CENTRE FOR EVIDENCE-BASED CONSERVATION

REVIEW PROTOCOL

SYSTEMATIC REVIEW N$^{O.}$ 11

WORKING TITLE:

The Effectiveness of Agri-Environmental Schemes at Conserving Farmland Bird Species within the U.K.

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1. BACKGROUND

The disturbing population declines of bird species commonly associated with the lowland farmlands of the British Isles have been highlighted as a conservation issue of growing concern not just in Britain but also elsewhere on the European mainland (Sirwardena *et al.*, 2000; Vickery *et al.*, 2004). Over the past couple of decades there have been a suite of studies focusing on the problems facing these bird species, however it was not until the 1990s that the scale of this problem became fully apparent (Fuller *et al.*, 1995; Gregory *et al.*, 2004).

Through reviewing the status of 28 bird species using atlas and census data, Fuller *et al.* (1995), was able to show the widespread decline in the geographical ranges and population sizes among nearly all the lowland farmland bird species during the late 1960s to 1990s. Further analysis has shown that these declines were much more striking for farmland specialists than generalist species. These declines was especially evident during the 1970s and 1980s and is widely credited to when there was a period of rapid agricultural intensification across Great Britain and elsewhere in north and west Europe. This intensification of agriculture included a vast reduction in the amount of spring sowing cereals, a simplification in the crop rotation cycles, the increased use of pesticides and inorganic fertilisers and a change in the management of grassland all of which had a direct impact on the areas associated wildlife (Fuller *et al.*, 1995; Sirwardena *et al.*, 2000).

With the reform of the Common Agricultural Policy (CAP) in 1985, along with the ratification of the European Union (EU) Regulations 2078/92 allowed European Community (EC) member states to instigate new agri-environment schemes with aims of switching resources away from goods/crop price support towards providing incentives for the farming community to implement environmentally favourable measures (Peach *et al.*, 2001). Within a number of years numerous schemes were launched by each of the EC member states. In 1987 the UK government launched the Environmentally Sensitive Areas (ESA) scheme, which was subsequently expanded with the addition of the Countryside Stewardship Scheme (CSS) in 1991, (further improved in 2002 with new arable options). Both these schemes aim to maintain and enhance the flora and fauna, landscape and historic value of an area – originally only 22 under the ESA, however expanded to other areas under CSS with the addition of the promotion of access and enjoyment by the public (DEFRA, 2002; Peach *et al.*, 2001).

This systematic review will use explicit methodology, through comprehensive searches and detailed inclusion criteria to capture evidence from primary research and trials on the effects of agri-environment schemes on farmland bird species. Meta-analysis and sub-group analysis will be used where appropriate to establish the overall effectiveness of the various agri-environment schemes on increasing each individual farmland bird species. Finally, recommendations for the policy implications of various agri-environment schemes will be developed; showing those schemes which had the greatest effects and highlighting knowledge gaps which require further primary research.

2. OBJECTIVE OF THE REVIEW

To assess the available evidence on:

"What effects do the different agri-environment schemes and their prescriptions have on (a) total farmland bird densities and (b) individual species densities?"

3. METHODS

3.1 Search strategy

The following electronic databases will be searched for the identification of an initial library of all possible relevant studies for this systematic review. All dates listed below show the years covered by that particular database.

1. **ISI Web of Knowledge** (**WoK**):
   ISI Web of Science (1981 to present).
   ISI Proceedings (1990 to present).
2. **Science Direct** – Agricultural and Biological Sciences (1823 to present).
3. **JSTOR**.
4. **Blackwell Synergy.**
5. **Index to Theses** (1970 to 2003).
6. **COPAC** – database of the 24 main British and Irish university libraries and the British Library and National Library of Scotland.
7. **Royal Agricultural College –** Online Library Catalogue
8. **Wildlink** – English Nature's Library Catalogue (only available on-site).
9. **Countryside Council of Wales (CCW) WebCat** - Library Catalogue.
10. **Centre for Ecology & Hydrology (CEH) online web catalogue.**
11. **Directory of Open Access Journals.**

The following search terms will be used on all the above electronic databases to identify the initial library of all possibly relevant studies.

1. Set-aside
2. Agri-environment*
3. Farmland bird*
4. Farmland bird* AND set aside/agri-environment*
5. Over-winter stubble* AND bird*
6. Bullfinch/*Phrrhula pyrrhula* AND agri-environment*
7. Corn Bunting/*Miliaria calandia* AND agri-environment*
8. Corncrake/*Crex crex* AND agri-environment*
9. Cirl bunting/*Emberiza cirius* AND agri-environment*
10. Goldfinch/*Carduelis carduelis* AND agri-environment*
11. Greenfinch/*Carduelis chloris* AND agri-environment*
12. Grey Partridge/*Perdix perdix* AND agri-environment*
13. Jackdaw/*Corvus monedula* AND agri-environment*
14. Lapwing/*Vanellus vanellus* AND agri-environment*
15. Linnet/*Carduelis cannabina* AND agri-environment*
16. Reed Bunting/*Emberiza schoeniclus* AND agri-environment*
17. Red-backed Shrike/*Lanius collurio* AND agri-environment*
18. Rook/*Corvus frugilegus* AND agri-environment*
19. Skylarks/*Alauda arvensis* AND agri-environment*

20. Song Thrush/*Turdus philomelos* AND agri-environment*
21. Spotted Flycatcher/*Muscicapa striata* AND agri-environment*
22. Starling/*Sturnus vulgaris* AND agri-environment*
23. Stone Curlew/*Burhinus oedicnemus* AND agri-environment*
24. Tree Sparrow/*Passer montanus* AND agri-environment*
25. Turtle Dove/*Streptopelia turtur* AND agri-environment*
26. Whitethroat/*Sylvia communis* AND agri-environment*
27. Woodpigeon/*Columba palumbus* AND agri-environment*
28. Yellowhammer/*Emberiza citronella* AND agri-environment*
29. Yellow wagtail/*Motacilla flava* AND agri-environment*

Web searches using www.alltheweb.com, and http://scholar.google.com/ (Google Scholar Beta) search engines will be undertaken for further identification of articles and grey literature.

Relevant organisations such as Royal Society for the Protection of Birds (RSPB), British Trust for Ornithology (BTO), English Nature (EN), Scottish Natural Heritage (SNH), Countryside Council for Wales (CCW), The National Trust, National Farmers Union (NFU), FWAG and the Wildlife Trusts will be contacted and their website publication lists searched for pertinent grey literature or unpublished data.

The first authors of included studies will be contacted if there are queries about the reported results, missing data values or their interpretations.

3.2 Study inclusion criteria

3.2.1. Types of Study

Any primary study conducted on U.K. data with a comparator.

(This criterion therefore includes: Randomised control trials (RCTs), control trials (CTs), site comparison studies (SCSs) and time series that have measures for before and after intervention).

3.2.2. Population Focus

Any farmland bird species within the U.K.

3.2.3. Interventions of Interest

Nay agri-environment schemes, prescriptions or trials undertaken within the U.K.

3.2.4. Desired Outcome Measures

i. Population densities
ii. Field Preference measures

3.3 Study quality assessment

The quality of each of the accepted papers will be assessed in accordance with a study quality assessment instrument. This involves assessing the quality of each individual study design, baseline comparators, intra-treatment variation, measurement of interventions and co-interventions, and replication outcome measures. The details of

these quality assessments will be recorded for each study on individual study characteristic tables contained within the appendix of the review to allow for maximum clarity and repeatability of the systematic review process.

3.4 Data extraction strategy

Information on the population focus, methodology, intervention and outcomes will be abstracted from the original studies into a specially designed spreadsheet for future synthesis. This data will be tabulated within the final systematic review document.

3.5 Data synthesis

A narrative synthesis, including summary tables of study characteristics, quality and results will be undertaken. Quantitative analysis will be embarked on any data that is suitable for formal statistical treatment. The nature of analysis will be dependent on the types of the extracted data. Meta-analysis with StatsDirect™ will be performed on viable forms of continuous data, which will be pooled across trials using both Weighted Mean Difference (WMD) and/or Standardised Mean Difference (SMD) meta-analyses (random effects model) (Sutton *et al.*, 2000). Sensitivity analyses will also be performed on the datasets lacking independence to give most positive and negative species outputs to allow independent analysis for each dataset.

4. Potential Conflicts of Interest and Sources of Support

No conflicts of interest declared.
Support as part of a NERC and English Nature Grant.

5. References

DEFRA (2002) *Review of agri-environmental schemes in England* Department for Environment, Food and Rural Affairs, [s.l.].

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Sutton, A.J., Abrams, K.R., Jones, D.R., Sheldon, T.A., & Song, F. (2000) *Methods for Meta-Analysis in Medical Research* John Wiley & Sons, Ltd.

Vickery, J., Evans, A., Grice, P., Aebischer, N., & Brand-Hardy, R. (2004) Editorial. *Ibis*, **146**, i-ii.

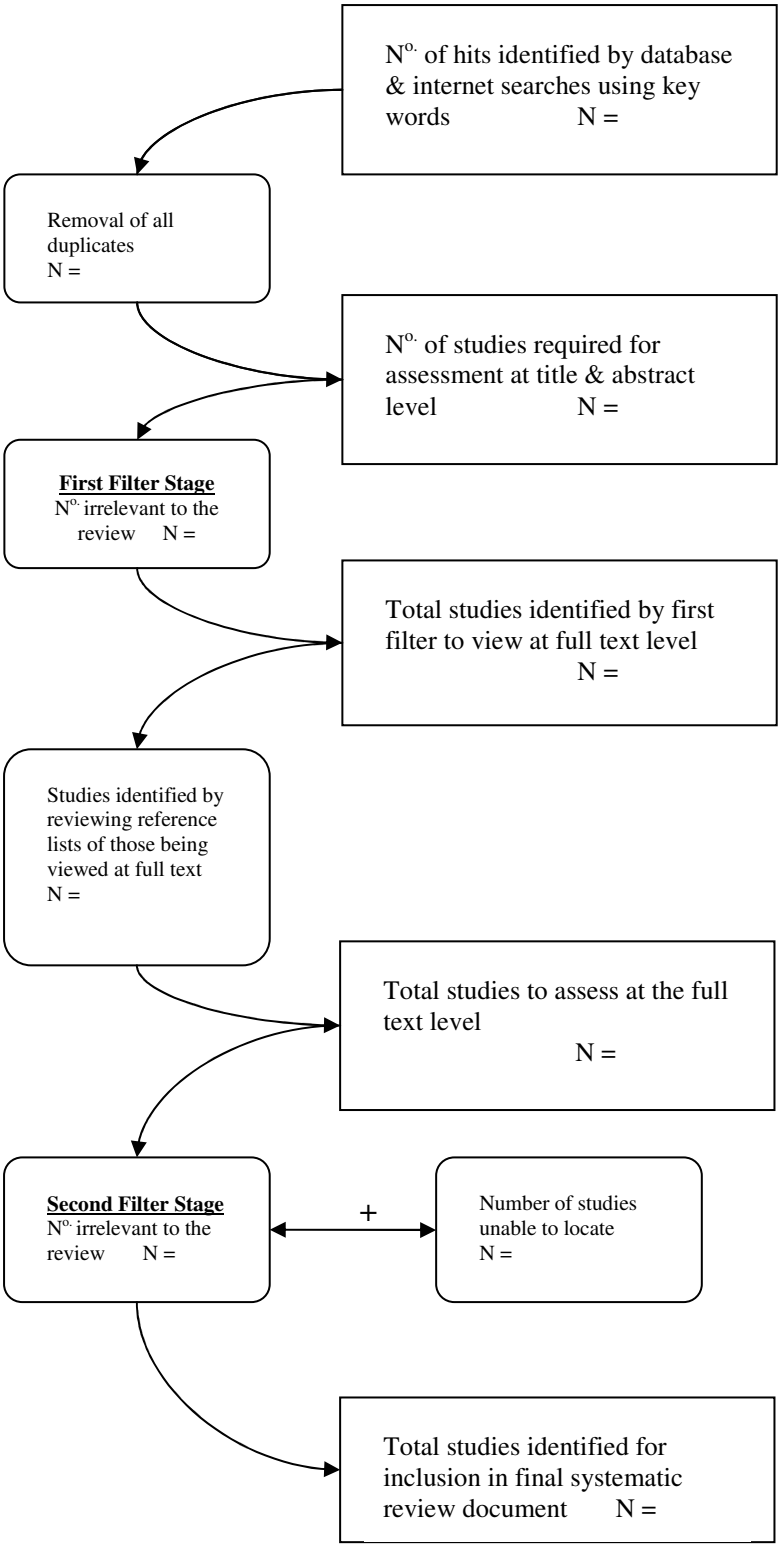

FIGURE 1: The process of studies inclusion within systematic review. This will show the numbers of studies at each stage during the study inclusion process.