



CEE review 09-003

EFFECTIVENESS OF MITIGATION ACTIONS FOR GREAT CRESTED NEWTS, TRITURUS CRISTATUS.

Systematic Review Protocol

LEWIS, B.

Durrell Institute of Conservation & Ecology, University of Kent at Canterbury, Canterbury, Kent, CT2 7NR, UK

Correspondence: bl37@kent.ac.uk
Telephone: +44 (0) 1227 764000

Draft protocol published on website: 20 October 2008- Final protocol published on website: 1 June 2009

Cite as: Lewis, B. 2009. Effectiveness of mitigation actions for great crested newts, *Triturus cristatus*. CEE protocol 09-003 (SR64). Collaboration for Environmental Evidence: www.environmentalevidence.org/SR64.html.

REVIEW PROTOCOL

1. BACKGROUND

When a development threatens an area containing a species that is afforded legal protection (e.g. under the Wildlife & Countryside Act 1981 or Conservation [Natural Habitats & c.] Regulations 1994), the developer is legally obliged to undertake appropriate mitigation measures to reduce the impact of the development on the species. Such mitigation measures are usually designed after consultation with a professional ecologist with expertise in this area. Although the mitigation actions depend on the species concerned and the degree of legal protection that it is afforded, a typical mitigation involves pre- and post-development population and habitat assessments, habitat management and enhancement and actions that will reduce the likelihood of animals being killed by the development activity (e.g. translocation or exclusion of the population from the development site). Examples of studies outlining why this work is important in the conservation of crested newts include, Cooke (2001) who reported on the apparent decline of a crested newt population up to six years post translocation, and only after monitoring for eight years, then found the translocation to be successful. Based on his results, Cooke called for a long-term approach to monitoring the success of translocation projects.

Similarly Edgar and Griffiths (2004), when evaluating the effectiveness of great crested newt mitigation projects in England, reported that newts were often overlooked during Environmental Impact Assessments and planning, and even though new ponds were created as a result of compensation through mitigation, the numbers did not compensate for all ponds lost. Many respondents in the report requested a more streamlined application procedure and better guidance for projects. A final example can be drawn for a study by May (1996) that examined the success of great crested newt translocations over the period 1990-1994. May felt that the review period post-mitigation was too short and it proved difficult to assess the success of the project. May also commented on the lack of clear guidance from English Nature (now Natural England) on translocations and receptor site standards as well as the lack of time given to long-term monitoring.

Although guidelines exist for developers and their consultants who need to carry out such actions, (English Nature, 2001) these are largely based on traditional management practices and consensus views, rather than on rigorous hypothesis tests of the best actions to take.

The aim is to develop a protocol that will be used to guide a systematic review of the current actions to mitigate the impact of development on a species that frequently comes into conflict with development – the great crested newt. The primary question will therefore be ‘Are current mitigation actions effective in the conservation of great crested newts’? The main secondary question will be ‘What are the determinants of successful mitigation actions for great crested newts’? The type of intervention to be considered is therefore ‘mitigation’, and the type of outcome will be ‘persistence of self-sustaining populations’.

Previous reviews have revealed that there is very little published literature on great crested newt mitigation (Edgar et al. 2005; Lewis et al. 2007). However, as all licence holders are obliged to provide a formal report to Defra/Natural England on the activities carried out under the mitigation licence, these reports provide a substantial data source on project outcomes. About 200 such licence returns are held on file by Natural England, who has agreed to make these available for the study. The search strategy will therefore utilize these data, but will also embrace computerized databases that may contain other relevant information. The types of data to be included will be census data on newt populations and data on habitat creation, restoration and enhancement. Possible sources of heterogeneity are likely to be associated with different census methodologies and timescales, and geographical variation in the distribution and abundance of newts. Depending on the nature of the available data, a qualitative review or quantitative meta-analysis will be designed using the data that meet the inclusion criteria.

2. OBJECTIVE OF THE REVIEW

2.1 Primary question

Are current mitigation actions effective in the conservation of great crested newts?

2.2 Secondary question (*if applicable*)

What are the determinants of successful mitigation actions for great crested newts?

3. METHODS

3.1 Search strategy

The following electronic databases will be searched:

1. Academic Search Complete (From Ebscohost)
2. Cambridge University Press
3. Digital Dissertations Online
4. Directory of Open Access Journals
5. JSTOR
6. Natural England's Publication Catalogue
7. Nature
8. Oxford University Press
9. Web of Knowledge
10. Wiley InterScience

The following English and Latin search terms will be used:

1. (Great crested newt* OR GCN OR Triturus cristatus) AND (mitigation OR pond OR development OR conservation)

Further terms may be added as the search progresses involving combination of the existing terms and the use of taxa-specific terms if necessary.

Publication searches will be undertaken on conservation and statutory organisation websites (Natural England, Countryside Council of Wales, Department of Environment, Food and Rural Affairs, Joint Nature Conservancy Council) as well as websites and publications produced by non-governmental organisations such as the Wildlife Trusts and herpetofauna groups (Herpetological Conservation Trust, Froglife, British Herpetological Society, ARG-UK). Further information will be gleaned from existing contacts within the field of herpetofauna conservation and through ecological consultancy organisations such as the Institute of Ecology and Environmental Management (IEEM). Meta-search engines such as Google Scholar, Althweb and Dogpile will also be used. The first 100 word document or PDF hits from each data source will be examined for appropriate data.

In addition bibliographies of articles viewed at full text will be searched. Authors, recognised experts and practitioners will also be contacted for further recommendation and for provision of any unpublished material or missing data that may be relevant. Natural England and Countryside Council for Wales will be asked for access to the license folders and license returns data that are provided at the end of licensed mitigation projects. Questionnaires or other appropriate methods may also be used.

3.2 Study inclusion criteria

- **Relevant subject(s):** Great Crested Newts, *Triturus cristatus*
- **Types of intervention:** Exclusion of animals, translocation, habitat creation, preservation and enhancement. Reduction of development.
- **Types of comparator:** Newt populations not subject to mitigation.
- **Types of outcome:** Persistence of self-sustaining great crested newt populations. Connectivity of Great crested newt populations in the wider countryside.
- **Types of study:** Type of Study will not be used to define inclusion or exclusion criteria. It is envisaged that all information regarding the primary outcome will be collated qualitatively or within a meta-analysis where appropriate.

Where there is insufficient information to make a decision regarding inclusion when viewing titles and abstracts, then relevance to the next stage of the review process will be assumed. Reviewers will consider articles viewed at full text for relevance excluding or admitting them to different categories of relevance and quality. At least two reviewers will independently assess a random subset of 50% of articles viewed at full text. The relevance of the articles viewed will be compared by performing a kappa analysis, which adjusts the proportion of records for which there was agreement by the amount of agreement expected by chance alone (Cohen 1960; Edwards *et al*, 2002). Disagreement will be resolved by consensus, or following assessment by a third reviewer.

- **Potential reasons for heterogeneity:** The following potential reasons for heterogeneity have been identified:
 1. Standardisation of data collection
 2. Interpretation of current guidelines
 3. Timing of mitigation projects (i.e. dateline and time of year)
 4. Scale of mitigation project
 5. Status of great crested newts within the wider countryside.

3.3 Study quality assessment

Reviewers will consider articles viewed at full text excluding or admitting them to different categories of information quality. At least two reviewers will independently assess a random subset of 50% of articles viewed at full text. Disagreement will be resolved by consensus, or following assessment by a third reviewer.

3.4 Data extraction strategy

Data regarding study characteristics, quality and results will be recorded on a specially designed spreadsheet or data extraction form. This spreadsheet may be amended after consultation with statisticians and piloting of the data extraction process.

3.5 Data synthesis

It is envisaged that all information will be collated qualitatively or within a meta-analysis where data exists and where appropriate.

4. Potential Conflicts of Interest and Sources of Support

No conflicts of interest to be declared. This systematic review is funded by NERC & ESRC as part of a PhD Thesis.

5. References

- COHEN, J. 1960. A coefficient of agreement for nominal scales. *Educational and Psychological Measurement* 20, 37-46.
- COOKE, A.S. 2001. Translocation of small numbers of crested newts (*Triturus cristatus*) to a relatively large site. *Herpetological Bulletin* 75, 25-29.
- EDGAR, P., GRIFFITHS, R.A. 2004. An evaluation of the effectiveness of great crested newt *Triturus cristatus* mitigation projects in England, 1990-2001. English Nature Research Reports No. 575, English Nature, Peterborough.
- EDGAR, P., GRIFFITHS, R.A., & FOSTER, J.P., 2005. Evaluation of translocation as a tool for mitigation development threats to great crested newts (*Triturus cristatus*) in England, 1990-2001, *Biological Conservation* 122: 45-52.
- EDWARDS, P., M. CLARKE, C. DIGUISEPPI, S. PRATAP, I. ROBERTS, AND R. WENTZ. 2002. Identification of randomized controlled trials in systematic reviews: accuracy and reliability of screening records. *Statistics in Medicine* 21, 1635-1640.
- ENGLISH NATURE. 2001. Great crested newt mitigation guidelines, Peterborough, English Nature.
- LEWIS, B., GRIFFITHS, R.A., & BARRIOS, Y., 2007. Field assessment of great crested newt mitigation projects. Natural England Research Report NER001. Natural England, Peterborough.
- MAY, R. 1996. The translocation of great crested newts, a protected species, MSc thesis, University of Wales, Aberystwyth.