Scarce Woodland Bird Survey

Title
Scarce Woodland Bird Survey 2005-2006

Description and Summary of Results
Habitat suitability for woodland birds and many other organisms is influenced by, among other things, management practices and the creation of new habitat patches. Species also respond at different spatial scales and, apart from exceptionally wide-ranging species, habitat relationships at relatively small scales are especially informative. Consequently, the 'stand' is an appropriate scale on which to examine habitat relationships of most territorial birds in managed temperate woodland and forests. The stand is also the level at which management decisions are usually taken.

Within temperate woodland, birds are often considered to select habitat primarily on the basis of vegetation structure with species composition frequently regarded as playing a lesser or secondary role, although both are affected by management and planting practices. Numerous previous studies have examined these, or have quantified habitat requirements of selected focal species, but most have been restricted to a small geographical area or number of sites so their generality is uncertain. Also only a few have considered relationships at the level of the stand or for floristic groups other than tree species.

The Scarce Woodland Bird Survey was set up to examine the relationship between stand-level patterns of bird occurrence and measures of stand structure and floristic composition for 28 woodland bird species although 8 (several known to be declining in numbers) were especially targeted: Firecrest *Regulus ignicapillus*, Hawfinch *Coccothraustes coccothraustes*, Lesser Redpoll *Carduelis cabaret*, Lesser Spotted Woodpecker *Dendrocopos minor*, Redstart *Phoenicurus phoenicurus*, Tree Pipit *Anthus trivialis*, Willow Tit *Parus montanus* and Wood Warbler *Phylloscopus sibilatrix*.

A total of 2668 stands embedded in 825 woodland sites were surveyed. The number of species recorded was independently related to growth stage, understorey structure, tree species composition and field layer type. Eighteen species showed at least one significant relationship in models containing structure variables only, 13 showed at least one in models with floristic variables only. In models containing both types of variable, 14 species showed at least one significant relationship with a structure variable, 9 species with at least one floristic variable and 8 species with at least one of both. Nine species showed no relationship with any variable, but all nine occurred in less than 100 stands. Three other species with less than 100 occurrences in stands were all typical scrub or early successional species and all showed significant relationships with growth stage, suggesting that only the most obvious relationships can be detected with this degree of sampling of the species' habitat.

The results suggested that, although gross structural factors have previously received most emphasis, both structure and floristics have complex and inter-related effects on bird distribution across woodland stands, and both appear to be important determinants of composition in bird assemblages in British woodland. There were species-specific responses to habitat variation which means that habitat heterogeneity, embracing both

structure and floristics, should be a key element in conservation planning within woodland especially in the light of uncertainty about future regional species pools due to climate change.

Methods of Data Capture

Observers walked a predetermined transect route through each wood and mapped locations of all birds seen or heard within 100m of the transect line. Transects were to be at least 500m (where the wood was big enough to accommodate this) and, although the line walked could be curved or deviate from a single straight line, different parts could not fall within 200m of each other. The transect line was requested to pass through a representative sample of the habitat present and that external edges and wide interior rides should be sampled according their availability. Observers were provided with 1:2500 scale maps of the selected area, and no two transects by different observers were allowed in the same 1-km square.

Observers made two main bird survey visits: first between late March and late April (ideally the first half of April), and the second in May (ideally the second week in the south but later in the north). An optional third visit could be made in June to maximise the chances of finding late-arriving migrants. A minimum of three weeks interval between successive surveys was required when two visits were to be carried out and two weeks when three visits were made. All surveys were to be completed by 1100 and were not carried out in heavy rain or winds stronger than Beaufort force 4.

All individuals of target bird species located within 100m of the transect line were mapped using standard activity and species codes. Only the initial location of each bird was recorded. Observers were asked to map locations as accurately as possible so that the distance of each from the transect line was clear and individual birds were not recorded twice. A specially-compiled CD containing the songs and calls of all target and potential confusion species was provided.

Some general information about each route was requested: grid reference, area (<10 ha, 10-50 ha, 50-100 ha, 100-500 ha, >500 ha), recreational use (none, some, heavy), impact of grazing by (a) deer and (b) livestock (none, light, moderate, heavy), presence of grey/red squirrels *Sciurus* spp (none, some, many), presence of any permanent open spaces within 100m of the transect. Also some habitat information for each individual stand (defined as patches of vegetation with no obvious vegetation boundaries, and relatively uniform in both tree species composition and habitat structure, although some woods comprised a single stand). For each stand the following was recorded: coppice (yes/no), codes for the growth stage and understorey structure, dominant tree species, dominant shrub or bush species, field layer species or species types.

Purpose of Data Capture

The aim was to determine the relative importance of structural and floristic factors in British woodland for the 28 relatively scarce bird species targeted, and to assess the strength and generality of these relationships.

Geographic Coverage
Rather over 800 woodland sites of various structure and species composition and covering all of the UK were chosen for survey.

Temporal Coverage
The 2005 and 2006 breeding seasons.

Other Interested parties
The survey was part-funded by the Joint Nature Conservation Committee on behalf of the statutory nature conservation agencies: Council for Nature Conservation and the Countryside, the Countryside Council for Wales (now Natural Resources Wales), Natural England and Scottish Natural Heritage. Restore UK funded the production of the CD of songs and calls.

Organiser(s)
Chris Hewson

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Publications
The main report of the survey is:
Hewson, C.M., Austin, G.E., Gough, S.J. & Fuller, R.J. 2011. Species-specific responses of woodland birds to stand-level habitat characteristics: the dual importance of forest structure and floristics. *Forest Ecology and Management* 261: 1224-1240.
The survey was also noticed in *BTO News* numbers 256, 260, 261, 262 and 294.

Available from NBN?
No

Computer data -- location
BTO Windows network personal space.

Computer data -- outline contents

Computer data -- description of contents

Information held in BTO Archives
7 archive boxes and 2 Transfer Cases contain the data sheets.

Notes on Access and Use

Other information needed

Notes on Survey Design
The dataset for this survey is unique in its combination of stand-level information on birds, woodland structure and floristics which were collected from a very large number of sites spread across Britain. The survey was designed to maximise the number, geographical range and diversity of sites covered whilst, within the limits of a volunteer-based survey, providing as much detailed information as possible about stand-level habitat characteristics associated with the occurrence of 28 targeted bird species. The species list included most of the woodland birds considered to have recently declined in Britain but also included several increasing and stable species. Most of the species were small songbirds that defend relatively small discrete territories; exceptions included the three woodpeckers, Mistle Thrush *Turdus viscivorus* and Turtle Dove *Streptopelia turtur*. Many of these species also occur in non-woodland habitats so few can be regarded as obligate woodland specialists in a British context.
All sites were selected by the participating volunteers. Each volunteer was asked to select two woods within a five mile range that were the same general habitat type (eg broad-leaved or coniferous, plantation or semi-natural, with a broadly similar range of growth stages) but with contrasting numbers of target bird species. The volunteers were asked to choose species-rich (good) woods likely to contain at least eight of the 28 target species and preferably at least one of the eight key species -- information was specifically sought for these eight due their conservation importance and/or a high degree of uncertainty about their habitat preferences based on prior knowledge, or to choose sites which most nearly met these requirements. The other (poor) wood should contain as few of these species as possible or to be an unknown quantity. This approach was adopted to ensure that the sample encompassed a wide diversity of woods. A final dataset was produced from a total of 825 sites widely spread throughout Britain. The dataset comprised 118 woods that were the sole wood surveyed by an observer, 602 woods that were surveyed as pairs of 'good' and 'poor' woods (including 80 by observers who surveyed two pairs) and 105 that were surveyed by observers who surveyed three woods.

Specific Issues for Analysis
The bird registrations from the maps for each visit to each site were digitised into ArcMapTM 9.2 GIS against a reference backdrop of the Ordnance Survey 1:10000 digital maps from which field maps had been created. To reduce biases arising from differences in detectability between species, observers and potentially habitats, analyses were restricted

to bird records falling within 50m of the transect lines since this is the distance most often used in fixed-radius point or line transect bird survey methods and is the distance within which most woodland bird vocalisations should be audible to the average observer. The area of each stand falling within a 50m buffer around each transect line was calculated; stands with less than 0.5ha falling within this buffer and their associated bird records were excluded from the analyses. This process produced a dataset containing presence of bird species across 2668 stands embedded within 825 woods.

The mean size of stands was 3.51 ha (±0.075 s.e.). Where woods had been surveyed in both 2005 and 2006, one year was chosen at random for inclusion in analyses. Cluster analysis was used to produce a set of floristic variables that could be used in further analyses. Clusters with less than 40 stands assigned to them were merged with the other cluster with which the species it contained had the greatest ecological affinity and the resultant group membership was used in further analyses. This process was carried out for each of the dominant tree, shrub and field layer species in turn. Because some observers did not specify species, all 'oaks' *Quercus* spp. and 'birches' *Betula* spp. were lumped together as were sweet chestnut *Castanea sativa* and horse chestnut *Aesculus hippocastanum* (although nearly all chestnut referred to *C. sativa*). Scots pine *Pinus sylvestris* (where specified) was kept in its own category independent of other pines (including those unspecified) which were lumped together. Scarce species including exotics were lumped together as 'Other Broadleaf' or 'Other Conifer' as appropriate.