

Generic breeding bird monitoring methods

Common Birds Census (CBC)

The Common Birds Census (CBC), run by the British Trust for Ornithology for more than 35 years, is a partnership between the BTO and JNCC. It has been the main scheme by which populations of common breeding birds are monitored in the UK. The CBC began in 1962 and is based on a survey method known as 'territory mapping'. It has proved highly valuable in revealing population fluctuations and trends among British birds and in helping to understand their causes. CBC data have played a key role in drawing up the listings of Birds of Conservation Concern (Gibbons et al 1996). Territory mapping methods provide full site coverage, they require many visits and provide quality information. However, because of the time-consuming nature of the fieldwork and the complex analysis required by the mapping method, an alternative scheme for national bird monitoring, the Breeding Bird Survey (BBS), has been developed. CBC will be continued in parallel with BBS for some time so that the results from the two can be properly calibrated for national monitoring purposes.

Where a complete census of birds at a site during the breeding season is required, the CBC method is the most accurate and practical way. Some CBC guidelines are provided below (after Marchant 1983, Marchant et al 1990, *Census Techniques*).

Information required

- number of territories of each species
- map for each species showing the registrations from all ten visits.

Number and timing of visits

Ten visits, March–July, ideally with at least ten days between each visit.

Time of day

Early morning. Avoid the first hour before sunrise. Up to two evening visits can be helpful.

Weather constraints

Avoid days of high winds (greater than Beaufort force 5) and poor visibility.

Sites/areas to visit

CBC covers farmland and woodland but the methods can be adapted to most habitats.

Equipment

- 1:2,500 OS map (see *General field guidelines* in the *Introduction* for information on these large-scale maps)
- clipboard
- two pencils.

Safety reminders

No specific advice. See the *Introduction* for general guidelines.

Disturbance

Disturbance to birds is minimal.

Methods

The size of the study plot will depend on the objective of the study. The area should be large enough to include sufficient numbers of any scarcer species of particular interest. A single visit should take 3–4 hours. In woodland with high bird densities, choose a plot of about 10–20 ha. On farmland, the plot should be about 50–100 ha depending on the number of hedges and woody areas. Be careful when choosing the boundaries of a plot; it is better to have plots that are roughly square or round, rather than ones which are long and thin or which have complicated edges. Using hedgerows as boundaries may be unavoidable but it exaggerates the density of birds on farmland, since the bulk of the birds are in the hedges. These 'edge' effects become relatively less important the larger the area.



Map the boundary of the survey area. Take a new field map with you on each visit. Walk the area at a slow pace so that all birds detected can be identified and located. Choose a route which gets you to within 50 m of every point. Where vegetation is thick, a closer approach is desirable. Walk all hedgerows on farmland. Vary your route and direction between visits so that there is no systematic tendency for any part of the

plot to be visited later or earlier in the day. Complete a single visit in a single morning.

Map the identity and activity of all birds with small and tidy writing in pencil or ball-point pen. Use standard BTO codes for all species and behaviour (Appendix 1). Record as much detail as possible, such as the age and sex of each bird. The most important point to concentrate on is the location of individuals of the same species which can be heard or seen simultaneously. Be sure to note on each visit map the visit, date, times, observer and weather (eg Visit F; 6/6/99; 0730–1025 BST; observer: JHM; Weather: cool, overcast and wind speed force 3).

When the visits have been completed, transfer all the information obtained from each species to a separate map, the 'species map'. Registrations on the species maps will fall more or less neatly into clusters indicating the activity of particular birds or pairs throughout the season. The maps can then be 'analysed' to determine the number of territories present. Example maps and analysis guidelines are given in Marchant (1983), Marchant et al (1990) and *Census Techniques*.

A cluster is in general a spatially distinct group of registrations in which not more than one male and one female (or two adults) are represented. Depending on the biology of the species, it usually relates directly to a breeding territory. Ideal clusters show a series of registrations of territorial behaviour spanning most of the visits, and dotted lines radiating out to neighbouring clusters. In practice, a small amount of confusion is to be expected, particularly for species such as duncock or long-tailed tit which do not always hold territory in pairs, and for smaller birds such as the tits and *Phylloscopus* warblers which are mobile and inconspicuous.

Some territories will overlap the plot boundary, so it is usually necessary to map records just outside the survey area. In the field, this translates as recording all birds up to 50 m outside the plot boundary in order to ensure that all territories straddling the boundary are mapped. Clusters are often difficult to differentiate and may sometimes overlap. As a consequence, map analysis can involve a certain amount of subjectivity in interpretation.

Report the number of territories of each species.

References

- Gibbons, D W, Avery, M I, Baillie, S, Gregory, R D, Kirby, J, Porter, R, Tucker, G and Williams, G (1996) *Bird Species of Conservation Concern in the United Kingdom*, Channel Islands and Isle of Man: revising the Red Data List. *RSPB Conservation Review* 10: 7–18.
 Marchant, J H (1983) *BTO Common Birds Census Instructions*. BTO, Tring.
 Marchant, J H, Hudson, R, Carter, S P and Whittington, P (1990) *Population Trends in British Breeding Birds*. BTO, Tring.

Breeding Bird Survey (BBS)

The UK Breeding Bird Survey is a partnership between the BTO, JNCC and RSPB and was introduced in the breeding season of 1994 as an annual survey of widespread and abundant terrestrial birds in the UK. The BBS runs in parallel with the Common Birds Census (CBC; see above), but will eventually take over as the UK's main scheme for national bird monitoring, having been set up to improve geographical and habitat representation and to increase species coverage. The BBS is a sample survey in which observers walk two 1-km transects within randomly allocated 1-km squares. The methods provide much more reliable information on UK-wide population trends than does the CBC, although the BBS does not provide as detailed full census information at the plot level as does the CBC.

In terms of national population monitoring, the BBS will provide:

- trends for many species for the UK as a whole
- trends for individual countries within the UK
- trends for European Union regions within the UK
- trends by habitat type.

In addition, the conservation of particular species and habitats will be greatly improved by a more complete understanding of the relationships between birds and broad habitat types, both of which are recorded by the BBS (Gregory et al 1996, 1997).

The BBS is not only a scheme, it is also a method. There are many circumstances in which using the line-transect method of the BBS may be the best way to monitor widespread and common breeding species in a particular area, even though these areas may not be within the formal sampling design of the BBS. In general, this would only work well for reasonably large sites, for example Environmentally Sensitive Areas (ESAs) or National Parks. In practice, such monitoring would probably be done by randomly selecting a sample of 1-km squares within the overall area, using the BBS method within each of these squares and repeating between years. Users of this approach should be warned that the analysis of the data collected using the BBS method can become quite complex and it is recommended that specialist advice is sought. This is particularly the case if the method is to be used to estimate absolute breeding densities and population sizes of individual species, rather than merely performing a between-year monitoring function. To estimate densities and population sizes it is necessary to use the distance sampling methods of Buckland et al (1993) and, ideally, the DISTANCE software specially written for such analyses.

The following is taken from 1998 Breeding Bird Survey Instructions.

Information required

- number of individual birds (excluding juveniles) of all species that were recorded in each 200-m section of a 2-km-long transect, in each of several distance bands, on each of two visits.

Number and timing of visits

Three: first visit March–April (set up route and record habitat); one between early April and mid-May (early transect count); one mid-May to late June (late transect count). The two count visits must be *at least four weeks apart*. NB Fieldwork should begin and end later in more northerly parts of the UK.

Time of day

Morning, beginning ideally 0600–0700 BST, and no later than 0900 BST.

Weather constraints

Do not attempt to census in heavy rain, poor visibility or strong winds.

Sites/areas to visit

All accessible habitat types (except large expanses of water). UK-wide scheme: 1-km squares allocated to you by your BTO Regional Representative. BBS as a method outside the UK-wide scheme: randomly selected 1-km squares within the study area.

Equipment

- recording forms (see Figures 1 and 2)
- 1:50,000 and 1:25,000 OS maps of the area.

NB When contributing to the national BBS always obtain instructions and recording forms from: Census Unit, British Trust for Ornithology, The Nunnery, Thetford, Norfolk IP24 2PU.

BREEDING BIRD SURVEY FIELD RECORDING SHEET

PLEASE DO NOT WRITE IN THE SHADDED BOXES.

PLEASE USE BLOCK CAPITALS

Obs. code	Observer name	Address	
1-km square reference (eg NK0212)			
County code (eg GBNK)			
Visit date (DD-MM-YY) (eg 08-04-94)		Tel. No:	
Early or late visit (E/L)	Weather	Start time (HH:MM)	Finish time
First half			
Second half			

Distance categories:

- 0-25 metres from the transect line
- 25-100 metres from the transect line
- More than 100 metres from the transect line whether within the 1-km square boundary or not
- F. Birds in flight only (at any distance) (record on sheets using an arrow, eg -BL-)

(NB: Boxes are not drawn to scale)

Distance category	100m	25m	100m	25m	100m	25m	100m
1							
2							
3							

START

Figure 1
Example of a field recording sheet
as used in the UK Breeding Bird
Survey.

BREEDING BIRD SURVEY COUNT SUMMARY SHEET

PLEASE DO NOT WRITE IN THE SHADDED BOXES.

PLEASE USE BLOCK CAPITALS

Obs. code	Observer name	Address	
1-km square reference (eg NK0212)			
County code (eg GBNK)			
Visit date (DD-MM-YY) (eg 08-04-94)		Tel. No:	
Early or late visit (E/L)	Weather	Start time (HH:MM)	Finish time
First half			
Second half			

Distance category

Distance category	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
F										

Figure 2
Example of a count summary sheet
as used in the UK Breeding Bird
Survey.

Safety reminders

No specific advice. See general guidelines in the *Introduction*.

Disturbance

This method involves little disturbance to breeding birds.

Methods

If you are contributing to the national scheme, your 1-km square(s) will be allocated for you. If you are using BBS as a survey method outside the national scheme, randomly select several tens of squares within your study area.

Once you know which 1-km square(s) to survey, map your transect route through each square on a habitat recording form. The transect route should consist of two parallel lines, north-south (preferably) or east-west, each 1 km long. It is important to use the same route each year. Transect lines should be 500 m apart and 250 m from the edge of

the square. Each transect line should be divided into five equal 200-m-long sections, making a total of ten 200-m transect sections, numbered 1 to 10 (see Figure 3). It is important to note the starting points of each transect section either by using permanent landmarks or temporary markers. In practice, transect lines are likely to deviate from the 'ideal' because of problems with access, or barriers such as roads, etc. However, at no point should the two transect lines be less than 200 m apart. Minor intrusions into adjacent squares may be unavoidable. It is imperative that the same route be followed year after year.

From your chosen starting point, walk the first half of your transect route at a slow pace, pausing briefly at intervals to listen for song and to scan for birds flying overhead. Using the standard recording form (Figure 1), record all birds seen and heard in the appropriate transect sections and distance categories (see below). At the end of section 5, stop recording, go to the start of section 6 and begin recording sections 6–10. Try to avoid double-counting the same individual. Use standard BTO codes (Appendix 1) and distinguish adults from juveniles.

Record birds in one of the following four distance categories when first noted:

1. Within 25 m either side of the transect line.
2. Between 25 and 100 m either side of the transect line.
3. More than 100 m either side of the transect line (including birds outside the 1-km square boundary).
- F. Birds in flight only (at any distance).

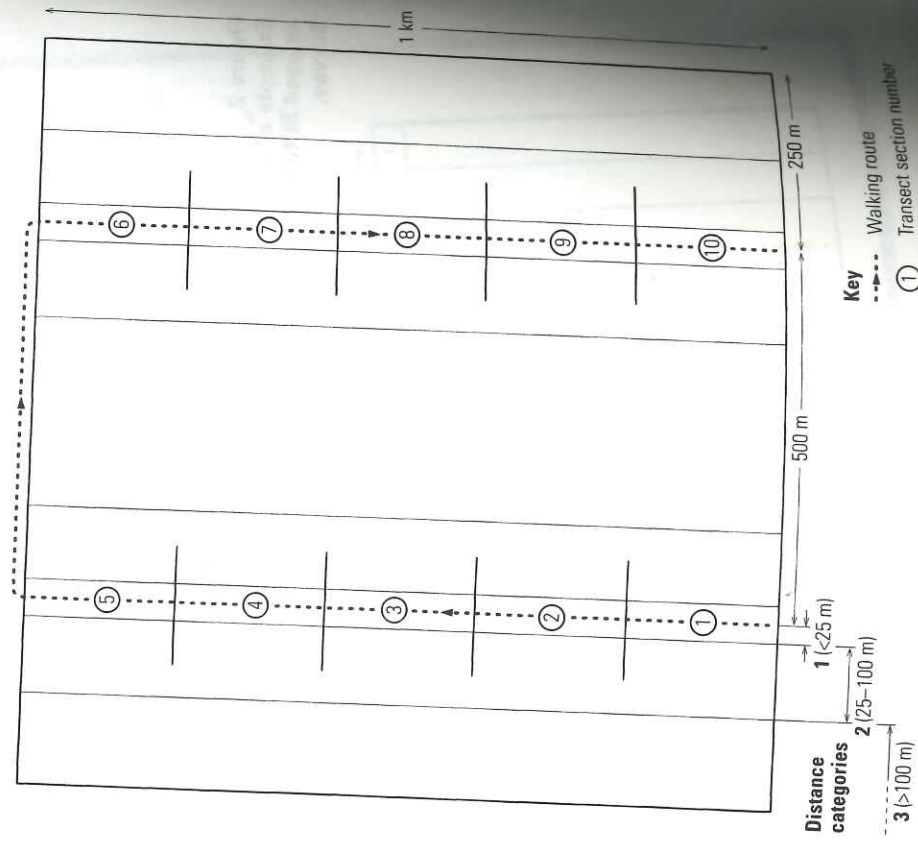


Figure 3
Transect line route, distances and numbered transect sections for a 1-km square in the UK Breeding Bird Survey.

Distances are measured perpendicular to the transect line. A bird seen 200 m ahead of the observer but within 25 m of the transect line should be recorded in category 1. To familiarise yourself with judging 25 m and 100 m distances, pace these out before starting the survey. For category F (birds in flight), draw an arrow through the species' two-letter code to indicate that it is in flight. If a bird is seen to take off or land it should be recorded in the appropriate distance category (1–3) at that position. NB skylarks in display flight should be recorded in the relevant distance category.

Complete the summary sheets (Figure 2) as soon as possible after each field visit. Transfer the number of individuals (excluding juveniles) that were recorded in each section of the transect, 1–10, on each visit, in each distance band. Habitat (and possibly other species) recording are essential parts of the national scheme; details of these will be included with the official forms and instructions received from the BTO.

If the survey is being undertaken as part of the UK-wide scheme, return all recording forms to the BTO via your Regional Representative, who will analyse and report the results. If you are using the BBS as a method rather than as part of the UK-wide scheme, you will probably have to undertake all analyses yourself. It is recommended that you seek specialist help for these analyses: try the BTO Census Unit in the first instance.

References

- Buckland, S T, Anderson, D R, Burnham, K P and Laake, J L (1993) *Distance Sampling: Estimating Abundance of Biological Populations*. Chapman and Hall, London.
- Gregory, R D, Bashford, R I, Balmer, D E, Marchant, J H, Wilson, A M and Baillie, S R (1996) *The Breeding Bird Survey 1994–1995*. BTO, Thetford.
- Gregory, R D, Bashford, R I, Balmer, D E, Marchant, J H, Wilson, A M and Baillie, S R (1997) *The Breeding Bird Survey 1995–1996*. BTO, Thetford.