

2007 SURVEY OF BREEDING CORN BUNTINGS IN ESSEX

By Chris Tyas, RSPB Essex Area Manager

INTRODUCTION

The UK Corn Bunting population declined by 89% between 1970 and 2006 and it is still declining. This decrease, being greater than 50% in 25 years, makes Corn Bunting a Red-Listed species, it is also a UK Biodiversity Action Plan (BAP) species. The most recent national population estimate puts the UK population at between 8,500 and 12,200 territories (Baker *et al* 2006). Set against this massive national decline, Essex still has a relatively good Corn Bunting population. The Essex Breeding Bird Atlas (Dennis 1996) recorded birds in 341 (32%) of the County's tetrads, with 293 classified as probable or confirmed breeders and 48 as possible breeders. However, evidence of population decline has been found in Essex, research in Tendring District suggested a decline of 48% over the 10 years 1994 to 2004 (Mason & Macdonald 2006).

The aim of this 2007 Essex Corn Bunting Survey was to count the numbers of territory-holding male Corn Buntings in a sample of tetrads in the County. In addition to this, information was also gathered on the habitat occupied by the birds and the type of song-post being used. In order to gain extra information on both numbers and distribution casual records were also gathered. The casual records form also asked for breeding information on both Turtle Dove and Bullfinch.

This survey was born out of necessity *i.e.* the importance of Essex for this key national BAP species and was coordinated by me under the umbrella of the Essex Birdwatching Society's Biodiversity sub-committee. It was thus a combined EBS/RSPB survey. It is interesting to note that the majority of the volunteers who helped with this survey were recruited via the Essex Birder's web-ring. An excellent example of the use of this venerable forum.

METHODS

The methods used for this survey drew heavily on a similar survey carried out by The Hertfordshire Bird Club. This survey was co-ordinated by Ken Smith, Chair of the Herts. Bird Club and, at the time of the survey, a senior member of the RSPB Research Department. Fifty tetrads (2km x 2km squares) were chosen from Dennis (1996), with the aim of getting a good spread throughout the various sub-populations found during the 1988-1994 recording period; all the chosen tetrads had the highest (probable/confirmed) breeding status. An excellent response to the call for volunteers meant that we managed to cover 33 of the chosen tetrads. This proportion represented a good number from a statistical analysis perspective.

The survey required three visits to be made to the selected tetrad between 2nd May and 20th July, with a gap of at least 20 days between visits. If a visit was interrupted by bad weather, the remainder of the tetrad could be completed during the following week, with this indicated on the form. The recording form (see Appendix One for completed example) consisted of a square grid representing the four 1km squares forming the tetrad. Using this grid (map), shading was used to map areas of woodland and urbanisation, these areas were excluded from the survey. Other topographical features, such as roads or field boundaries, were included if it helped the fieldwork.

On each visit, observers were asked to locate all territory-holding Corn Buntings in the tetrad; singing was the most obvious evidence of territory occupancy. Using one form for each visit, the position of each bird was marked on the recording form with a dot and a coded designation for habitat and song-post. Where a bird was singing on the boundary

of two habitat classifications both habitats were recorded. Dashed lines were used wherever possible to link simultaneous registrations of different birds and solid lines used to show the same bird moving to a different song-post. Notes were made on any factors that may have affected the number of birds located, such as weather, traffic noise or incomplete coverage. As the survey progressed it became clear that there were many tetrads where birds were absent. With this in mind, we decided to limit the survey to two blank visits rather than waste the observer's valuable time on a fruitless third visit.

Further information was gathered on each tetrad for use in the analysis. Using 1:10,000 scale maps, the percentage of farmland within each tetrad was measured along with the distance from the centre of each tetrad to the 'coast', usually the top of the nearest sea wall.

The casual record form asked people to record similar information to that of the tetrad survey *i.e.* date, location, grid reference, habitat code and song-post code.

RESULTS/ANALYSIS

Table 1 (Appendix Two) summarises the results from the 33 tetrads, expressed as the peak count of singing corn buntings. Table 2 summarises the casual record data in a similar fashion. The Map (Appendix Three) shows the distribution of both the tetrad and casual record data and shows the population size per tetrad using a range of different sized dots.

Of the 33 tetrads covered, each with probable/confirmed breeding in 1988-94, only 14 (42%) held birds. There has been an obvious contraction to the coast, with all but three tetrads being within 1.8km of the coast and the furthest just 6.3km from the nearest coast. It is interesting to note that two of the three tetrads that were furthest from the coast were in Tendring District, within the population surveyed in Mason and MacDonald (2006). The casual record data also confirms the contraction to the coast, with the vast majority of the records coming from the coastal zone. The obvious exceptions were good populations in the Bulphan and Orsett Fens in the southwest of the county and at Wormingford Airfield, 10km northwest of Colchester. There may have been a contraction to the coast but populations along the coast remain high in some areas, with three tetrads having over 20 singing males, two on The Dengie and the one centred on Wallasea Island.

Given the clear pattern of more birds on/near the coast a statistical analysis was carried out to prove this association. The problem with this analysis was that there was such a large variation in the numbers recorded in each tetrad. In statistical jargon the data were 'over dispersed' and so didn't fit standard models. We got round this in two ways, logistic regression and regression of numbers verses distance.

Using *logistic regression* the data was turned into simple presence (1) or absence (0) for each tetrad and then the probability of occupation was calculated. The formula for the probability of being occupied for the corn bunting tetrad data was:

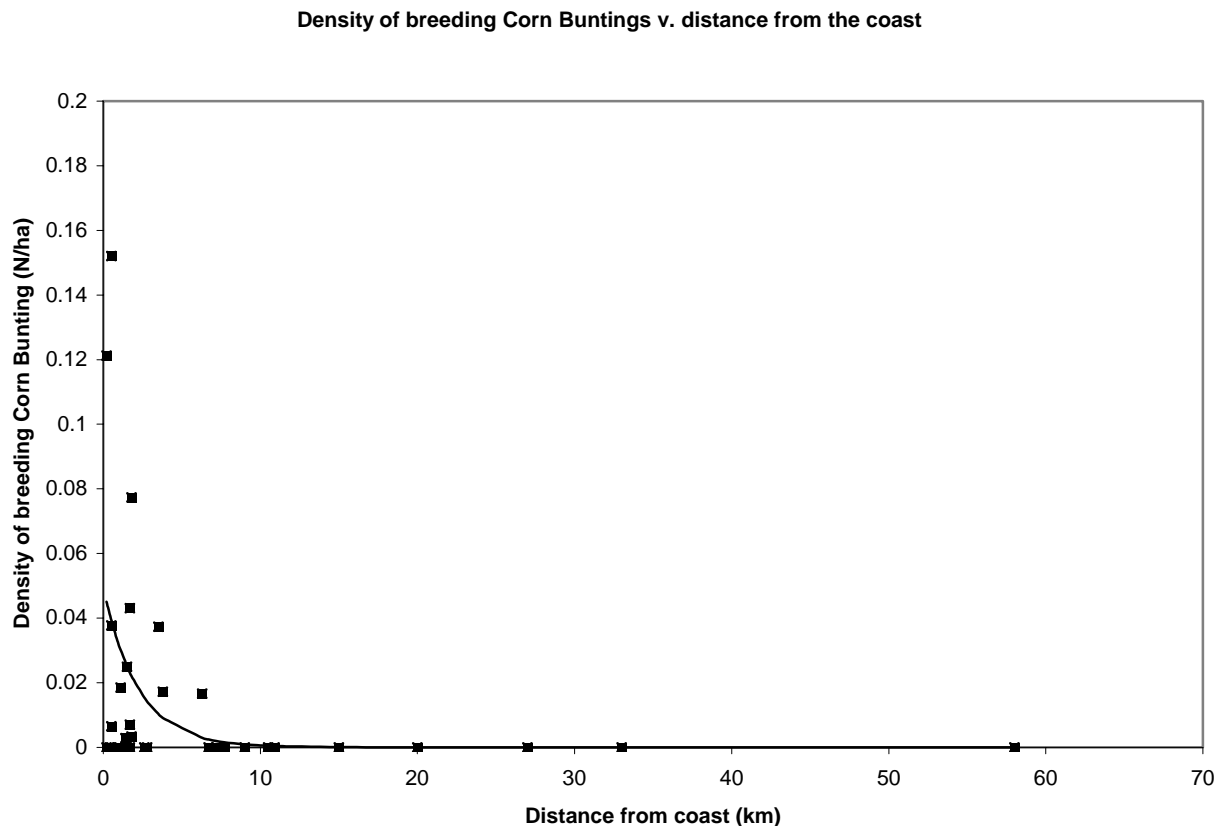
$$\text{Prob} = 1 / (1 + \exp(-0.690 + 0.317 * \text{distance from coast}))$$

This analysis translates in to a c.65% probability at the coast, falling sharply to around 25% 5km inland. This is a highly significant relationship (chi squared = 11.40, $p < 0.001$).

Using *regression of numbers verses distance* over dispersion becomes an issue. We got round this by using a negative binomial distribution, this allows for the large numbers in a few tetrads and low or zero in many others. Again, there was a highly significant fall off with distance even more sharply than the logistic model:

$$\text{Loge (number in tetrad)} = 2.243 - 0.393 * \text{distance (p=0.009)}$$

The following graph clearly shown the relationship between corn bunting numbers and the coastal zone:



We then combined the above analysis with the information gathered on farmland area and applied regression analysis, giving the following result:

$$\text{Loge (corn buntings per ha of farmland)} = -3.010 - 0.4453 * \text{distance}$$

This is another highly significant relationship. We also looked at the presence of saltmarsh in the models but the effect was not significant. This suggests a relationship with the 'mixed farm' element afforded by the seawall grassland habitat immediately adjacent to arable.

The number of tetrads covered during the survey allowed an estimate of the total Essex breeding population to be made. This was done using a statistical analysis called bootstrapping. Two population sizes were produced, one using the peak counts from each tetrad and one using the mean number of birds over the three visits to the tetrad:

Using peak CB numbers: Mean number per tetrad = 5.31 (95% CI 2.06 -9.09) which translates to county total of 1554 (95% 604-2663) (assuming 293 tetrads in the overall sample).

Using mean CB numbers: Mean number per tetrad = 4.50 (95% CI 1.63 -8.40) which translates to county total of 1313 (95% 478-2461) (assuming 293 tetrads in the overall sample).

NB The figure of 293 tetrads is taken from Dennis (1996) *i.e.* the number of tetrads with probable/confirmed breeding from which the 33 tetrads used in this survey were drawn.

We feel that the peak number figure is the most plausible. If we use a UK population of 10,350 (mean of the 8,500-12,200 quoted in Baker *et al* 2006), then 1,554 Essex territories represents an impressive 15% of the UK population.

Only a limited number of records were received for Turtle Dove and Bullfinch. The request via the casual recording form yielded 51 records of Turtle Dove and 15 for Bullfinch. These were passed to the County Recorders for inclusion in the main body of this Report.

SUMMARY

The key facts to come out of this survey:

- Of the 33 tetrads chosen (each with probable/confirmed breeding in 1988-94) only 14 (42%) held birds.
- There has been an obvious (statistically significant) contraction to the coast, with all but three occupied tetrads being within 1.8km of the coast.
- Casual data confirms that there are very few birds being seen away from the coastal zone.
- Numbers on the coast remain high in some areas, with three tetrads having over 20 singing males.
- The tetrad data imply a county population of between 1,313 and 1554 singing male corn buntings.
- Using a UK breeding population of 10,350 (Baker *et al* 2006), this survey implies that Essex has c.15% of the UK breeding population.

In one of my many email conversations with Ken Smith he commented "Nice survey though, if only it had been done 20 years ago I am sure it would have been possible to demonstrate a massive decline and redistribution". How right he is, but at least we now have a good base line to work from. This survey, combined with the on-going Atlas work, should give us a clear picture of current Corn Bunting distribution and a reasonable estimate of numbers. This is a survey that will be well worth repeating in, say, 10 years time. It is hoped that in the intervening time, with targeted agri-environment grant, numbers will have stabilised and, hopefully, started to rise.

ACKNOWLEDGEMENTS

Special thanks are due to Ken Smith for providing the survey methodology and carrying out the vast majority of the in-depth analysis. I know there are name checks in the tetrad and casual record tables in the appendices but I make no excuses for naming everyone again and giving a big thank you to everyone who helped make this survey a success.

Thanks are due to the following 35 people who carried out tetrad surveys:

Chris Balchin, Robert Barrett, Neil Chambers, Paul Charlton, Brian Clayden, Adrian Dally, Jeff Delve, Graham Ekins, Juliette Elderton, Glyn Evans, Neil Harvey, Barry Jones, Howard

Knott, Colin Jupp, Anne Lansdown, Chris Lewis, Stephen Marginson, Paul Morris, Russ Neave, Mark Nowers, Paul Parmenter, Bob Pease, Jannette Rowland, Alan Shearman, Graham Smith, Jim Smith, Les Steward, Steven Swaby, Andrew Thompson, Chris Tyas, Dougal Urquart, Howard Vaughn, Rick Vonk, Dave Wagstaff and Paul Wood

Special thanks are due to Les Steward and Bob Pease who helped with two tetrads and Graham Smith who coordinated the recording on The Dengie. Thanks are also due to the following 20 people who submitted casual records for corn bunting, turtle dove and bullfinch:

Neil Chambers, Brian Chruches, John Clark, Brian Clayden, Pat Cox, Simon Cox, Adrian Dalley, Glyn Evans, Nick Green, Glenn Jacobs, Anne Lansdown, Russell Neave, Paul Parmenter, Bob Pease, Martin Peers, Les Steward, Steven Swaby, Chris Tyas, Howard Vaughan and Paul Wood.

Apologies are due to anyone I have missed off this long list and particularly to the person who submitted casual data for Corn Buntings around Abberton Reservoir, I am afraid that I was unable to find the name associated with this form.

REFERENCES

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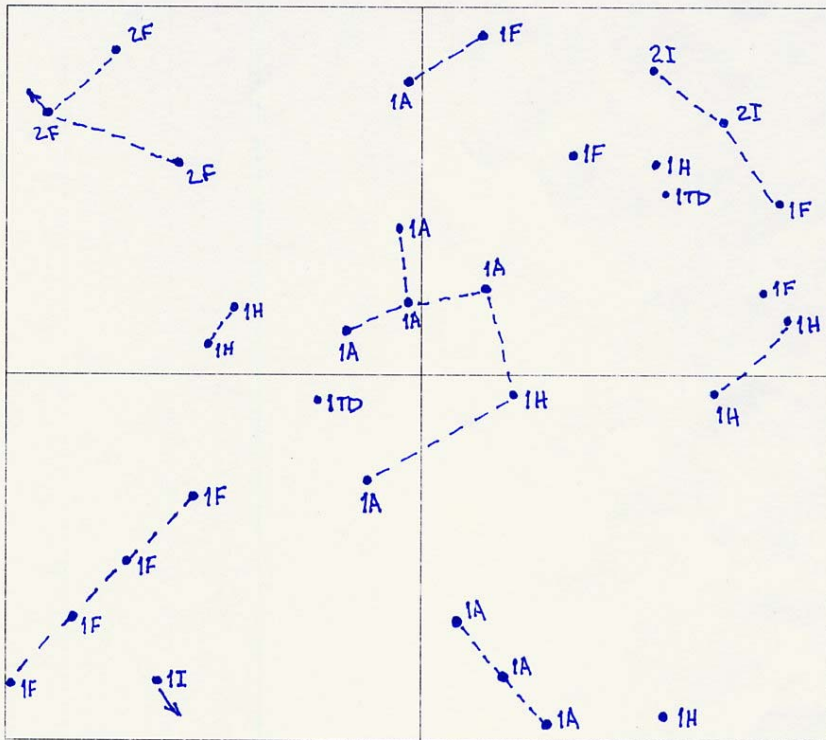
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APPENDICES

APPENDIX ONE: Example of completed recording form

Essex Birdwatching Society
2007 BREEDING CORN BUNTING SURVEY

Observer Bob Pease Tetrad TM00A
 Address 2 Cornwallis Drive Date 1st June 2007
South Woodham Ferrers Time 11:00



Observer's comments:

Habitat codes	Song-post codes	
Arable (cereals).....1	Overhead wires.....A	Hedgerow (untrimmed).....H
Arable (other than cereals).....2	Electricity posts/pylons.....B	Other vegetation.....I
Grass (hay/silage).....3	Fencing/gates.....C	Song-post not determined.....J
Grass (livestock grazing).....4	Farm machinery/buildings.....D	
Grass (recreational).....5	Isolate 1 trees.....E	
Gravel pits.....6	Hedgerow trees.....F	
Habitat not determined.....7	Hedgerow (trimmed).....G	

APPENDIX TWO

Table One: Results of tetrad survey

Tetrad	Surveyor	Grid ref for centre of tetrad	Peak number of singing males	Km to nearest seawall/coast
14 Tetrads with breeding Corn buntings				
TL80M	Russell Neave	TL850050	1	1.8
TL90 M	Adrian Dalley	TL950050	6	1.1
TL90 X	Brian Clayden	TL990050	2	1.7
TM00A	Bob Pease	TM010010	30	1.8
TM00I	Les Steward, Graham Smith & Bob Pease	TM030070	31	0.2
TM02 Y	Anne Lansdown	TM090270	6	6.3
TM12 T	Chris Balchin & Jannette Rowland	TM170270	6	3.8
TM21J	Mark Nowers	TM230190	8	0.5
TQ67 Z	Paul Wood	TQ690790	1	0.5
TQ78 N	Les Steward	TQ750870	16	1.7
TQ89Z	Steven Swanby	TQ890990	1	1.4
TQ99 R	Jeff Delve	TQ970930	45	0.5
TQ99 U	Dave Wagstaff	TQ970990	13	3.5
TR09B	Chris Lewis	TR010930	9	1.5
19 Tetrads without breeding Corn buntings				
TL43 Z	Chris Tyas	TL490390	0	58.0
TL60 M	Paul Charlton	TL650050	0	15.0
TL70 K	Juliette Kerr & Howard Knott	TL750010	0	6.7
TL70 P	Graham Ekins	TL750090	0	10.5
TL73 G	Neil Harvey	TL730330	0	33.0
TL80P	Paul Parmenter	TL850090	0	1.5
TL92 A	Andrew Thompson	TL910210	0	10.9
TM01 D	Dougal Urquart	TM010170	0	0.4
TM02 F	Stephen Marginson	TM030210	0	0.2
TM02 L	Glyn Evans	TM050230	0	1.9
TM12A	Robert Barrett	TM110210	0	2.8
TM22J	Rick Vonk	TM230290	0	0.5
TQ49 Q	Alan Shearman	TQ470910	0	9.0
TQ49 Z	Barry Jones	TQ490990	0	27.0
TQ58 F	Colin Jupp	TQ530810	0	1.7
TQ58 X	Paul Morris	TQ590850	0	7.7
TQ68 N	Howard Vaughan	TQ650870	0	7.2
TQ69 E	Jim Smith	TQ610990	0	20.0
TQ89 W	Neil Chambers	TQ890930	0	2.6

Table Two: Results from casual record forms

Surveyor	Grid ref	Tetrad	No of birds
Paul Parmenter	TL870030	TL80R	5
Russell Neave	TL870050	TL80S	1
Nick Green	TL890090	TL80U	1
Adrian Dally	TL890030	TL80W	7
Russell Neave	TL930030	TL90F	1
Les Steward	TL930030	TL90G	1
Russell Neave	TL930050	TL90G	1
Les Steward	TL950050	TL90M	1
Brian Clayden	TL990050	TL90X	3
?	TL950150	TL91M	3
?	TL950170	TL91T	1
Paul Parmenter	TL970150	TL92S	2
Martin Peers	TL910310	TL93A	6
Martin Peers	TL930310	TL93F	6
Brian Clayden	TM010050	TM00C	1
Les Steward	TM030050	TM00H	1
Les Steward	TM030090	TM00J	1
Glyn Evans	TM050210	TM02K	1
Anne Lansdown	TM090290	TM02Z	8
Anne Lansdown	TM090310	TM03V	2
Simon & Pat Cox	TM110130	TM11B	8
Simon & Pat Cox	TM110150	TM11C	1
Simon & Pat Cox	TM130130	TM11G	1
Simon & Pat Cox	TM130150	TM11H	2
Simon & Pat Cox	TM150150	TM11M	2
Simon & Pat Cox	TM150170	TM11N	1
Anne Lansdown	TM110290	TM12E	7
Simon & Pat Cox	TM210170	TM21D	1
Paul Wood	TQ690770	TQ67Y	3
Howard Vaughan	TQ620810	TQ68A	2
Howard Vaughan	TQ620830	TQ68B	5
Howard Vaughan	TQ620850	TQ68C	5
Paul Wood	TQ730820	TQ78G	4
Les Steward	TQ730850	TQ78H	5
Neil Chambers	TQ950890	TQ98P	15
Bob Pease	TQ970970	TQ99T	9
Bob Pease	TQ990970	TQ99Y	9

APPENDIX THREE: Map showing distribution of tetrads and casual Corn Bunting data

NB With this map showing both the tetrad and casual records there are some tetrads with data from both sets, where this has occurred the larger figure has been used.