (and many more not shown) may be spanned by bridges or culverts. It may be useful to carry out a pilot survey with trained surveyors (see **Training** section) to survey all bridges in a set area *eg.* 10 km square (or a number of 10 km squares representative of local habitat). The results will give an idea of the potential in your area and an estimation of the total number of bridges.

If results show that there is the scope for a major survey then funding could be sought, primarily from the maintenance bodies and secondly from statutory nature conservation organisations and other conservation bodies, to carry out a full bridge survey and implement successful roost preservation. Smaller scale surveys targeting key habitats (broadleaved woodland and slow flowing water) and selected bridge types could be carried out.

##### Locating bridges

To identify where sites are and what they are called a number of sources of information are available. Lists and maps of bridges can be obtained from County Highways, Highways Agency and British Waterways, raising the issue of bats and bridges with them.

First contact your local and central senior Bridge Inspectors in County Highway departments for lists and maps of bridges they maintain (they might have a data base of sites), they may also have some information on bridges maintained by other bodies. County Council Highways own virtually all road bridges and culverts (A, B, C and U class roads) over watercourses. They also maintain most motorway, trunk routes, and privately managed roads (these are becoming more common due to contracting out responsibility of road maintenance). In Cumbria the Highways bridge maps do not show most culverts, disused and used railways, canal, and footpath /bridleway bridges. Contact local authorities for maps of land ownership; organisations like the National Trust are large land owners and will usually own the footpath and private access bridges within their land holdings.

Railway, disused railway, canal and larger private bridges are readily identified from Ordnance Survey maps (maps of canal networks are available from British Waterways). Railtrack maintains railways (which includes bridges/culverts under and over railways) and British Rail Property Board maintain disused railways (which again includes all structures under and over the line). A small number of road bridges over disused and existing railways have gone over to Highways ownership and maintenance. Large numbers of bridges on disused railways have been sold off with the land - in Cumbria at least half of the bridges have gone into private ownership. The Viaduct Trust also own some disused railway bridges and viaducts. Regional railway property

board offices look after ownership of both disused and existing railways. Existing railway structures tend to be very well maintained - frequently offering few deep crevices for bats (except for large viaducts which often have deep crevices or drains). Disused structures are often totally neglected (except for those bridges under or over roads).

Some small railways are privately owned and maintained (including structures under/over). These vary considerably in the traffic using them. These railways are usually only used in peak tourist seasons so for the rest of the year they may provide quiet havens.

In the National Parks the park authorities maintain footpath and bridleway bridges which can either be owned by themselves or privately. Also they sometimes assist in funding the preservation of private bridges which do not carry rights of way (mainly listed ones). They use contractors, maintenance teams and volunteers.

### **Training**

To carry out initial surveys of bat potential a licence is not required. When any signs of bats are found further survey work should only be conducted by a person carrying a bat roost visitor licence.

### **Health and safety considerations**

Surveyors should be trained in safe working practices including tackling steep ground, climbing on scaffolding and ladders, and water safety (assessing water flow, depth, and currents). Health and safety at work rules dictate that two people should accompany anyone using chest waders. To conform to safe working practices a risk assessment would need to be undertaken which clearly defined what can and cannot be classed as acceptable practices.

A tetanus inoculation should be obtained as infection is possible through cuts. Leptospirosis (Weil's disease) is a hazard from exposure to urine of infected mammals, particularly rats and cattle and is contracted through cuts or the linings of the mouth, throat and eyes. Culverts, slow flowing water, ditches and canals present potential infection sites risks - no inoculation is available. Always carry a first aid kit containing an antiseptic and plasters - **never leave cuts uncovered and treat immediately.**

Surveyors should be trained in the use of equipment such as waders, lifejackets/buoyancy aids, ladders, and fibrescopes.

To visit enclosed environments (eg. long culverts) which may present physical hazards, low or unsafe roofs or gas risks (eg. Carbon Dioxide, Hydrogen sulphide or Methane) - surveyors would need extra training including using the use of gas monitoring equipment.

## **Bat roosts in bridges**

Trainees should be taught the use bats make of bridges including; seasons of occupation, the signs they leave of their presence, and the types of bridge construction and the potential roosting sites they offer. Site visits should be carried out to several bridge roosts, and trainees should be taught how to safely carry out exclusions.

Trainees should be aware of the construction techniques used in bridge works and the threats bats face from them, methods of preserving roosting sites and minimising disturbance during works, and creating new roosting sites during bridge construction.

## **Training outcome**

Each trainee will need to demonstrate that they can safely and accurately survey bridges for bats and be able to provide advice to engineers or SNCO's.

Training seminars should be given to engineers/maintenance staff on a regular basis (*eg.* yearly) - taking them to see bat roosts, discussing the threats faced by bats in bridges and the methods of preserving/creating bat roosts.

## **Equipment**

Surveying bridges will involve getting dirty and wet. Appropriate clothing should be worn as it may get torn by barbed wire, brambles and dog roses. Barbed wire is a problem especially when it is underwater - waders or wellies can be easily punctured.

For surveying most sites wellies, chest waders, a lifejacket, and a bright torch will be required. For checking bridges of <2.5 m arch height a small bright torch would be suitable *eg.* 'Lazer lite', but for higher structures a very powerful lamp (*eg.* 1 million candle power) should be used *eg.* 'Clulite' range.

For some situations a wet suit/dry suit or a boat (for slow moving rivers and canals) may be needed to get access to sites. A suitable buoyancy aid should be worn with waders, dry suits and wet suits. A rough rule of thumb guide is: do not enter water travelling faster than 1m per second and deeper than your knees. Time a floating orange to determine water speed as this will exhibit similar buoyancy properties to that of a person.

Low culverts/bridges may require hard hats, miners lamps, and gas monitoring equipment.

For recording take a clip board with recording forms, black biros, pencils, and a rubber.

Waterproof yellow marking crayon should be used to identify holes to be retained during works - this will often last several weeks or more before fading away but this will depend on the prevailing weather conditions. Holes should only be marked for retention just prior to works starting. The crayon can be easily removed by rubbing causing no damage or lasting marks to stonework usually encountered in bridges. Test the crayon on an inconspicuous part of the stonework first if it appears that it may be highly absorbent.

## Surveys

### Timing

If survey time is limited then efforts should be concentrated from mid August - late October as this was when most bats were encountered in the Cumbria survey (based on data for June - December). If evidence of bat presence such as droppings, staining, or wear marks, are found during autumn surveys but no bats are present, the site should be ear-marked to be re-visited in summer. Further work needs to be done in spring (April and May) and in mid summer (mid June - end of July) to identify nursery sites. If there are time and resources available surveys should be conducted from April - October.

Results suggest the majority of bats do not rear their young in bridges but take up residence very soon after the young are flying. Males may be present almost all year round.

### Carrying out surveys

Visit bridges in daylight hours and in low water conditions (for bridges over watercourses). When bridges cannot be surveyed over watercourses due to flood conditions most disused railway, railway and canal structures can still be surveyed. One person can carry out most surveys but for reasons of safety two or more people may be required.

Compile records with sketches forwarding copies to your local SNCO and the relevant maintenance body. It is essential that the right people get the information - in large organisations often the information does not get through to the people organising or actually carrying out the work with the result that roosts are lost through ignorance of their existence.

Once a number of bridges have been surveyed then revisit lists can be drawn up. The first priority should be assessments of sites which are listed for maintenance works, then bridges with signs of significant use by bats, bat sites, and structures with high bat potential that are not confirmed to be roosts.

As well as recording data on bats consider other fauna and flora that may also be recorded according to expertise available. Bird nesting sites are particularly important and should be taken into account in the timing of works. Invertebrates, flora growing on the structure, or mammals that live in or use the site for defining their territory could also be recorded (*eg* small rodents, mink and otter).

Adjacent habitat and what occurs in it could also be recorded (*eg* crayfish and water vole) particularly if they could be affected by work on the bridge or banks nearby.

To handle a large number of records a data base would be worth setting up and may be linked to an existing one of bridges. But any existing Highways data system is likely to contain only a proportion of the total sites worthwhile surveying for bats.

## Counts

Once roosts have been identified monitoring can be carried out to determine bat numbers and the seasons that bats use the site. Counts in May, July and September should take account of the main periods that bats use bridge roosts.

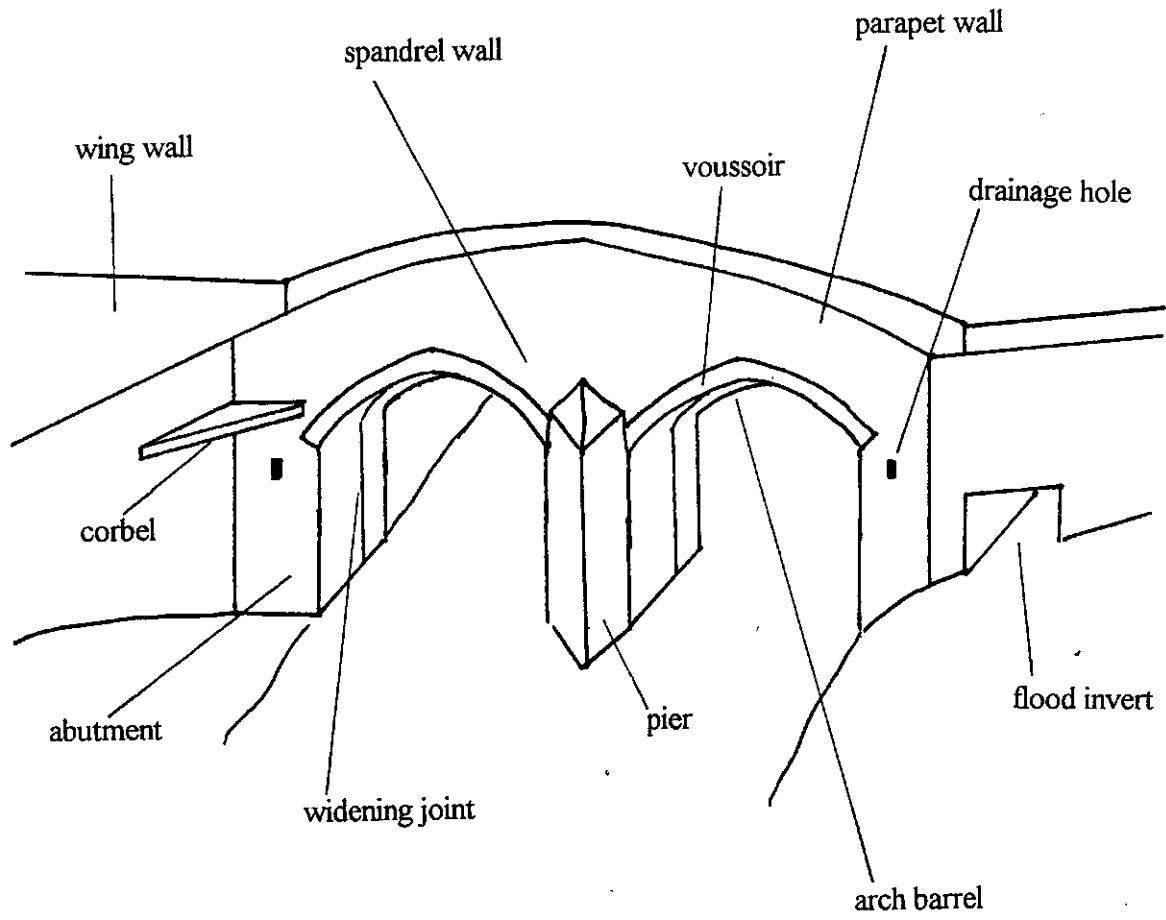
## Male roost surveys

Using ultrasonic bat detectors mating station surveys can be carried out one to three hours after emergence to listen for male calls. Long-eared bats, noctule bats, and 45 kHz and 55 kHz pipistrelles all have clearly discernable calls at around 25 kHz. Daubenton's and Natterer's bats have quieter calls more toward 30 kHz (and up to 35 kHz) - but often calls are only heard during swarming behaviour at roosts or in more enclosed situations *eg.* inside caves or buildings (possibly inside bridge box voids). The best time of year would be September but depending on the latitude in the U.K., and the prevailing weather conditions, male roost surveys could possibly be carried out in April, August, October and November as calling males have also been recorded during these months.

**Note:** These notes are an appendix to the report: The Conservation of Bats in Bridges Project - A report on the survey and conservation of bat roosts in bridges in Cumbria (Billington, G.E. & Norman, G.M.). The full report should be consulted for further information.

# APPENDIX IV

## Annotated bridge diagram

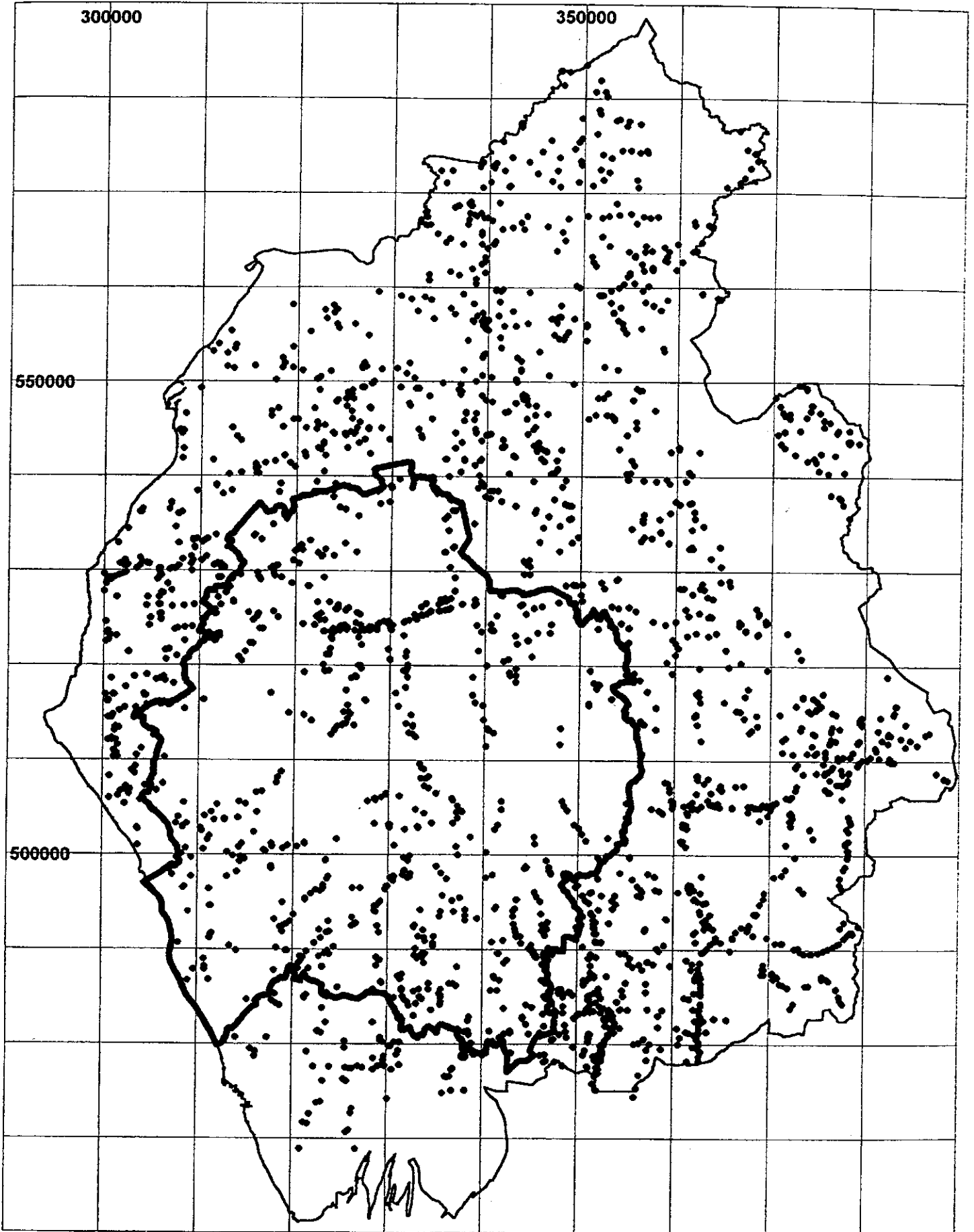


## **APPENDIX V**

### **Distribution maps**

- Map 1:        Distribution of bridges surveyed**
- Map 2:        Distribution of bridge roosts**
- Map 3:        Distribution of Daubenton's bat roosts in bridges**
- Map 4:        Distribution of identified bat roosts in bridges (excluding Daubenton's bat)**
- Map 5:        Distribution of dipper nest sites**
- Map 6:        Distribution of otter records**

**Map1: Distribution of bridges surveyed**

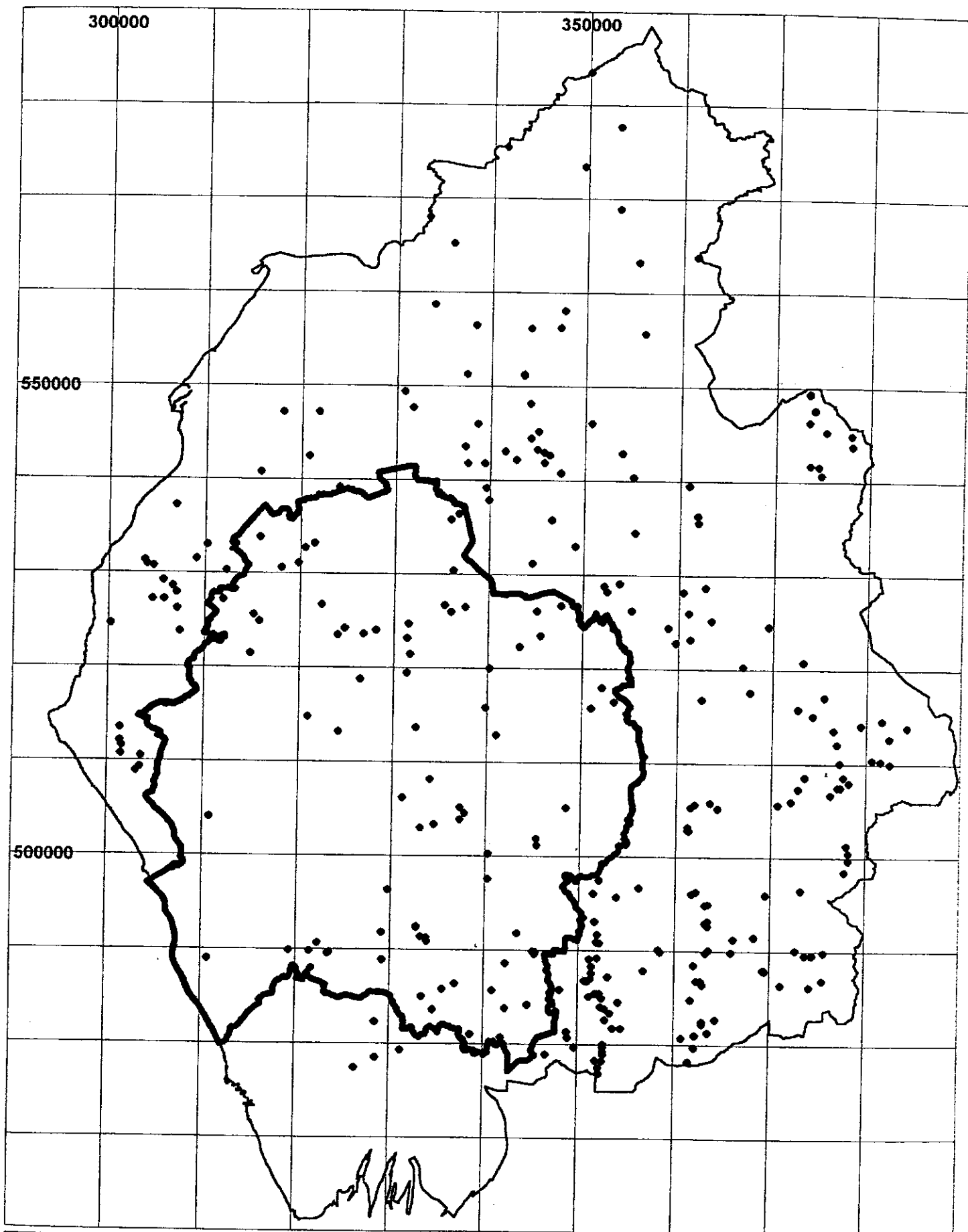


**— National Park Boundary**  
**— County Boundary**

**10km GRID SQUARE**



# Map 2: Distribution of bridge roosts



**— National Park Boundary**  
**— County Boundary**

**10km GRID SQUARE**