

## **Tetrad Population Estimate guidance – August 2008**

### Background

One of the most difficult tasks ahead of us is to produce national population estimates for all species. These are in demand, for both winter and breeding season, to identify important areas for protecting birds and their habitats, for example through the designation of Ramsar sites, Special Protection Areas or Sites of Special Scientific Interest (Baker *et al.* 2006).

The calculation of national population estimates has never been an exact science, and we hope with our work over the next few years, that we will be transparent about how the national estimates have been derived and that the magnitude of error is clearly presented. That way, anyone using the national population estimates we derive will know exactly how they have been calculated for each species and can make their own judgement on how accurate they might be. If you look at previous national estimates, the ranges have been very large for some species eg Redstart 90,000 - 330,000 pairs, House Sparrow 2,600,000 - 4,600,000 pairs for Britain (Gibbons *et al.* 1993) which certainly hints at the difficulty in producing these.

### How population estimates are derived

We have at our disposal an array of information sources that can be combined with Atlas data to produce population estimates for birds in the breeding season and in winter. It is important for us to recognise the limitations of each survey/method and if necessary combine information from different sources.

The actual methods used will depend on just how widespread the species is. This will be reasonably straight forward for those rare species whose entire breeding population is counted periodically by special surveys eg Red-necked Phalarope and Corncrake where it is possible to gather an absolute count of birds in a specific year. We will also be working closely with the Rare Breeding Birds Panel and will exchange information. There will also be periodic counts of seabirds that we can draw on. For very common breeding species we can draw on density information from the Breeding Bird Survey and Countryside Bird Survey in the Republic of Ireland which when applied across the distribution from the Atlas will give us estimates. The difficulties arise for the breeding species that are not sufficiently often detected on BBS to derive meaningful density estimates. The BBS annual report lists those species which are recorded on fewer than 40 BBS squares, for example, Ring Ouzel, Little Ringed Plover and Water Rail (Risely *et al.* 2008). Results from surveys outside the Atlas period will give us a handle on the total population at the time of the survey eg National Ring Ouzel Survey in 1999. During the winter, other than for a range of wetland birds counted by the Wetland Bird Survey, we have no systematic counts of species in Britain and Ireland. For example, for Lapwing in winter we have good counts of the numbers on wetlands from WeBS and IWeBS but we have no idea how many are on farmland as this habitat is not counted in WeBS. For some species, such as Waxwing, Crossbill and Quail there will be year to year variability to take into account. We hope the Tetrad Population Estimates (TPE) will give us another strand of information to work with. Perhaps not on their own, but in conjunction with other data sources, they will really help us to produce population estimates for species for which we have never been able to make more than an educated guess.

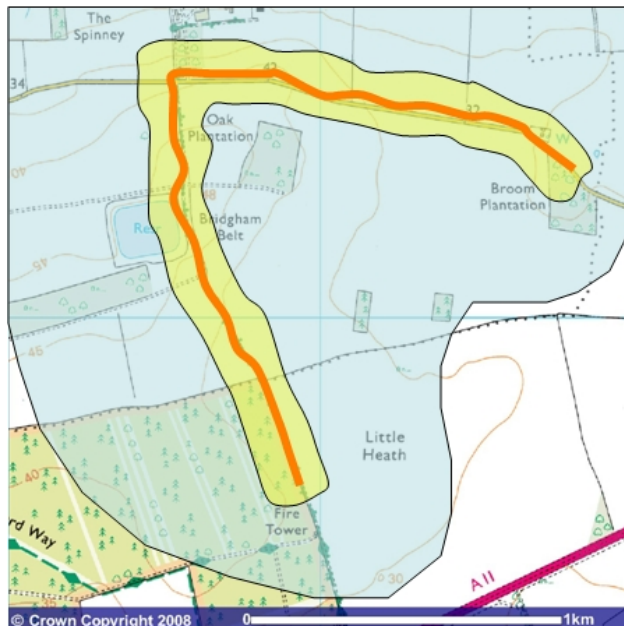
### So what does the Atlas tell us?

The Timed Tetrad Visits (TTVs) were designed to gather sufficient data to calculate relative abundance of species at the 10-km level. To help us with population estimates, we will have

the counts for species from the TTVs. Nationally, we aim to achieve coverage of at least eight tetrads in every 10-km square. For example in a TTV, you do two visits and may record two Dunnocks on one visit and three Dunnocks on the second visit. We could either take an average across both visits, or more likely, take your maximum count across the two visits. If we did this for all eight tetrads covered, we would have the maximum number of Dunnock counted in eight tetrads and could multiply this up to the 10-km square and then add together all the maximum counts from every 10-km square. This will be an underestimate because your timed counts (one or two hours) aim only to cover the main habitats and not the whole tetrad, and therefore won't count ALL the Dunnocks present.

The idea of the Tetrad Population Estimate is that the volunteer, given they have made one or two visits and will have a reasonably good idea of the habitats present in the tetrad, is in a much better position to have a go at working out the number of Dunnocks in the tetrad than someone who has never visited the tetrad. It is likely that the estimate from the volunteer will be broadly in the right area. If you count a maximum of 3 singing Dunnocks on your breeding season TTV, and have covered about a quarter of the suitable habitat, you might assume that each of your three birds has a mate (you most likely record singing males in the breeding season) and then you can multiply your count by 4. You would come up with 24 birds, so a Tetrad Population Estimate of 30 seems sensible. In this example, it is unlikely you would record 3 Dunnocks but actually think 100 were present. It is important to consider the detectability of each species and to take this into account. For a species like Dunnock, it is more detectable in the breeding season when it is singing, than in the winter when it is not.

### Example



This tetrad (TL98P) was covered for two one-hour visits in the breeding season. The route walked on each visit is shown as an orange line and follows a road with substantial hedges either side and also follows a footpath towards the block of woodland in the south-west of the tetrad. The rest of the tetrad is mostly open farmland with good visibility across the flat fields. The mature coniferous forest plantation in the south-west corner is dense and most of the trees are covered in Ivy. Along the hedgerow it is likely that most of the species were detected but small birds in the middle of the field could have been missed, as were birds in the small patches of woodland. In the forest block, only birds audible from the path were

detected. The likely detection distance for birds (especially songbirds) is about 50m either side of the route walked (shown approximately by yellow shaded area) although singing Skylarks could be detected across a wider area (shown approximately by blue shaded area)

On the early visit 30 Chaffinches were recorded (of which approximately 25 were singing males), and 14 were recorded on the late visit (of which approximately 10 were singing males). Given the route taken in the tetrad and habitat covered (good quality habitat for

Chaffinches along the hedgerow), the habitat preferences of Chaffinch (hedges, woods) and the area of the tetrad not visited (mostly open farmland with no wooded boundary and the dense coniferous woodland), the TPE was estimated to be 100. This number was estimated by taking the highest count of singing males (25) and doubling to take into account females not detected (total = 50) and then doubling again to take into account the suitable habitat (for Chaffinch) not visited, which gives a total of 100. This may be an under-estimate or over-estimate of the real number but it is likely to be broadly correct.

For Skylark (where singing birds are readily detectable over a greater distance than Chaffinch) 16 were recorded on the early visit and 15 on the late visit and the TPE was estimated to be 40. This number was estimated by taking the maximum count of singing birds (16) and then doubling to take into account females (total = 32) and then adding a few more that may have been in the suitable habitat not covered in the south-east corner of the tetrad. It is likely this is still an under-estimate of the population of Skylarks in the tetrad as not all singing birds would have been detected on the visits. Nonetheless the TPE will be a useful guide.

#### Duplication and double-counting

Birds move between squares and there is potential to double count them in both locations. We must bear in mind however, that the opposite is equally likely – that the TTVs will occur such that the flock gets missed in both places. The best way to treat this problem is to count whatever you see on the day you see it, unless you know for certain that the birds have moved from a tetrad you've already visited that day. Whilst this may seem counter-intuitive when looking at one's own tetrads, when we look at the national picture we have to assume that the "double-counting" and the "double-missing" balance each other out. This becomes increasingly important as we move into the latter stages of the Atlas when observers will be surveying tetrads they are unfamiliar with and cannot second-guess what is normal for the tetrad. For these reasons our basic rule is to always count what you see on your visit and include these birds in your TPE. A few specifics for winter and breeding season, and some examples are detailed below.

#### General guidance

The TPE should be based on what you see during your TTVs or on your experience of the tetrad gained outside TTVs but within the atlas recording period (1 November 2007 – 31 July 2011) and the relevant season. For a handful of early/late nesting species breeding season TPEs can be based on observations outwith April-July. These species include Goshawk, Crossbill sp and Long-eared Owl. TPEs are optional and you can enter them for some species but not others if you do not feel confident in doing so.

#### Guidance for the breeding season – birds using the tetrad not just breeding there

The TPE in the breeding season should include birds present in the tetrad in the breeding season except **juvenile** birds of the year. Like the TTV counts, the TPE reflects the number of birds *using* the tetrad and not strictly just those actually breeding there. This is because for many species, even with good knowledge of a tetrad, it would be difficult to work out how many you think are actually breeding. Furthermore, as fieldwork progresses and volunteers start visiting tetrads, and perhaps even 10-km squares they are unfamiliar with, the task of estimating which are breeding birds becomes even more difficult. In years three and four of atlas fieldwork, when we start organising expeditions, volunteers may be visiting entirely unfamiliar areas. We think, therefore, that it is better to have a uniform approach to count everything you encounter.

### Guidance for the winter

In winter, one of the main problems for fieldworker is flocks of birds and what to count. In order to minimise double-counting, we suggest that if you see a flock of birds, for example Wigeon, move from one tetrad into another (and you are counting both tetrads for TTVs on the same day) then you only include the flock in the tetrad where you first encountered it and use that as a basis for that tetrad's TPE.

If you are making TTV visits on different days to adjacent tetrads and you're not sure if the same flock has moved or if you are seeing different birds, then you should count them all and use that as the basis of your TPE.

We have already given guidance that coastal TTV counts should be done at mid to high tide whenever possible to facilitate counting and identification. Hence, including high-tide roosting waders in TPEs is permissible as it shouldn't lead to duplication. However, if you are certain you have already counted these individuals in a different tetrad, and in that tetrad's TPE, then ignore them here.

### A TPE should include:

- Flocks of waders feeding on the shoreline should be included as they are using the tetrad.
- Flocks of moulting geese should be included as they are using the tetrad.
- Non-breeding immature gulls feeding on a landfill site, or foraging in pig fields should be included.
- Swifts feeding over a field away from breeding habitat should be included.
- Late Brent Geese encountered on an early TTV visit should be counted.
- Summering Grey Plovers or other waders should be included.

### A TPE should not include:

- Juvenile Starlings on a late breeding season visit
- Birds at a dawn or dusk roost (TTVs should avoid these periods)
- A flock of Wigeon that has just moved from the tetrad you just surveyed.
- Flyovers of birds not using the square

### Summary

Tetrad Population Estimates are new for us too. However, experience in The Netherlands and Catalonia suggests that they may be useful for a number of species. In the Catalan Breeding Bird Atlas observers were asked to give an 'approximate and intuitive estimate' of birds per grid square and these figures were used where better data were absent. For those species where alternative data also existed, the observers' estimates were reassuringly similar.

We do encourage volunteers to have a go at producing TPEs for those species they feel able, and appreciate from our own experience that they can be difficult.

It's important to remember that the Atlas is concerned with the 'big picture' and that we have volunteers of varying skills, often visiting areas with no prior knowledge. It is particularly true of volunteers in Ireland and parts of Scotland who will be visiting areas unknown to them and will have no benefit of local knowledge. The fieldwork methods and guidelines need to be simple to follow. Whilst it would be good to have species-specific guidelines, such an approach would not work on a project of this scale. The Atlas Working Group will

shortly be setting up a sub-group of specialists to concentrate on the methods for producing national population estimates.

#### References

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