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An evaluation of the effectiveness of great crested newt *Triturus cristatus* mitigation projects in England, 1990 - 2001

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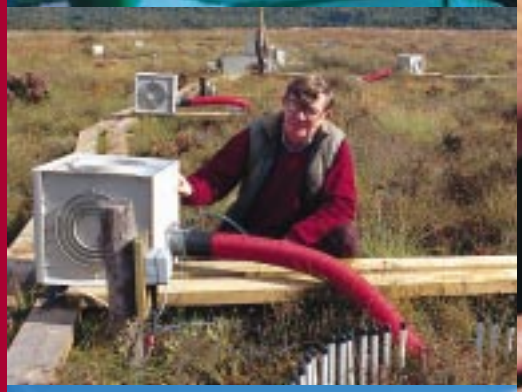

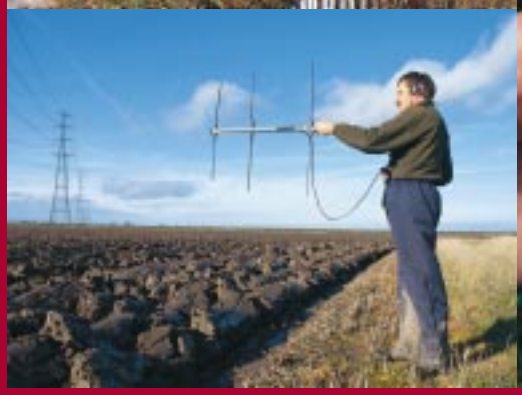

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An evaluation of the effectiveness of great crested newt *Triturus cristatus* mitigation projects in England, 1990 – 2001

Paul Edgar and Richard A. Griffiths

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English Nature cover note

This project was undertaken by Paul Edgar and Richard Griffiths of the Durrell Institute of Conservation and Ecology, University of Kent under contract to English Nature (project reference KI0126). The authors may be contacted at: Durrell Institute of Conservation and Ecology, University of Kent, Canterbury, Kent, CT2 7NS, UK (RAG); The Herpetological Conservation Trust, 655A Christchurch Road, Boscombe, Bournemouth, Dorset, BH1 4AP (PE). The English Nature project officer was Jim Foster. The views expressed in this report are the authors' own and do not necessarily represent those of English Nature.

Abstract

An analysis of great crested newt mitigation projects carried out between 1990 and 2001 was performed by (1) reviewing all licences issued by English Nature and Defra over this period; and (2) a questionnaire survey of a large sample of mitigation projects. A total of 649 licence files covering some 345 mitigation projects were examined from English Nature files. Over half of these contained no report of work undertaken under the licence. A total of 153 questionnaires were distributed, yielding information on 72 mitigation projects.

There has been a steady increase in the number of licences issued for great crested newt mitigation from less than 10 per year in the early 1990s to over 80 per year by 2000. A relatively small number of consultants have carried out most mitigation work on great crested newts. The proportion of in-situ mitigation projects has increased relative to the number of projects involving ex-situ translocation of newts in recent years. The largest numbers of mitigation projects have been conducted in Cheshire and Lancashire. Most projects lasted longer than one year at an average estimated cost of £15,000-£20,000 per project. Over this timeframe some 59% of projects spent up to 80 days on mitigation work, and a further 26% of projects up to 240 days. Building developments were the commonest type of development requiring mitigation. Great crested newts were often overlooked in the planning process and were rarely considered as part of wider Environmental Impact Assessments. Most pre-development surveys that were commissioned were started less than six months prior to the mitigation work commencing. A variety of methods were used in pre-development surveys, but torch counts were used in 80% of projects.

A range of methods was used to catch newts for mitigation, and the average number of newts translocated per project has declined in recent years. This is probably because (1) an increasing number of smaller newt populations are being identified and accounted for within mitigation work; and (2) more projects are focusing on in-situ population management that makes large-scale translocations unnecessary. The number of newts translocated was positively related to the area destroyed by development; the number of capture methods used; capture effort and overall project effort. Less than half of all projects had any post-development monitoring. Moreover, it is difficult to determine what proportions of the actual populations were actually captured or whether these became part of a sustainable populations at the receptor sites because of (1) differences in the survey methodologies used before, during and after the developments; (2) the fact that only a single study used a mark-recapture method to establish population size; (3) difficulty in distinguishing between translocated newts and natural colonizers at the receptor sites; and (4) the short-term nature of most follow-up surveys.

Most receptor sites were on the periphery – or immediately adjacent to – the development site and had some degree of connectivity to other areas of potential newt habitat. The number of new ponds created compensated for the number of known great crested newt ponds destroyed, but did not compensate for the total number of ponds lost. Newly created ponds were generally smaller than those lost to development, so the total surface area of water lost to development created was less than the total surface area of great crested newt ponds lost. Of the ponds that were retained as part of mitigation, less than half underwent any management or enhancement. Overall, slightly less than one-third of the great crested newt

terrestrial habitat within the development area was destroyed. However, at least 75% of potential great crested newt habitat was affected in over 30% of projects.

No post-development monitoring was carried out in 36% of projects. Where post-development monitoring was carried out it continued for up to five seasons, with most projects carrying out monitoring for up to two years. Adult newts were observed to be present at 87% of the sites surveyed one year after the development with evidence of breeding confirmed at 56% of sites. There are insufficient data to judge whether sites subjected to mitigation contained post-development populations that were self-sustaining in the long-term.

However, many respondents to the questionnaire requested more streamlined processing of licence applications, improved guidance for mitigation activities, and better training of personnel charged with providing advice and decisions on mitigation procedures. Although less than 25% of mitigation projects received any wider publicity, when this was the case the mitigation was generally viewed in a positive light by the media. The new guidance introduced in 2001 (ie after the majority of sample projects were implemented) was viewed by most respondents as positive, and should help to remedy some of these issues. Recommendations are made to further refine advice and procedures.

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1. Introduction

The great crested newt *Triturus cristatus* is strictly protected under the Wildlife and Countryside Act 1981 and the Conservation (Natural Habitats &c) Regulations 1994. The species frequently occurs on land threatened by development, and if development proceeds a mitigation plan is normally implemented. Typically, such mitigation involves the capture and exclusion of newts, and their removal to areas that have been subject to habitat creation, enhancement or restoration. Some of this work can only be done under licence; up until March 2000 English Nature was the relevant authority for England, and since then Defra has issued licences for such work.

Over the years, post-development monitoring of habitats and of the newts themselves has occurred in some cases (and is now invariably a requirement of licences), but this appears to have been undertaken to varying standards. As information about individual mitigation case studies is usually confined to licence returns and reports by ecological consultants to their clients, there are very few published data readily available on these activities. Oldham and others (1991) collated information from 64 translocations carried out between 1970 and 1990. Their study revealed that great crested newts had been released into existing populations as well as new sites over this period, and they concluded that their data did not provide conclusive evidence of the success or failure of translocation. A further (unpublished) study by May (1996) collated data on great crested newt translocations between 1990 and 1994. As Oldham and others (1991) also observed, the procedures used and the degree of monitoring varied considerably between projects, although there was evidence of breeding in some 61% of sites that were monitored post-translocation.

Oldham & Humphries (2000) collated data from the two earlier reviews, resulting in a pooled data set of 178 translocations. They concluded that 37% were 'successful' (at least on the liberal criterion of the presence of a population one year after the translocation), and 10% were 'unsuccessful'. However, 31% of projects were not monitored at all and there were no data available for a further 12% of projects (Oldham & Humphries, 2000). It is important to note, however, that these studies looked at translocation in the broadest sense, and included a considerable number of projects unrelated to development. Many of the projects do not bear comparison with the standard practices employed when addressing the impacts of land-use change. The current report is therefore the first substantial examination of mitigation for development.

Apart from these reviews, information on mitigation is restricted to a few commentaries, guidance notes and case studies that vary in the detail provided (eg Gent & Bray, 1994; Cooke, 1997, 2001; Clemons & Langton, 1998; Oldham & Humphries, 2000; Green, 2000; Langton and others 2001; English Nature, 2001). The mitigation guidelines provided by English Nature (2001) attempt to consolidate existing information into a form that should inform 'best practice', but this document will require regular updating as new data emerges from new projects, research and legislation. Given that the number of mitigation projects being undertaken is steadily increasing, and there is even closer scrutiny of the legislative provisions, there is a need to compile and assess the existing evidence for the effectiveness of past mitigation projects. The current project addressed this issue using two approaches: (1) using an interrogation of the existing database of great crested newt licences held by English Nature and Defra; (2) using a questionnaire to obtain more detailed information on a large sample of mitigation projects carried out between 1990 and 2001.

2. Project methodology

2.1 Definition of terms

The terminology used in mitigation and translocation is often confused. Below we briefly clarify the terminology used in this report:

Mitigation: Here we adopt the terminology used by English Nature (2001), who break the process down into two elements:

- mitigation (*sensu stricto*), which refers to the practises which reduce or remove damage (eg by changing the layout of a scheme, or by capturing newts to avoid killing);
- compensation, which refers to works which offset the damage caused by the development (eg by the creation of new habitat and subsequent establishment of a population)

Translocation: Any activity that involves the capture and movement of newts. This embraces both in-situ mitigation projects where newts may be moved only a few metres to contain them within the same site, as well as ex-situ projects where newts are moved off-site to a different area.

Development area: The total area of the site that is being developed, including habitat that will be destroyed and reconstituted and habitat that will be retained.

Development footprint: The area within the total development area that will be permanently converted to a land use that is inimical with supporting great crested newts.

2.2 Sampling of great crested newt licence database

2.2.1 Initial interrogation of database

Details of all great crested newt licence applications for England, including those more recently handled by Defra, are held by the Licensing Section at English Nature head office in Peterborough. A total of nine working days were spent in Peterborough during March and April 2002 to collate information about previous great crested newt mitigation projects. Sources of information included:

- The main English Nature filing system containing hard copies of licence applications and mitigation project proposals, licences issued, licence returns and subsequent reports.
- A computer database of English Nature licences issued from 1997 – 1999 inclusive (including some from up to March 2000).
- Computer files and hard copies of great crested newt mitigation project carried out between 1990 and 1994 collected by a previous researcher (May 1996).
- Licence applications to Defra, annual licence tracking sheets, copies of licences issued, licence returns and mitigation project reports for the years 2000 and 2001.

In addition, original information pertaining to pre-1990 great crested newt translocations, that had been used in an earlier study (Oldham and others 1991), was also provided by Prof. Rob Oldham of De Montfort University.

2.2.2 Information obtained from licence files

Licensing and other information was first checked to confirm that great crested newts had in fact been captured, disturbed, excluded or translocated for a development project, rather than as part of some temporary disturbance, such as conservation management work, or for a simple introduction attempt to a garden pond. In addition, licences were cross-referenced to determine when those issued in subsequent years, or to different ecological consultants, had been for the same mitigation project.

Finally, the following details were summarised if possible for each individual mitigation project:

- Mitigation project name, location, development dates, type of development and details of all licences issued including the names of all individuals to whom licences were issued
- The type of mitigation project necessary, ie whether an in-situ or ex-situ translocation of great crested newts was carried out
- From the licence returns, the numbers of great crested newts actually translocated, including different sexes and life stages if recorded.
- Any subsequent post-mitigation monitoring results or reports.

2.3 Questionnaire sampling of great crested newt mitigation projects

2.3.1 Sampling protocol

In addition to the general information about mitigation projects obtained from the licence database, further sampling was undertaken in order to:

- Assess the general effectiveness of mitigation projects in England, especially the perceived success of great crested newt translocations to in-situ and ex-situ receptor sites.
- Quantify any differences between aquatic or terrestrial habitat resources destroyed and those created as a result of mitigation projects – in other words, to determine if an overall conservation gain for great crested newts was being consistently achieved.
- Investigate the methodology employed for great crested newt capture, exclusion and monitoring, as well as for pond and terrestrial habitat improvements or creation.
- Gain an idea of the level of resources typically needed for mitigation projects.
- Examine the role of the planning process and relevant legislation in securing successful mitigation projects and determine the extent to which post-mitigation monitoring and site management agreements were being complied with.
- Detect, if possible, any trends or changes with time in any of the above.

- Obtain feedback from ecological consultants and other licensees, including problems regularly encountered and concerns about any other aspects of great crested newt mitigation work.

2.3.2 Questionnaire design

The questionnaire was designed to collect the following information about selected great crested newt mitigation projects:

- Licence information.
- Details of the development requiring great crested newt mitigation and the planning process involved.
- Mitigation project work breakdown.
- Pre-development assessment of the existing great crested newt population plus the aquatic and terrestrial habitats affected.
- Methods used to capture and exclude great crested newts and the numbers translocated.
- Details of receptor sites, whether in-situ or ex-situ, and work done to enhance or create aquatic and terrestrial habitats for great crested newts.
- Post-development monitoring programmes.
- Post-development receptor site management carried out.
- Problems encountered before, during and after the mitigation project.
- Relevant comments about great crested newt mitigation work.

2.3.3 Pilot questionnaire survey

The mitigation project questionnaire was designed in collaboration with English Nature, The Herpetological Conservation Trust, and Calumma Ecological Services. Two conservation scientists who have professional experience of designing questionnaires for social science and community based conservation surveys were also consulted over the structure and format of the project questionnaire. It was then piloted among a number of experienced ecological consultants and their feedback was used to draft a final version for wider circulation.

2.3.4 Main questionnaire survey

An example of this questionnaire is shown in Appendix I. The original intention was to send 200 questionnaires to consultants, each one representing a randomly selected great crested newt mitigation project (Section 2.3.2). However, inspection of the licence database showed that well over 50% of all licences had been issued to only 22 of the most active ecological consultants (Section 3.2.2.). Random selection would therefore have resulted in most of these consultants receiving far too many questionnaires to practically complete. It was instead decided to limit the number of questionnaires sent to any one person to a maximum of five. Only 153 questionnaires were therefore actually sent in August 2002, by a combination of post and e-mail, to 114 individuals (only 23 people were sent more than one questionnaire).

3. Project results

3.1 Mitigation project samples

3.1.1 Licence database

A total of 737 great crested newt licences were examined at English Nature Licensing Section, Peterborough. English Nature had issued 427 of these licences during the period 1990-2000, with the remaining 310 subsequently being issued by DETR/Defra in 2000 and 2001. A total of 649 of these licences, issued to 164 individuals and ecological consultancies, collectively cover 345 great crested newt mitigation projects started between 1990 and 2001 (Tables 1 and 2). A further 50 out of the 737 licences examined were issued for projects, such as pond maintenance by conservation bodies, that are not considered to be mitigation work as defined by this study. In addition, a few licences had been cancelled almost immediately due to necessary project amendments, some remained unused altogether due to various work delays and cancellations, while others were variously revoked or otherwise not required – these account for the remaining 38 licences.

3.1.2 Problems encountered sampling licence database

Among the aims of sampling the licence database was the production of a comprehensive list of great crested newt mitigation projects undertaken in England since legal protection for this species was introduced under the Wildlife and Countryside Act 1981. Although an enormous amount of useful information was obtained, a full record of projects proved to be impossible to compile for a number of reasons.

Most seriously, considering the legal requirement to report licensed work involving protected species, returns could not be found for over half of all the licences issued. It is possible that some were sent to local English Nature offices, instead of Peterborough, and many licence returns may still be forthcoming for the more recent mitigation projects started in 2000 and 2001. Nonetheless, only 176 licence returns were present in the files for the 394 licences issued for 1990-1999 projects. In other words, 55.3% of the licences issued during this period apparently had no licence return. Consequently, it was not possible in these cases to determine how many newts (if any) had been translocated, if mitigation had proceeded as proposed in the licence application, or even if the project had taken place at all.

In addition to the 737 licences actually examined, a further 63 licences listed on the English Nature spreadsheet for the period 1997-1999 were searched for in the files but never discovered. It is therefore unclear how many projects these licences involved, where they were located or what the eventual outcome was for the great crested newt populations affected. An unknown number of licences were also issued in the years 1995 and 1996 but these records are not included in the English Nature computer database. Since licences are filed by licensees' name, rather than by species, only a few of these were fortuitously discovered in the files.

In some cases, particularly where several consultants were licensed and only limited details of localities had been given, it was difficult to work out if two or more differently named projects actually involved the same development site or not. A few other minor inconveniences, such as missing paperwork, were encountered with the licence files. A much worse problem, however, was caused by the filing of many original faxes (rather than good

photocopies) of correspondence and licence returns – most of these had subsequently faded to the extent that they were unreadable.

3.1.3 Questionnaire sample

Eventually, 84 of the 153 original questionnaires were returned (by 62 individual consultants), a respectable response rate of 54.9%. All those who wished to be acknowledged in this report are listed in Section 6.

3.1.4 Problems encountered with questionnaire sample

The following problems affected the number of questionnaire samples and collection of data about mitigation projects:

- The timing of the questionnaire survey was poor since the summer is an extremely busy period for most ecological consultants. Due to a slow initial response – no doubt the result of such a large questionnaire being received – two reminders were subsequently sent out and English Nature also made direct appeals to consultants for cooperation. Although this set back the timetable of the project, it also eventually resulted in the return of 84 questionnaires by the end of December 2002.
- Several addresses for consultants who had carried out older, pre-1995 projects were no longer current. In addition, several others no longer had access to project files from this period.
- Pre-1990 files (which have been archived by English Nature) were provided by Prof. Rob Oldham of De Montfort University, Leicester, but most of these projects involved the translocation of great crested newts to new ponds, rather than for actual mitigation for development. The very few that were relevant had been carried out by consultants who had already received a number of questionnaires for later projects. Consequently, this period is not represented in the study.
- One of English Nature's original objectives in commissioning this project was to detect any trends and changes in mitigation practice over time from the questionnaire sample. In particular, it was hoped that projects taking place during the two periods 1990-1994 and 1995-1999 (or 2001) could be compared. However, only seven questionnaires were returned that covered projects from the earlier period. In addition, respondents were obviously unable to complete many of the questions fully after so much time had elapsed. Consequently, it was not possible to directly compare the two periods and perform any analyses on the questionnaire data – this exercise therefore had to be confined to the more extensive data set collected from the licence files.
- Nine of the 84 questionnaires returned contained only very limited information, and three were actually sent back completely blank. These 12 questionnaires were subsequently discounted, so the final sample size used for data analysis was 72 mitigation projects.

3.2 Licence information

3.2.1 Numbers of mitigation projects

A total of 345 great crested newt mitigation projects, carried out between 1990 and 2001, have been investigated by examination of the licence database for this report. In addition, far more detailed information was obtained for 72 of these projects from the questionnaire survey. As has already been pointed out in Section 3.1.2, the total number of projects carried out during this period is obviously greater than 345, although there is no way of knowing by how much.

Table 1 shows the annual breakdown of all mitigation projects started, including those for which questionnaire returns were received. It should be noted that each project is only included in the table for the first year in which it was first licensed. Only 112 projects (32.5%) were carried out within one season – the remainder continued for two or more years and indeed, several are still underway. Consequently, the number of projects actually taking place in every year after 1990 was actually greater than shown in Table 1. Due to factors such as work being taken on by different consultants, variable numbers of licence returns and breaks in projects of a year or more, it was not possible to accurately indicate these numbers in the table (but see Section 3.2.4. for more details about the duration of mitigation projects).

Table 1. Total numbers of mitigation projects and questionnaire returns (1990–2001)

Year	Total number of projects started	Total No. of questionnaires sent	Total No. of questionnaire returns
1990	3	2	0
1991	6	4	1
1992	6	4	1
1993	12	10	2
1994	21	9	3
1995	6	4	3
1996	11	5	2
1997	33	20	5
1998	37	23	9
1999	39	18	15
2000	87	31	18
2001	84	23	13*
Totals	**345**	**153**	**72**

*Includes 3 returns for projects licensed in 2001 but not actually carried out until 2002

3.2.2 Numbers of licences issued

Details of the 649 licences issued for 345 great crested newt mitigation projects carried out in England between 1990 and 2001 are shown in Table 2. All licences issued are shown for the year that the project actually started. For example, a licence issued in 1999 for a project that commenced in 1997 is counted in the latter year in Table 2. The fact that many projects continued for two or more years, often requiring the issue of multiple licences, is reflected by the mean number of licences (1.9) issued per project. There is no significant difference in the numbers of licences issued per project between 1990-1994 and 1995-2001 (Mann-Whitney

U-test: n_1=48, n_2=297, U = 7879, z=1.17, p=0.2347). Similarly no trend is evident between these two periods in the numbers of consultants that have been involved in mitigation projects (Mann-Whitney U-test: n_1=48, n_2=297, U=7328.5, z=0.3, p=0.7456).

Table 2. licences issued for great crested newt mitigation projects (1990–2001)

Year	Total No. of projects started	Total No. licences issued*	Mean No. licences/ project	S.D.	Range	Mean No. of consultants per project	S.D.	Range
1990 – 1994								
1990	3	3	1.0	0.00	1 - 1	1.0	0.00	1 – 1
1991	6	17	2.8	4.02	1 – 11	1.8	0.41	1 – 2
1992	6	12	2.0	1.55	1 – 5	1.8	0.41	1 – 2
1993	12	23	1.9	1.93	1 – 6	1.1	0.29	1 – 2
1994	21	36	1.7	1.55	1 – 6	1.1	0.44	1 – 3
Totals	**48**	**91**	**1.9**	**2.01**	**1 – 11**	**1.1**	**0.37**	**1 – 3**
1990 – 2001								
1995	6	18	3.0	2.61	1 – 8	1.7	0.82	1 – 3
1996	11	33	3.0	2.53	1 – 8	1.6	1.03	1 – 4
1997	33	71	2.2	2.20	1 – 11	1.2	0.53	1 – 3
1998	37	102	2.8	2.57	1 – 14	1.4	0.63	1 – 3
1999	39	79	2.0	1.71	1 – 8	1.6	0.54	1 – 4
2000	87	158	1.8	1.24	1 – 9	1.1	0.29	1 – 2
2001	84	97	1.2	0.45	1 – 3	1.0	0.00	1 – 1
Totals	**297**	**558**	**1.9**	**1.69**	**1 – 14**	**1.2**	**0.46**	**1 – 4**
Overall totals	**345**	**649**	**1.9**	**1.74**	**1 – 14**	**1.1**	**0.45**	**1 – 4**

* Excludes 63 licences not found in English Nature files

Figure 1 indicates the total number of licences issued to individual consultants from 1990-2001. The total is 712 because, as the consultant's names were already known, the 63 English Nature licences not found during the licence database search are included here. The mean number of mitigation licences issued to a consultant over this period is 4.3 (S.D. = 6.39, range = 1 – 51, n = 164). This masks an interesting disparity, however, in that a relatively small number of consultants have carried out most of the great crested newt mitigation projects in England. The 22 people issued with 10 or more licences constitute only 13.4% of consultants who have been involved in this type of work but have been issued with 53.2% of all licences (total number of licences = 379, mean number of licences per consultant = 17.2, S.D. = 9.43, range = 10 – 51, n = 22). Conversely, the 142 people (86.6%) issued with less than 10 licences between 1990 and 2001 (75 of them with only a single licence) account for 46.8% of all those issued (total number of licences = 333, mean number of licences per consultant = 2.4, S.D. = 2.00, range = 1 – 9, n = 142).

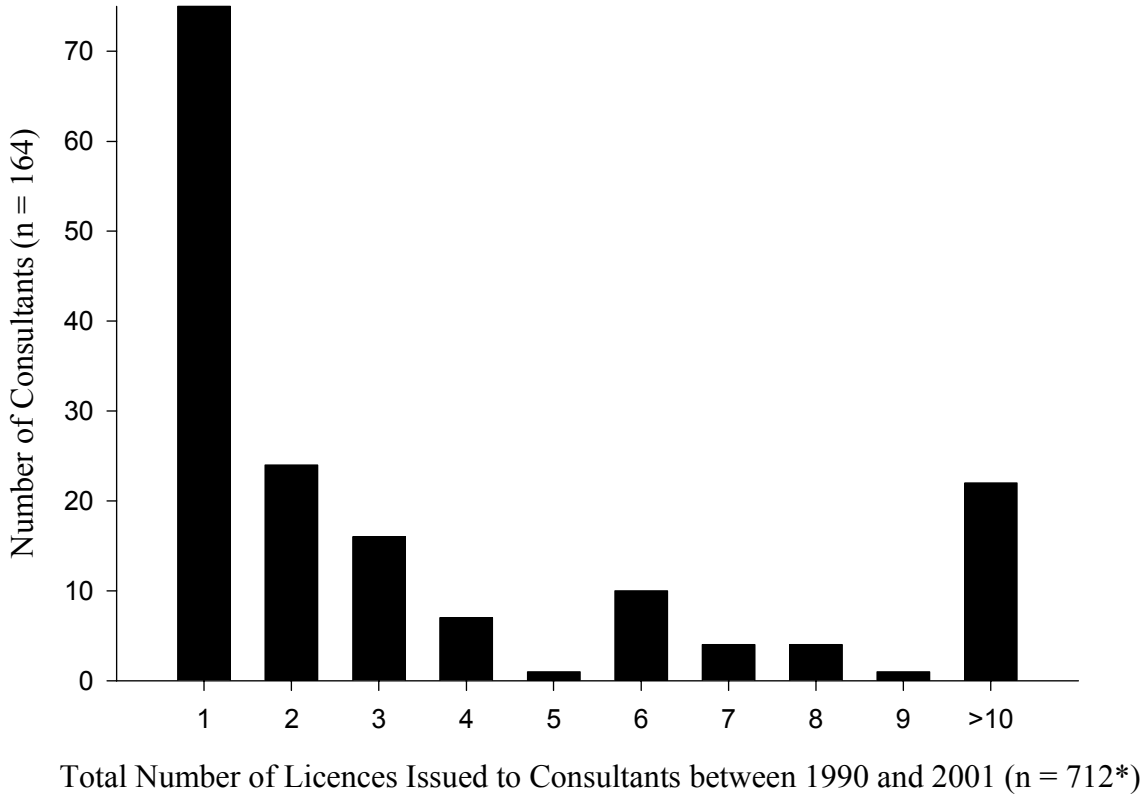

Figure 1. Number of licences issued per consultant (1990-2201)

* Includes 63 licences not found in English Nature files but for which consultants' names are known

3.2.3 Types of consultants

There is a fairly even spread in the numbers of great crested newt mitigation projects carried out by the three main types of ecological consultancies involved: individuals (or sole traders), partnerships and limited companies (Figure 2). Much smaller numbers of projects have been undertaken by other categories of licensee including voluntary bodies (local amphibian and reptile groups for example), academic institutions and 'others' including the local authorities themselves, water companies, wildlife trusts and specially constituted joint ventures.

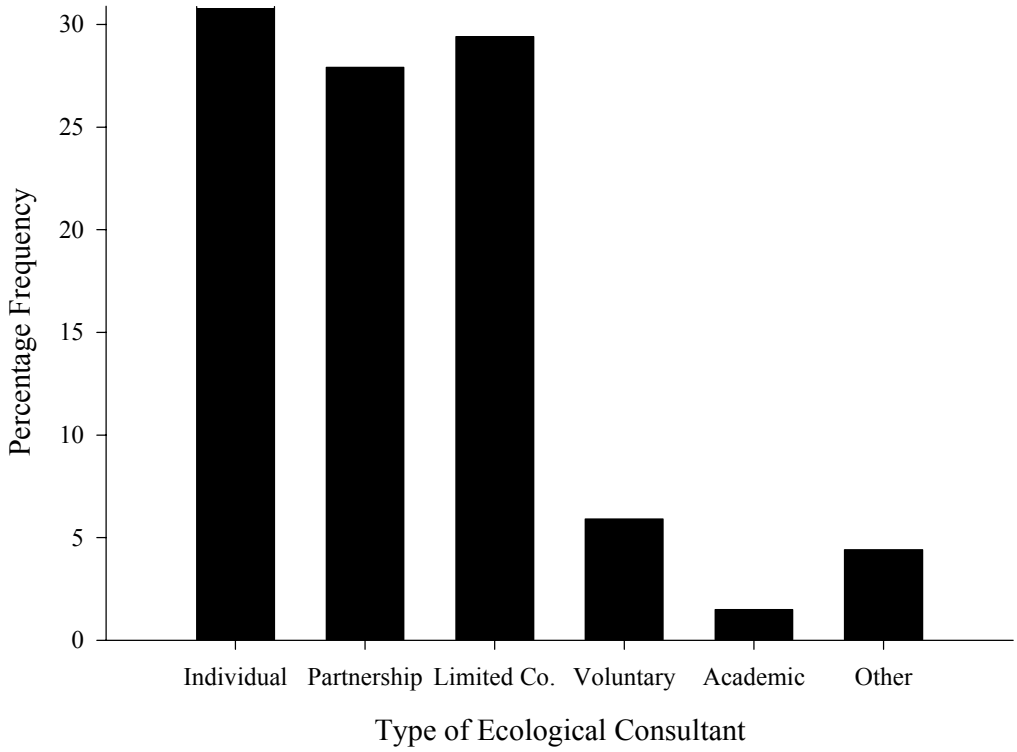

Figure 2. Frequency of types of ecological consultants licensed for mitigation work

3.2.4 Types of mitigation projects

Information was available for 178 mitigation projects (51.6%) about the type of receptor sites to which great crested newts were translocated. The three categories are defined as:

1. **In-situ receptor sites.** Refers to receptor sites managed for great crested newts that are located less than 500m from the original development site, and not separated by any major newt dispersal barriers, usually within the site boundaries or in an immediately adjacent area.

2. **Ex-situ receptor sites.** Sites receiving newts that are greater than 500m from the original development site, or are situated on the far side of a newt dispersal barrier, such as a major road.

3. **Mixed receptor sites.** Great crested newts were translocated to a combination of the above two.

There has been a distinct trend over time, with ex-situ and mixed mitigation projects becoming less frequent and the percentage of in-situ great crested newt translocations increasing (Figures 3 and 4). Although over 70% of projects involved in-situ rather than ex-situ translocation over the entire study period, comparing the periods 1990-1995 and 1996-2001, revealed a significant shift away from ex-situ translocation to in-situ translocation over time (chi-squared = 6.8, df = 1, $p<0.01$).

Table 3. Types of mitigation projects (1990–2001)

Year	Total No. of projects started	Type of mitigation project			
		In-situ projects	Ex-situ projects	Mixed projects	Unknown
1990	3	1	-	-	2
1991	6	2	3	-	1
1992	6	3	2	1	0
1993	12	5	0	1	6
1994	21	8	2	-	11
1995	6	4	2	0	0
1996	11	9	1	-	1
1997	33	26	3	1	3
1998	37	27	8	-	2
1999	39	33	3	-	3
2000	87	20	-	-	67
2001	84	13	-	-	71
Totals	**345**	**151**	**24**	**3**	**167**

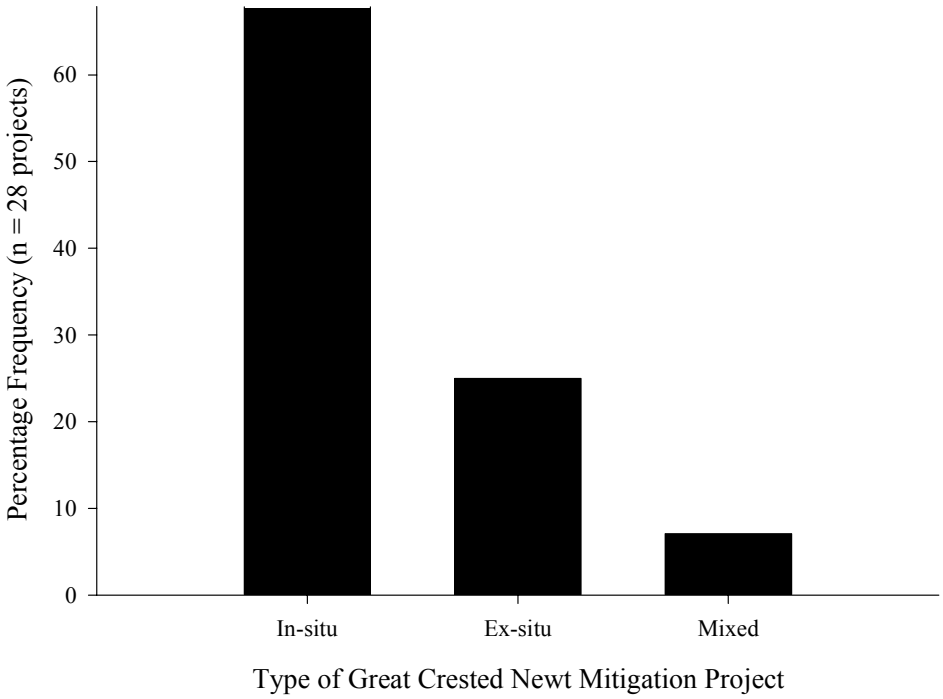

Figure 3. Frequency of different types of mitigation projects (1990-1994)

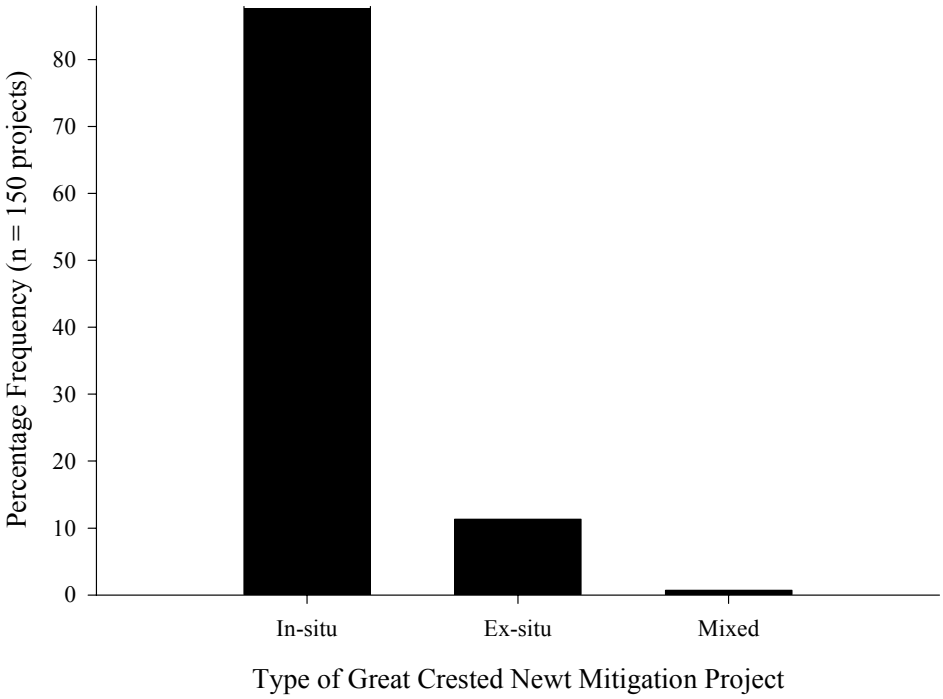

Figure 4. Frequency of different types of mitigation projects (1995-2001)

3.2.5 Duration of mitigation projects

Table 4 and Figure 5 indicate the approximate duration, as gleaned from the licence database, of great crested newt mitigation projects. Projects started in 2000 and 2001 are not included in Table 4 as many will not have been completed. The duration of a project is defined here as the time between first and last licensing. It should be stressed that this leaves considerable room for error as it was frequently not possible to tell from licence files (particularly because of the lack of licence returns) when work on the ground actually took place. In addition, an unknown number of projects are still underway, some having been passed onto other consultants, sometimes with a change of site name. For example, of the 72 projects covered by the questionnaire sample alone, 11 were ongoing at the time of the survey and development was on hold in another two. Work such as habitat management of receptor sites and post-mitigation monitoring may also continue for some time, often under a different type of licence to that required for the translocation of newts and disruption of their habitat.

Nonetheless, it is clear that only a minority of mitigation projects (112 or 32.5% of the total) have been completed within one year. There is no significant difference in the duration of projects between the two periods 1990-1994 and 1995-1999 (Mann-Whitney test: n_1=48, n_2=126, U=3526.0, z=1.69, p = 0.0847).

Table 4: Duration of mitigation projects (1990–1999)

Year	Median duration of projects (years)	Mean duration of projects (years)	Standard deviation	Range (years)	n
1990 – 1994					
1990	1.00	1.0	0.00	-	3
1991	1.00	2.7	3.62	1 – 10	6
1992	1.00	2.2	2.40	1 – 7	6
1993	1.00	1.6	1.51	1 – 6	12
1994	1.00	1.9	2.08	1 – 8	21
Totals	**1.00**	**1.9**	**2.13**	**1 - 10**	**48**
1995 – 1999					
1995	2.50	3.0	2.10	1 – 6	6
1996	2.00	2.2	1.54	1 – 6	11
1997	1.00	1.7	1.19	1 – 5	33
1998	1.00	1.9	1.13	1 – 5	37
1999	1.00	1.4	0.64	1 – 3	39
Totals	**1.00**	**1.8**	**1.16**	**1 - 6**	**126**
Overall totals	**1.00**	**1.8**	**1.49**	**1 - 10**	**174**

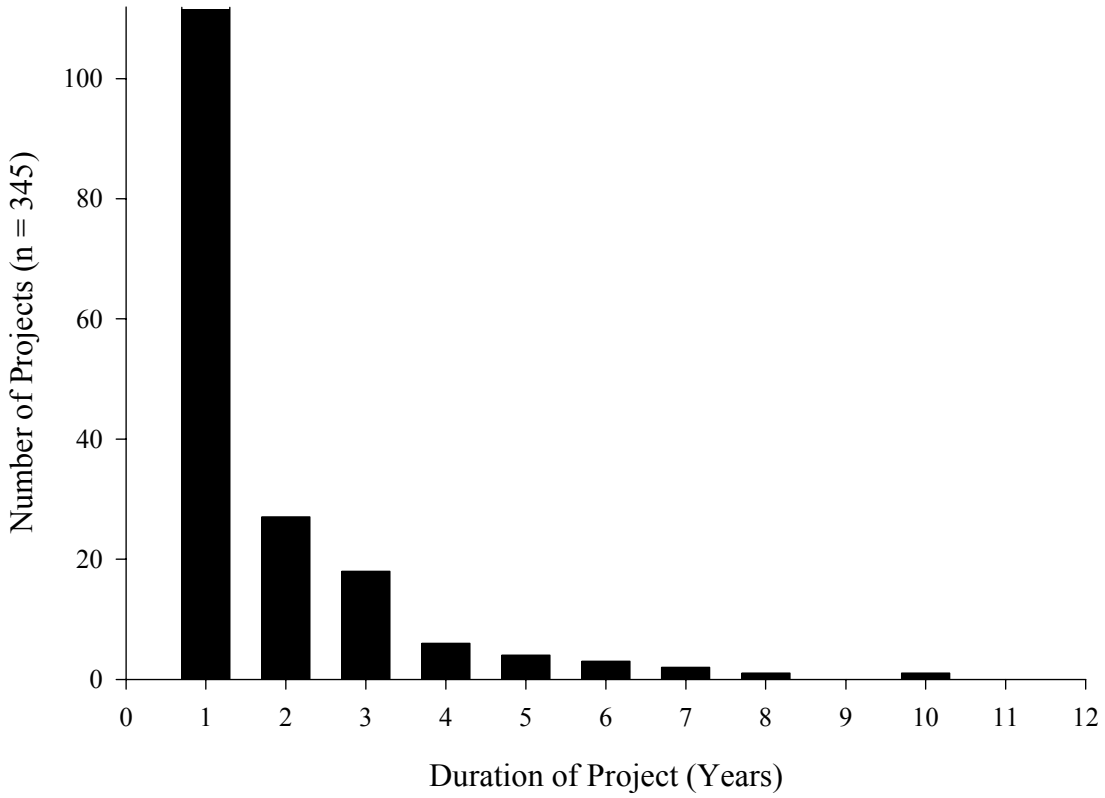

Figure 5. Duration of mitigation projects

3.2.6 Geographical distribution of mitigation projects

Great crested newt mitigation projects have been carried out across much of England in the past 13 years, although the West Country counties of Devon and Cornwall are notable by their absence from the sample (great crested newts are absent from Cornwall, but the analyses do not imply that such projects have never taken place in Devon where they are known to occur). Table 5 shows the total number of projects – where information is available – and also the numbers of questionnaire samples for English counties. This only represents a total of 311 projects since details of the counties concerned – or any other location information – were not found in the files for 34 of the projects.

The location of past mitigation projects in England probably reflects the geographical distribution of great crested newts more than the amount of development that has taken place in any particular county. In other words, developers are more likely to have considered great crested newt mitigation in some regions than in others. In particular, there is a very distinct cluster of mitigation projects around Cheshire and Lancashire, an area where great crested newts are known to be relatively widespread and abundant.

Table 5: Location of mitigation projects in English counties

County	Total No. of projects	No. of samples	County	Total No. of projects	No. of samples
Avon	2	1	Lincolnshire	5	1
Bedfordshire	7	2	Merseyside	5	1
Berkshire	6	2	Norfolk	1	0
Buckinghamshire	1	1	North Yorkshire	5	4
Cambridgeshire	17	4	Northamptonshire	8	1
Cheshire	41	6	Northumberland	1	1
Cleveland	3	1	Northumbria	1	1
Cumbria	5	2	Nottinghamshire	1	1
Derbyshire	8	4	Oxfordshire	5	1
Dorset	4	0	Shropshire	10	2
Durham	2	1	Somerset	2	1
East Sussex	11	0	South Yorkshire	4	2
East Yorkshire	2	0	Staffordshire	13	2
Essex	14	1	Suffolk	9	1
Gloucestershire	4	2	Surrey	9	2
Greater London	1	1	Tyne & Wear	1	0
Greater Manchester	14	2	Warwickshire	10	4
Hampshire	4	2	West Midlands	6	1
Herefordshire	1	0	West Sussex	3	0
Hertfordshire	6	1	West Yorkshire	3	0
Kent	10	0	Wiltshire	11	3
Lancashire	24	4	Wirral	1	1
Leicestershire	5	2	Worcestershire	5	3

3.2.7 Mitigation project work effort

During the pilot questionnaire survey it was decided that asking for the actual costs of great crested newt mitigation work would be inappropriate and also that few consultants would be able to spare the time to compile these figures, especially from old, archived files. Instead, a

rough estimate of the work effort involved for the different aspects of each project was requested with a view to relating this information to the overall numbers of great crested newts translocated (Table 6, and see Section 3.6.2).

Table 6: Estimated work effort involved in great crested newt mitigation projects

Mitigation project work	Estimated number of work days/sessions (numbers of projects are shown in table)					Not known
	<10 days	11-30 days	31-60 days	61-90 days	>90 days	
Project management (meetings, project planning, production of reports, etc.)	41	20	6	0	2	3
Pre-mitigation great crested newt population assessment (fieldwork only)	51	11	1	0	0	9
Development site preparation (trap lines, fencing and maintenance, etc.)	32	23	5	1	4	7
Receptor site preparation (pond construction, habitat management, etc.)	25	15	2	3	2	25
Actual capture and translocation of great crested newts	20	18	7	8	8	11
Post-mitigation great crested newt population monitoring (fieldwork only)	34	11	2	1	1	23
Post-mitigation management of receptor site (including projected work effort)	22	8	2	3	1	36
General administration, office support f project staff/fieldworkers	42	12	2	0	3	13
Median number of projects	33	13.5	2	1	2	12
Mean number of projects	33.4	14.8	3.4	2.0	2.6	15.9
Standard deviation	10.85	5.18	2.26	2.73	2.50	11.10

Assuming project management fees are £300 per day, and that the other elements of project work are charged at £150 per day, the absolute minimum cost of a great crested newt mitigation project would be £1,350 for eight days work. At the other extreme, substantial and very lengthy projects involving hundreds of days work over several years can easily exceed £100,000. However, a rough figure – estimated from Table 6 – for the cost of an average great crested newt mitigation project would be between £15,000 and £20,000 (not including plant hire and equipment).

3.3 Development details

3.3.1 Types of development

Information about the type of developments requiring great crested newt mitigation was available for the 72 projects in the questionnaire sample and a further 87 projects in the licence database.

The following six types of development are recognised. Figures in brackets refer to the numbers of specific projects from the questionnaire sample.

1. **Building.** Includes residential housing (23 sites, mean number of houses = 647), commercial developments such as business parks (16), leisure centres (4) and redevelopments involving demolition (9) – also includes the necessary infrastructure

of roads, sewage and power supplies, as well projects involving a mixture of any of these.

2. **Sports.** Developments such as sports fields (3), golf courses (1) and playgrounds.

3. **Minerals.** Extraction of sand and gravel and other minerals (5), along with landfill (2) and mixed projects combining both of these elements (3)

4. **Transport.** Both permanent large-scale linear developments such as new roads (6), including road widening schemes and junction improvements, railways (2) and airport runways and smaller scale work including footpaths and cycle ways (2).

5. **Pipelines.** Temporary liner developments, including pipelines installed for gas and so on (9), as well as cable laying projects (2).

6. **Other.** Various other types of development included new country parks and public open space (2), a small car park (1) new lagoons for water treatment works (3), the rebuilding of a school destroyed by arson (1), demolition and other work with no redevelopment involved (2), a materials recycling facility (1), accommodation and other facilities for a paintball and 4 x 4 course (1) and improvements to fisheries (1) and flood defences (1).

Figures 6 and 7 show the frequency of development types for all projects and those for which additional information was obtained from the questionnaire survey (the total of 99 projects for the latter reflects the fact that more than one type of development was often carried out).

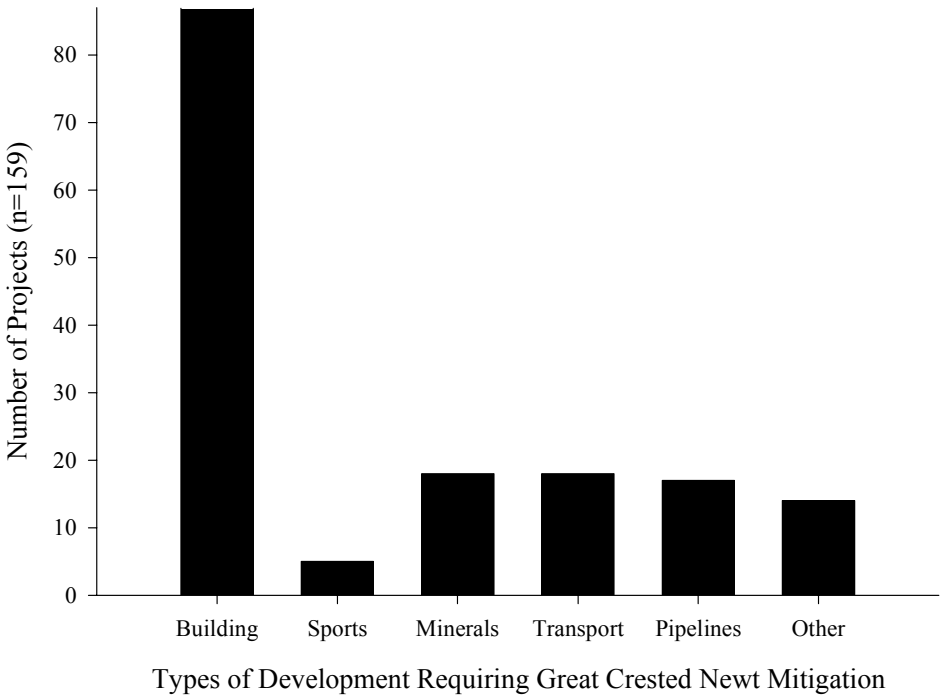

Figure 6. Types of development – licence database

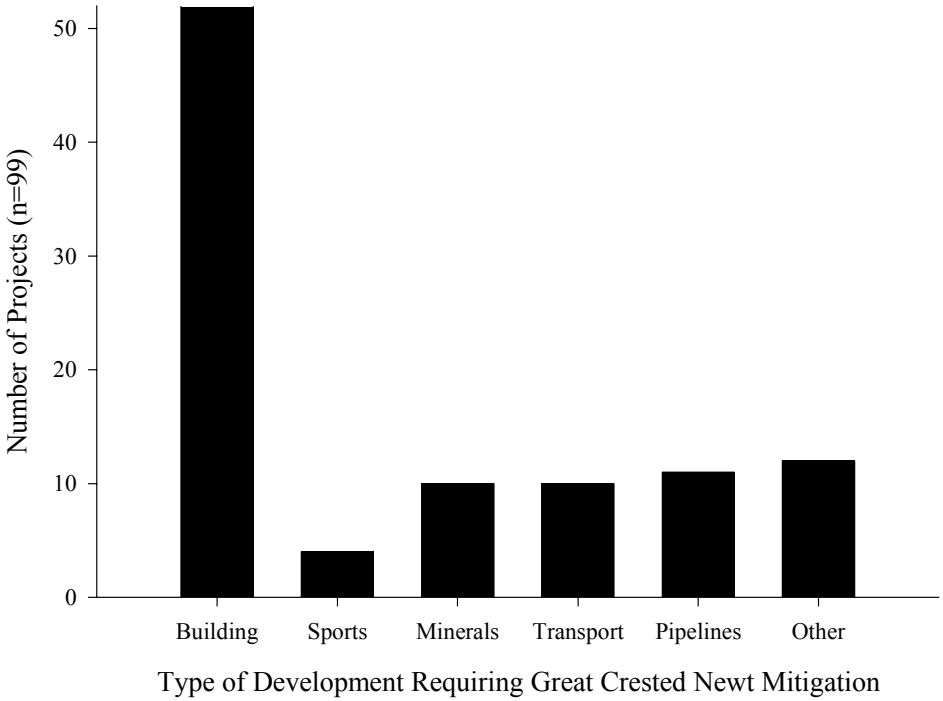

Figure 7. Types of development – questionnaire sample

3.3.2 Scale of development

Table 7 shows the scale of development projects using information provided by the questionnaire sample. In most cases, the area of great crested newt habitat actually destroyed occupied considerably less than a third of the entire development site - 27.3% of the mean total area (Figure 8). This proportion is even less for linear developments, where the mean area of great crested newt habitat affected was only 8.6% of the total.

Table 7. Areas of development sites

Area of development sites affected	Mean	S.D	Range	n
Non-linear developments				
Total site areas	20.48	33.039	0.5 – 120.0	49
Area of site destroyed by development	10.83	20.037	0.0 – 80.0	47
Area of great crested newt habitat destroyed	5.60	13.585	0.0 – 80.0	48
Linear developments (eg pipelines)				
Total area affected	93.97	145.360	0.1 – 440.0	9
Area of great crested newt habitat affected	8.05	9.499	0.1 – 28.0	7

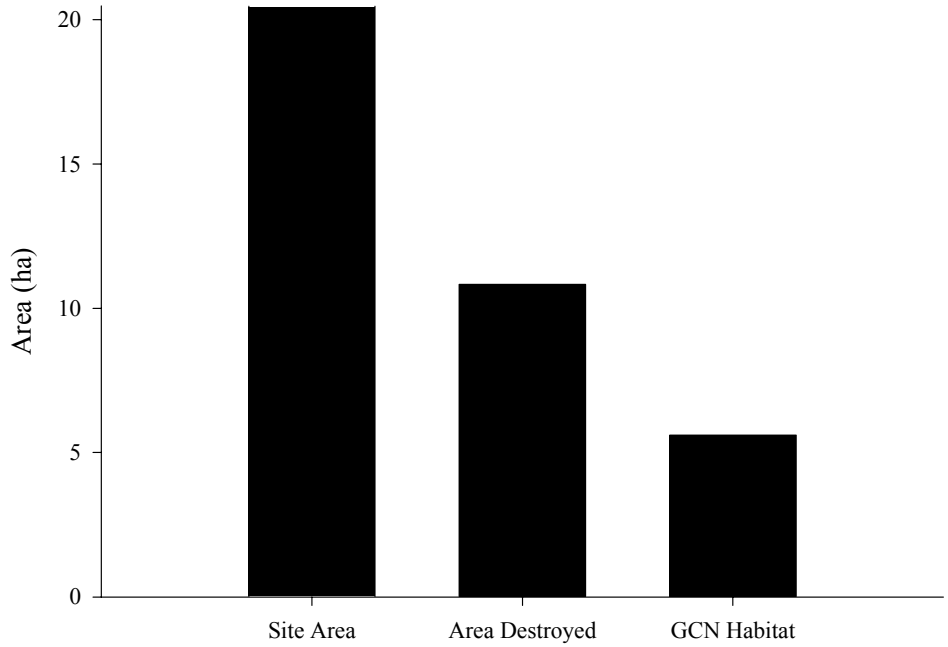

Figure 8. Areas of non-linear project sites affected by development

3.4 The planning process

Planning permission is not always required for developments requiring great crested newt mitigation, especially pipelines, and this was the case for 12 projects (16.7%) in the questionnaire survey. In cases where planning permission is required, however, great crested newts are still sometimes overlooked during the planning process. According to questionnaire returns, the presence of this species was not confirmed on 17 of development sites (33.3% of the 51 sites for which this information was provided) until after full planning permission had already been granted. Great crested newts are considered even more rarely in wider, formal Environmental Impact Assessments (EIAs): these were only carried out for 17 of the 44 projects for which information is available (38.6%). Furthermore, newt populations, although later found to be present, were missed altogether during three of these EIAs.

Once the presence of great crested newts has been established, there are a variety of planning mechanisms by which mitigation is secured (Figure 9). Section 106 agreements are the most common and were drawn up in 19 (51.4%) of the 37 projects where this information was available. Planning conditions and informal agreements, as well Environmental Statement undertakings in one case, were also used to ensure mitigation. There were no legal or planning conditions imposed at all for 6 (16.2%) projects.

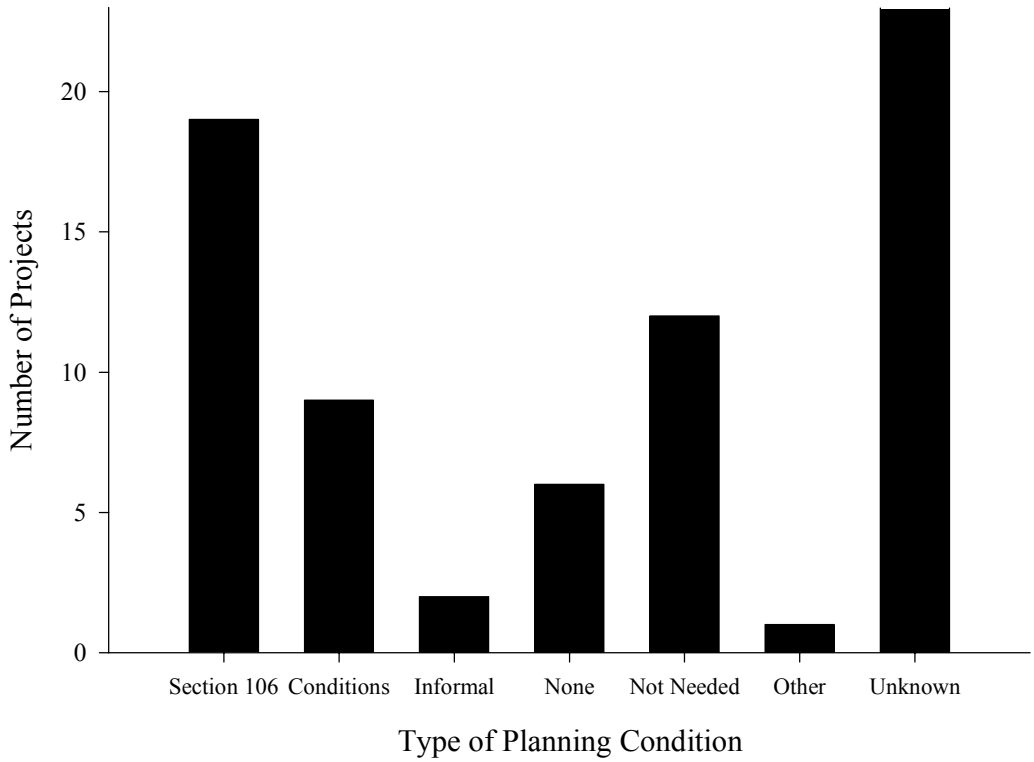

Figure 9. Planning mechanisms associated with mitigation projects

3.5 Pre-development assessment

3.5.1 Great crested newt populations

Questionnaire respondents had been responsible for assessing the presence and status of great crested newts on all but two sites prior to development. Table 8 indicates the numbers of projects for which pre-existing great crested newt records were already available, and those for which specially commissioned surveys were also carried out. The 42 sites with existing records included 30 where this information merely confirmed the presence of great crested newts, 11 where some simple count data was also available and one site where a detailed population estimate had previously been carried out. All sites with no pre-existing records (plus 20 with records) were subsequently surveyed so, at the least, the presence of great crested newts was established in advance for all sites.

Table 8. Number of projects with pre-development great crested newt information

	Existing great crested newt survey records available?	**Great crested newt survey specially commissioned for project?**
Yes	42	48
No	28	19
Unknown	0	3
Not responsible	2	2
Totals	**72**	**72**

Most of the 48 specially commissioned surveys (27 or 56.3%) were conducted less than six months prior to the start of the actual mitigation work, 13 (27.1%) from six to 12 months beforehand and only seven (14.6%) more than 12 months (one over two years) in advance. One further survey was not actually commissioned until *after* the mitigation work had been completed. A variety of methods were employed to carry out the great crested newt surveys and information was provided for 45 out of the 48 projects involved. These methods include:

- **Torching** (used in 36, ie 80% surveys). Nocturnal searching of ponds for active newts.
- **Day counts** (used in 13, ie 29% surveys). Diurnal searches for active newts in ponds.
- **Netting** (used in 30, ie 67% surveys). Standardised sweep netting of potential breeding ponds.
- **Bottles** (used in 24, ie 53% surveys). Standardised bottle trapping of ponds.
- **Pitfalls** (used in 2, ie 4% surveys). Capture of newts with pitfall traps and drift fences.
- **Refugia** (used in 25, ie 56% surveys). Use of artificial refugia, such as old wooden boards, to attract newts.
- **Egg searches** (used in 26, ie 58% surveys). Active searching of aquatic vegetation for newt eggs.

Other methods used included terrestrial habitat appraisals (3 surveys), searches for dead great crested newts in newly created earth piles adjacent to the development site (1 survey) and one detailed mark/recapture study, where belly marking photographs were used for identification of individual newts. The mean number of methods used per survey was 3.5 (S.D. = 1.42, range = 1 – 6, n = 45) – see Figure 10.

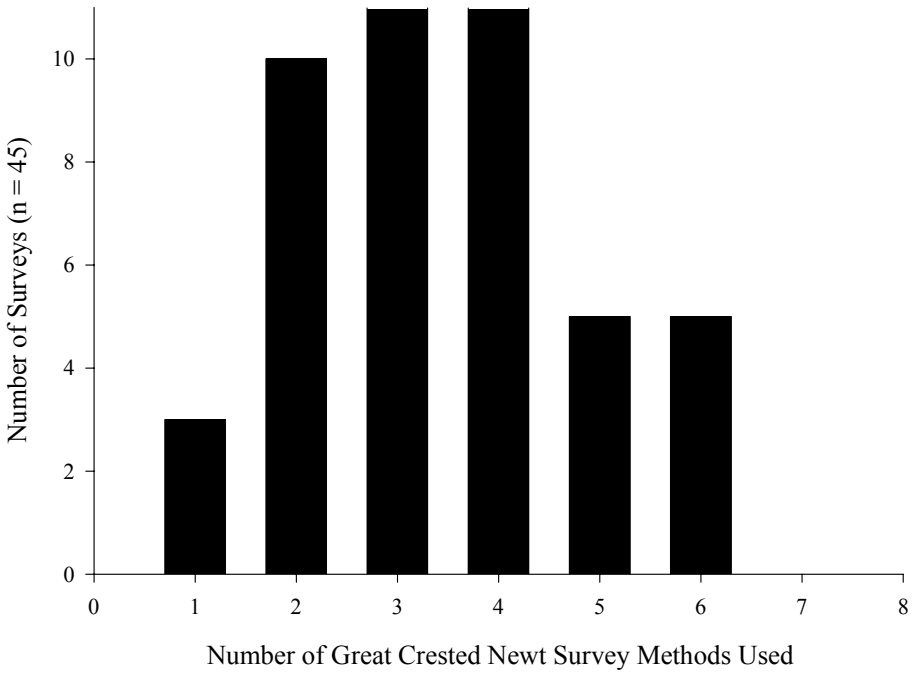

Figure 10. Pre-development survey methods – frequency of use

The number of pre-development survey visits was provided for 37 projects. The mean number of visits was 6.4 per survey (S.D. = 11.45, range = 1 – 66, n = 37). Great crested newts were recorded on 41 out of the 45 surveys with information available (91.1%) and the results are summarised in Table 9. Eggs were also discovered on 14 surveys but no figures are available for numbers.

Table 9: Mean numbers of great crested newts recorded on pre-development surveys

	Adults	Sub-adults	Larvae
Mean number per survey	28.4	1.4	2.7
Standard deviation	57.25	4.93	11.65
Range	0 – 326	0 – 30	0 – 75
Total number of surveys	45	45	45
Number of times recorded*	35	9	7

*At least one life stage was recorded on 41 out of the 45 surveys

Apart from those provided to clients, pre-development survey reports were also sent by consultants to English Nature/Defra (36 surveys), the local planning authority (23), the County Council Ecologist (2), the county Wildlife Trust (5), the local Biological Records Centre (6), the local Amphibian and Reptile Group (3) and to other recipients such as the Highways Agency (1), the Police (1) and a local ornithological group (1).

3.5.2 Aquatic habitats

Information provided in the questionnaires about the pre-development assessment of aquatic habitats also summarised the eventual fate of ponds on most sites. Table 10 shows how ponds on development sites were affected by development. The numbers of ponds with confirmed great crested newt breeding activity are shown separately, although these figures should be viewed with caution, as at least another 57 ponds were suspected by consultants of supporting this species. More details, including pond areas are given in Table 14 (see Section 3.7.3).

Table 10: Numbers of ponds affected by developments

	Number of development sites (n)	Numbers of ponds affected	% of pond total	Mean No. of ponds per site	Standard deviation	Range
All available pond records for development sites						
All ponds	65	243	100	3.7	5.88	0 – 31
Ponds destroyed	65	123	50.6	1.9	5.30	0 – 31
Ponds retained	65	67	27.6	1.0	2.04	0 – 9
Ponds improved	65	53	21.8	0.8	1.65	0 – 8
Records for ponds with confirmed great crested newt breeding only						
GCN ponds only	60	115	100	1.9	3.39	0 – 25
GCN ponds destroyed	60	59	51.3	1.0	3.29	0 – 25
GCN ponds retained	60	35	30.4	0.6	1.08	0 – 4
GCN ponds improved	60	21	18.3	0.4	0.80	0 – 4

3.5.3 Terrestrial habitats

It was suggested by ecological consultants who participated in the pilot questionnaire survey that it would not be feasible to gather information about the areas of habitats on development sites. Most mitigation projects simply do not involve such detailed site assessments. It was possible to obtain a list of different terrestrial habitats present, however, as well as a rough indication of how each had been affected by development. Table 11 records the fate of these habitats for the 61 development sites for which information was provided, and also adjacent areas within 500 m. Assuming that deciduous woodland, scrub/hedgerows, semi/unimproved grassland and aquatic habitats represent the main great crested newt habitats within development sites, at least 75% of great crested newt habitat was affected in at least 30% of the projects.

The simple scoring system employed in Table 11 is as follows:

0: habitat not present
1: habitat present but unaffected by development
2: less than 25% affected
3: 26-50% affected
4: 51-75% affected
5: 76-100% affected

Table 11. Effects of development on terrestrial habitats (numbers of projects)

Type of habitat	Development site						Adjacent habitats (within 500m)					
	0	**1**	**2**	**3**	**4**	**5**	**0**	**1**	**2**	**3**	**4**	**5**
Deciduous woodland	47	8	2	0	0	4	31	28	2	0	0	0
Coniferous woodland	58	2	0	0	1	0	51	10	0	0	0	0
Scrub/hedgerows	20	11	9	2	3	16	16	41	1	1	0	2
Semi/unimproved grassland	36	5	4	3	2	11	33	25	2	0	0	1
Improved/amenity grassland	40	2	5	1	2	11	34	25	0	1	0	1
Gardens/allotments	54	4	1	2	0	0	36	22	2	1	0	0
Pasture	39	4	3	3	2	10	29	31	0	1	0	0
Arable	48	2	2	1	2	6	42	17	0	0	0	2
Disturbed land (quarries, etc.)	42	4	4	0	4	7	47	14	0	0	0	0
Built land (buildings, roads)	33	9	4	0	3	12	27	31	2	1	0	0
Aquatic habitats (ponds, etc.)	16	10	11	2	4	18	20	38	2	1	0	0
Wetland (marshland, etc.)	38	7	3	2	1	10	37	23	1	0	0	0
Other	57	1	0	2	0	1	57	3	0	1	0	0

3.6 Great crested newt translocations

3.6.1 Capture methods used

Effective translocation of great crested newts for a mitigation project is dependant on adequate effort, as well as on sufficient numbers of suitable capture methods. Table 13 (Section 3.6.2.) provides correlations between the numbers of methods used, capture effort and other variables and the numbers of great crested newts eventually translocated. Four projects were designed merely to exclude newts from the development sites, and hence involved minimal capture effort, and no information was available for one project. Up to 10 capture techniques were employed to collect great crested newts (Figure 11) with a mean of 4.1 per project (S.D. = 2.43, range = 1 – 10, n = 71). Capture methods include:

- **Pitfalls** (used for 38, ie 56% projects). Capture of newts with pitfall traps and drift fences (see Figure 12 for details of numbers of pitfall traps used for 36 mitigation projects where information was provided).
- **Fences** (used for 49, ie 69% projects). Drift fencing, either used in conjunction with pitfall traps or by itself for exclusion of newts only (see Figure 13 for lengths of fencing installed on 46 of the projects).
- **Refugia** (used for 26, ie 37% projects). Use of artificial refugia, such as old wooden boards, to attract newts.
- **Netting** (used for 28, ie 39% projects). Sweep netting of ponds, both day and night, for adult and larval newts
- **Bottles** (used for 24, ie 33% projects). Bottle trapping of ponds for adult newts.
- **Hand** (used for 52, ie 73% projects). Hand searching of suitable terrestrial habitat and natural refugia such as logs.
- **Destructive search** (used for 32, ie 45% projects). Final destructive search for newts as development site is being cleared.
- **Draining** (used for 24, ie 34% projects). Search for newts as ponds by gradual draining down of ponds
- **Night** (used for 18, ie 25% projects). Night searches by torchlight for active newts.
- **Egg searches** (used for 1, ie 1% projects). Translocation of aquatic vegetation containing great crested newt eggs. This may also include the deliberate introduction of easily removed artificial egg-laying media.

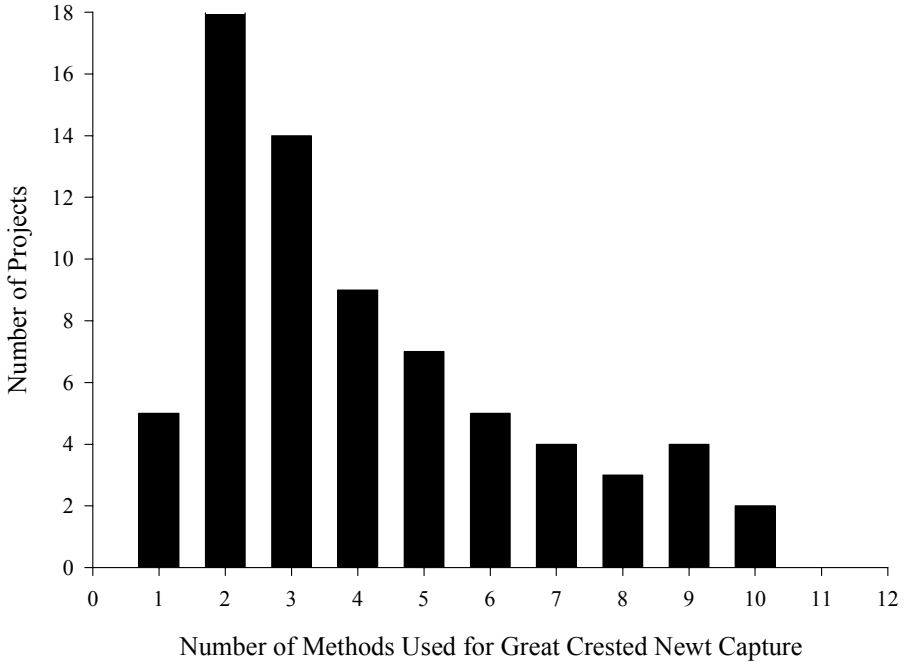

Figure 11. Great crested newt capture methods – frequency of use (information available for 71 projects)

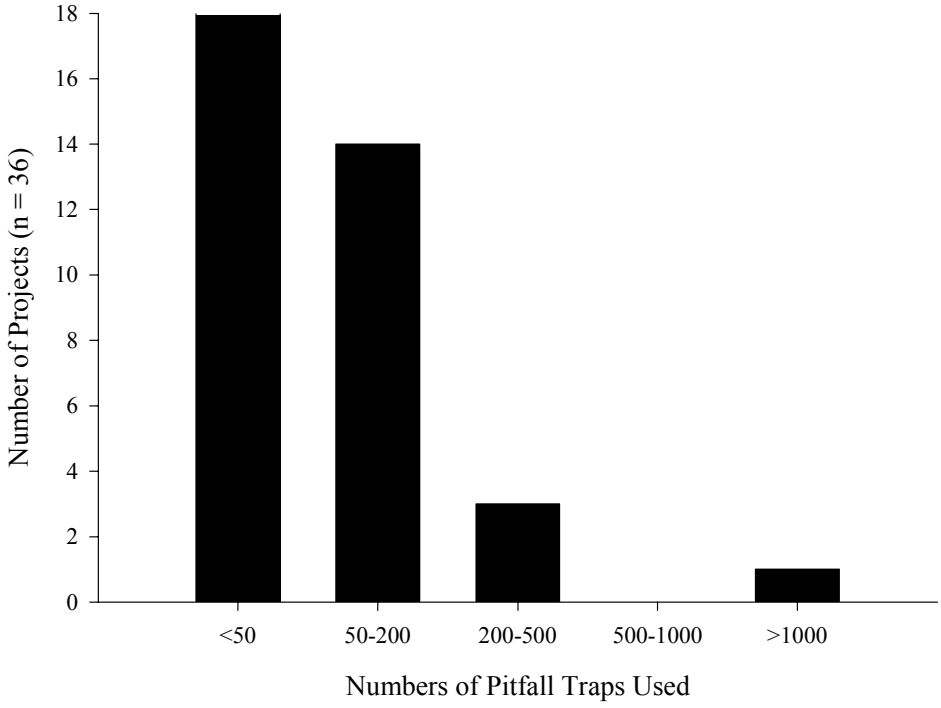

Figure 12. Numbers of pitfall traps used for capture of great crested newts

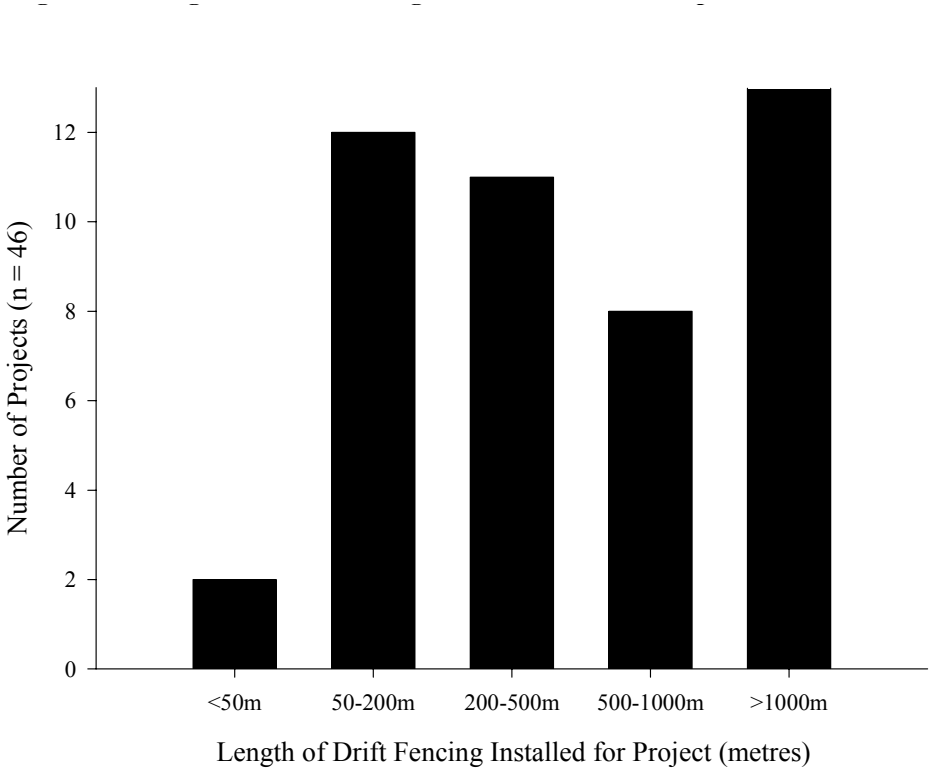

Figure 13. Length of drift fencing used to exclude or capture great crested newts

3.6.2 Numbers of great crested newts translocated

Information about the numbers of great crested newts translocated (non-larval newts only) was available for 139 projects (40.3%) in the licence database, including all those in the questionnaire sample (Table 12). A further eight projects (2.3%) involved exclusion of newts only, therefore none were translocated. Unfortunately, due to a lack of licence returns, no information at all was available for 198 projects (57.4%). A mean number of 171.9 great crested newts per project was moved overall but there was a definite trend for the size of translocations to decline with time. The mean of newts moved from 1990-1994 (358.3 per project) was significantly different from the mean of 109.2 per project between 1995 and 2001 (Mann-Whitney test: n_1=35, n_2=104, U=2707.0, z=4.3, $p<0.001$).

Figure 14 shows the total numbers of newts of all life stages, including larvae, translocated for mitigation projects included in the questionnaire sample only. Where information was available for other project variables, such as total areas of great crested newt habitat destroyed, number of capture methods used, capture effort and overall project effort, these were all found to be correlated with the numbers of non-larval newts moved (Table 13).

Table 12: Summary of numbers of non-larval great crested newts translocated

Year	Total No. mitigation projects	Numbers of Mitigation Projects			Total No. of GCN moved*	Range	Mean No. per project	S.D.
		No info. available	Exclusion only	Info. available				
1990 - 1994								
1990	3	1	0	2	889	9 – 880	444.5	615.89
1991	6	2	0	4	1331	1 – 879	332.8	383.70
1992	6	1	0	5	3561	33 – 2234	712.2	870.88
1993	12	2	0	10	3124	1 – 1571	312.4	540.36
1994	21	7	0	14	3637	1 – 1405	259.8	427.09
Totals	**48**	**13**	**0**	**35**	**12542**	**1 – 2234**	**358.3**	**532.87**
1995 – 2001								
1995	6	3	0	3	155	4 – 86	51.7	42.60
1996	11	4	0	7	408	0 – 308	58.3	114.01
1997	33	15	1	17	603	0 – 148	35.5	50.64
1998	37	17	0	20	2364	0 – 917	118.2	208.76
1999	39	14	2	23	4267	0 – 2140	185.5	501.32
2000	87	62	4	21	3325	0 – 1576	158.3	378.23
2001	84	70	1	13	230	0 – 100	17.7	32.62
Totals	**297**	**185**	**8**	**104**	**11352**	**0 – 2140**	**109.2**	**307.97**
Overall totals	**345**	**198**	**8**	**139**	**23894**	**0 – 2234**	**171.9**	**390.56**

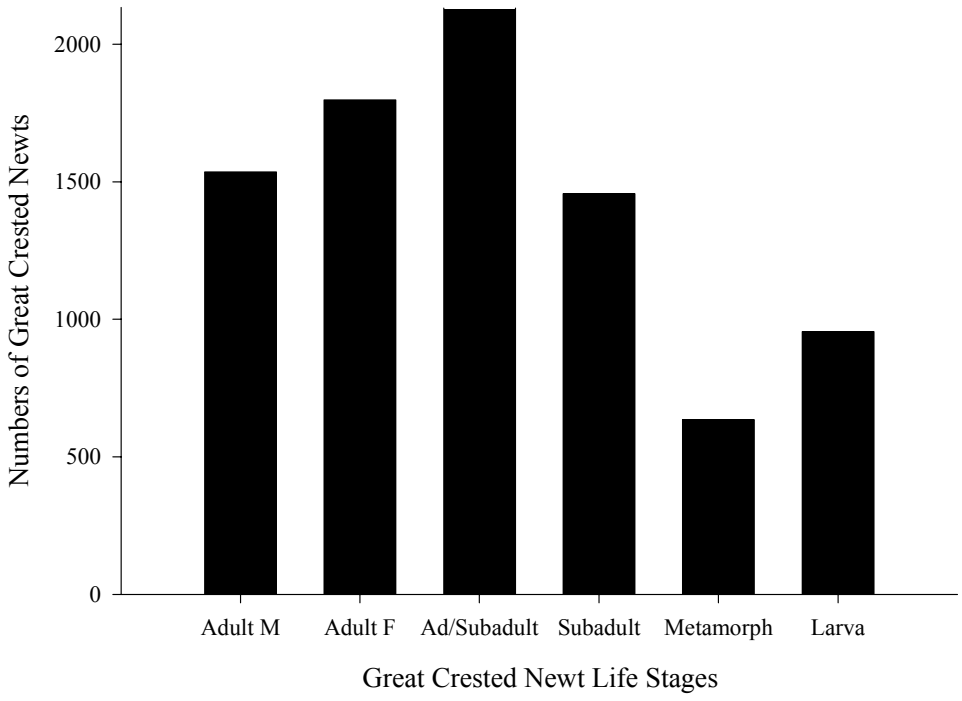

Figure 14. Numbers of great crested newts translocated for sample projects (information available for 65 projects)

Table 13. Correlations between project variables and total numbers of non-larval great crested newts translocated[1]

Project variable correlated with number of great crested newts	n	r_s	95% confidence interval	p	Significant?
Total area of great crested newt habitats destroyed by development	41	0.5862	0.3314 to 0.7613	<0.0001	Yes
Number of great crested newt capture methods used for translocation	64	0.5415	0.3345 to 0.6987	<0.0001	Yes
Capture effort (work days)	56	0.4683	0.2266 to 0.6556	0.0003	Yes
Overall project effort	25	0.5416	0.1743 to 0.7766	0.0052	Yes

[1] Spearman Rank Correlation (capture and project effort ranked on ordinal scale)

3.7 Location and management of receptor sites

3.7.1 Location of receptor sites

Of the 52 projects for which information is available in the questionnaire returns, only four in-situ receptor sites remain in the middle of development, 20 are on the periphery, 26 outside but adjacent and two within 500 m.

Responses concerning the connectivity of in-situ receptor sites (53 projects) showed that 30 receptor sites retain a continuous connection with other great crested newt habitat, 14 are connected via corridors, six are left with poor connections and three sites are now more or less isolated.

Little information was available for the nine ex-situ receptor sites used for great crested newt translocation. These ex-situ sites were located a mean distance of 10.26 km from the original development sites so there is little chance that these populations (if they survive) are able to reach any surviving great crested newt habitat adjacent to the original development sites. The connectivity of the ex-situ receptor sites with existing newt populations in the immediate area is not known.

3.7.2 Aquatic habitat management

In many cases, no management was carried out during the course of the mitigation project to improve existing great crested newt aquatic habitats on the receptor sites. Figure 15 shows the relative effort involved in projects where some post-development management was actually undertaken (no work was done in 33.7% of cases). Where aquatic management was used, the one-off removal of shade, rubbish and excessive aquatic vegetation were the most frequently employed methods to improve these ponds. In many cases, physical alterations to existing aquatic habitats were also made in conjunction with these improvements (Figure 16), particularly the enlargement, de-silting and re-profiling of ponds.

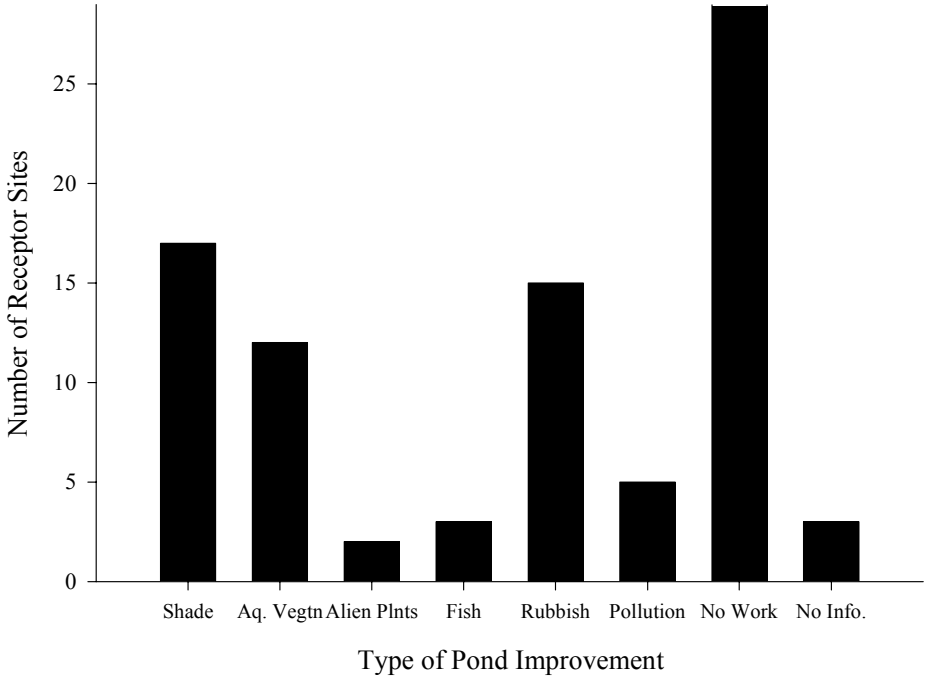

Figure 15. Pond improvements at in situ receptor sites

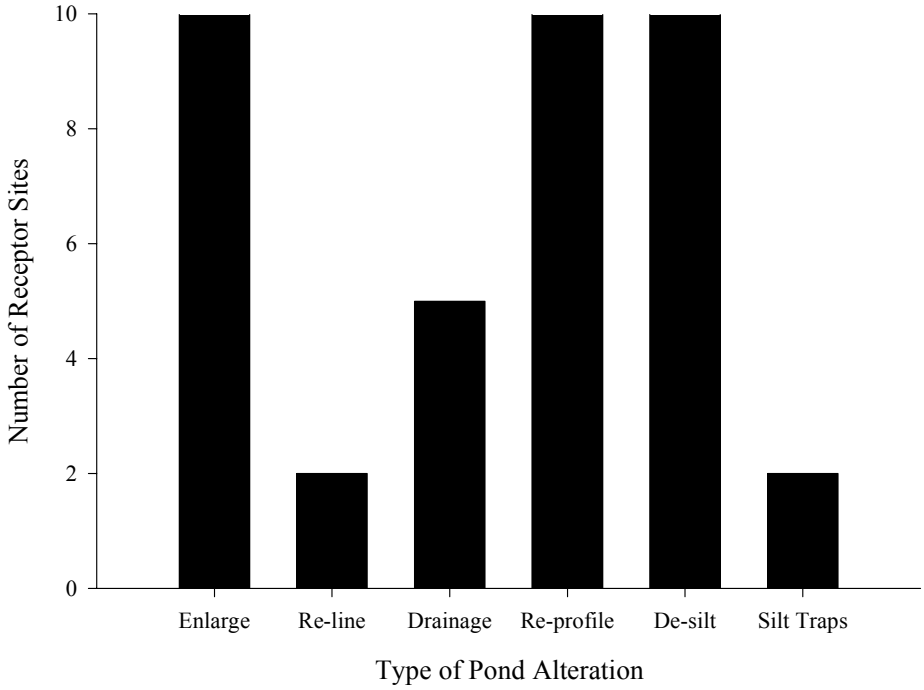

Figure 16. Pond alterations at in-situ receptor sites

3.7.3 Aquatic habitat losses and gains

Ponds on development sites have been avoided by developers in many cases and, most often, incorporated into a receptor site within or adjacent to the development. Figure 17 illustrates the proportion of original ponds retained on development sites in relation to the total numbers destroyed and created in mitigation. The management of, and improvements to, these original ponds has not always occurred (Section 3.7.6). Moreover, where there is a complete

loss to development of ponds used for breeding by great crested newts, it is generally recommended that twice as much aquatic habitat is created in mitigation to achieve a conservation gain for this species (eg English Nature, 2001). In theory, this doubling of available aquatic habitat should include both the numbers of ponds and, more importantly, the overall areas and volumes of the ponds created in mitigation (inadequate information was available about pond depths so volumes are not considered here). Clearly, however, this has only happened in rare cases and the creation of new aquatic habitat has often fallen well short of parity, especially in terms of pond areas (Figure 17 and Table 14).

For analysis purposes, ponds were classified as 'confirmed great crested newt ponds' and 'all ponds on development site'. The latter category may include an unknown number of ponds that contain great crested newts but which were not confirmed during surveys. In both categories, about half of the ponds on the development sites were destroyed (Table 14). Of those that remained, less than half were subject to any form of enhancement. The number of new ponds created slightly exceeded the number of great crested newt ponds lost but did not compensate for the total number of ponds lost. Moreover, newly created ponds were usually smaller than the ponds that were destroyed during the mitigation, and the area of aquatic habitat gained did not compensate for the area of great crested newt aquatic habitat lost.

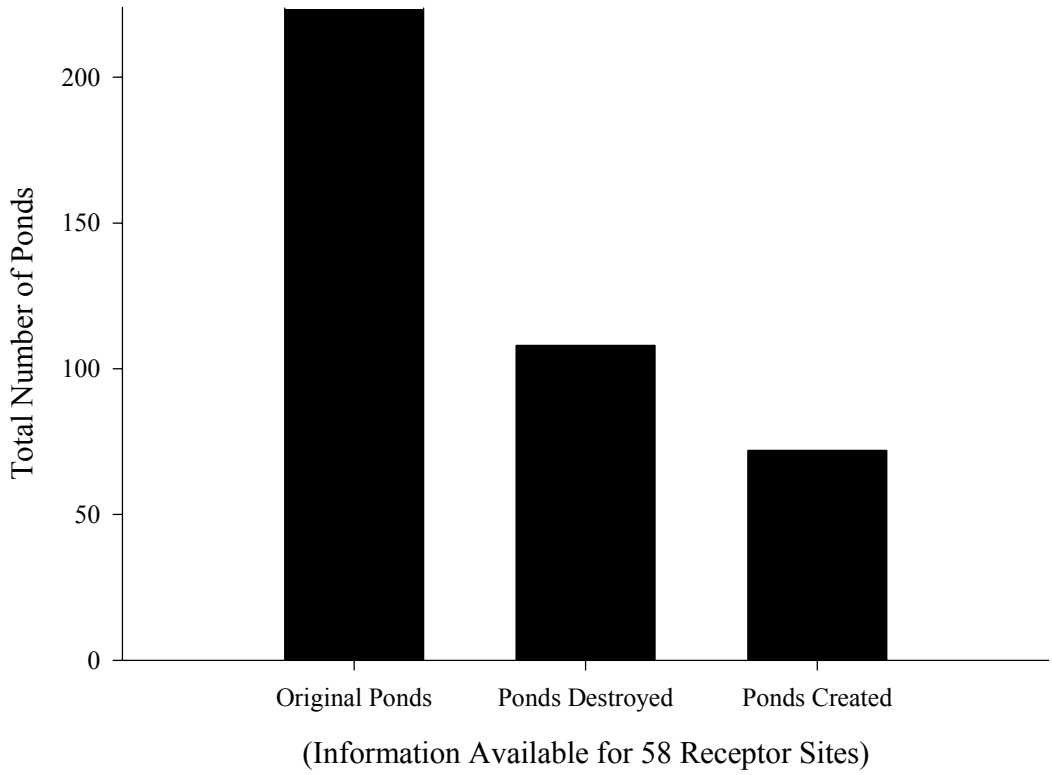

Figure 17. Aquatic habitat creation on in-situ receptor sites

Table 14. Comparison between ponds destroyed by development and ponds created in mitigation

	All ponds on development sites	All ponds destroyed by development	No. confirmed GCN breeding ponds only[1]	GCN ponds destroyed by development	New ponds created in mitigation[2]
Numbers of ponds					
Total number	243	123	115	59	74
Mean no./site	3.7	1.9	1.9	1.0	1.2
S.D.	5.88	5.30	3.39	3.29	1.64
Range	0 – 31	0 – 31	0 – 25	0 – 25	0 – 7
No. of sites	65	65	60	60	60
Surface areas of ponds[3]					
Mean area (m^2)	809.4	738.4	804.4	340.0	196.8
S.D.	2349.90	1792.20	1829.10	527.22	416.35
Range (m^2)	1 – 20800	1 - 11200	2 - 11500	2 - 2400	4 – 3000
No. of ponds	154	56	74	23	65
Mean area/site[4]	2955.6	2130.0	1656.3	494.4	381.3
S.D.	9289.70	4612.90	2992.20	891.80	621.81
Range (m^2)	3 – 59225	3 – 20545	3 – 13580	3 – 2781	4 – 3000
No. of sites	42	24	35	16	32

[1] This does not imply that the remaining 128 original ponds on the development sites were not used as questionnaire returns indicate that great crested newts may have been breeding in at least a further 57 of these ponds (unconfirmed information excluded from table).

[2] Includes two ponds created on two separate ex-situ receptor sites, as well as 72 created on 34 in-situ sites.

[3] N.B. the numbers of ponds with surface area information provided is less than the total numbers of ponds.

[4] Mean pond area/site only includes those sites for which this information was provided

3.7.4 Terrestrial habitat management and creation

A range of methods was employed to improve existing terrestrial habitats at receptor sites (Figure 18). The building of artificial hibernacula was the most often used means of enhancing sites for the newts. The planting of trees and shrubs, and seeding of rough grassland, were also frequently employed. However, no information is available with which to compare the areas of new terrestrial habitat improved and created to those lost to development, and it is also impossible to determine the quality of this habitat or its subsequent use by great crested newts.

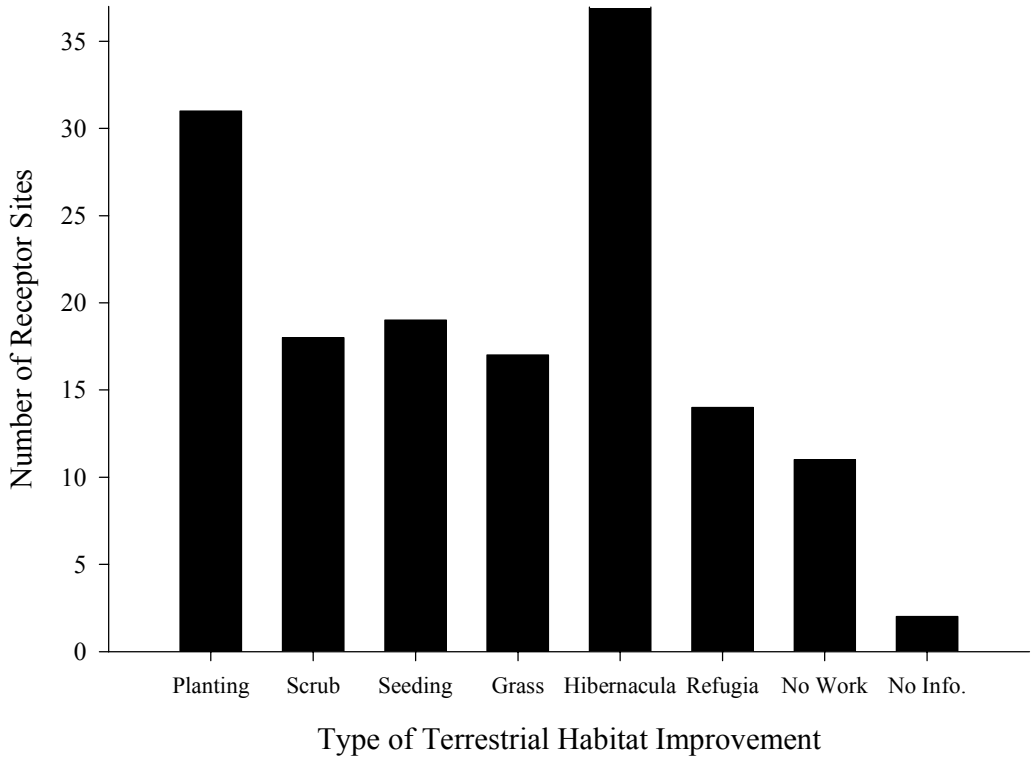

Figure 18. Receptor site terrestrial habitat improvements

3.8 Post-development monitoring

3.8.1 Monitoring agreements and monitoring methods

For the 72 projects for which information was supplied about post-development monitoring, only 35 (48.6%) included an agreed monitoring period (Figure 19). Moreover, a monitoring period of five years or more was only agreed for 21 mitigation projects (29.2%). A range of methods was used where post-mitigation surveys were carried out (Figures 20, 21). The 30 projects where monitoring was not done include four development sites where no newts were translocated. Some monitoring was carried out on two of the sites in the 'no information' column of Figure 19, but limited results only were provided for the first monitoring year of one of these and the agreement periods for both are unknown.

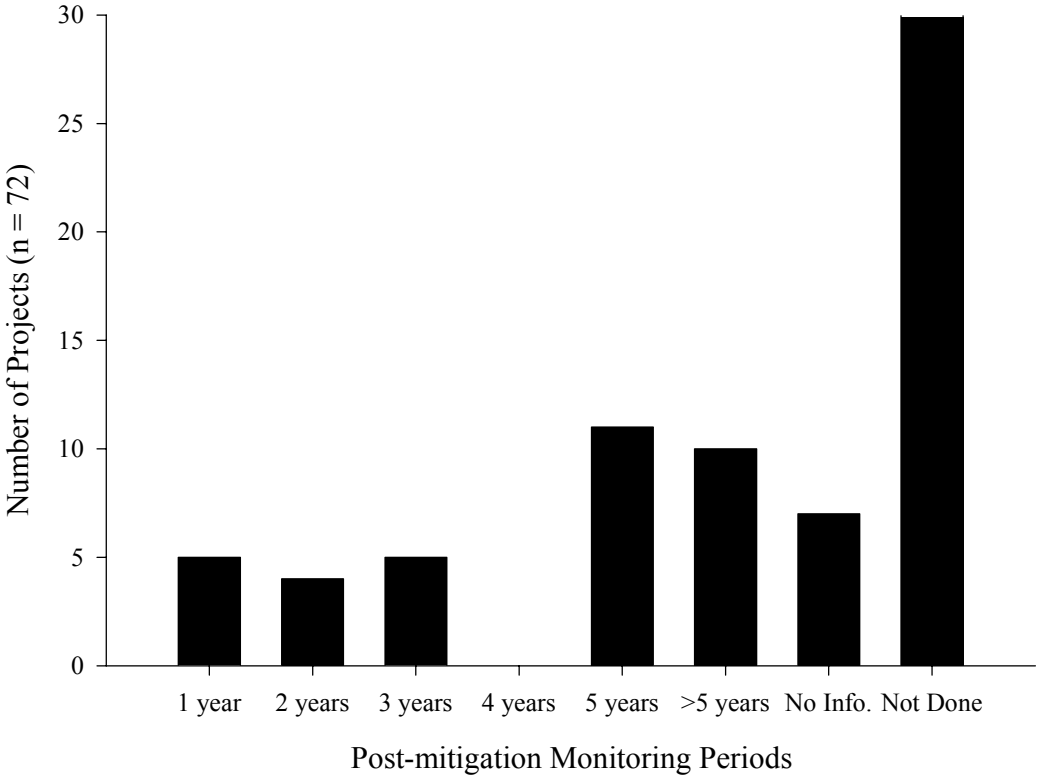

Figure 19. Agreed post-mitigation monitoring periods

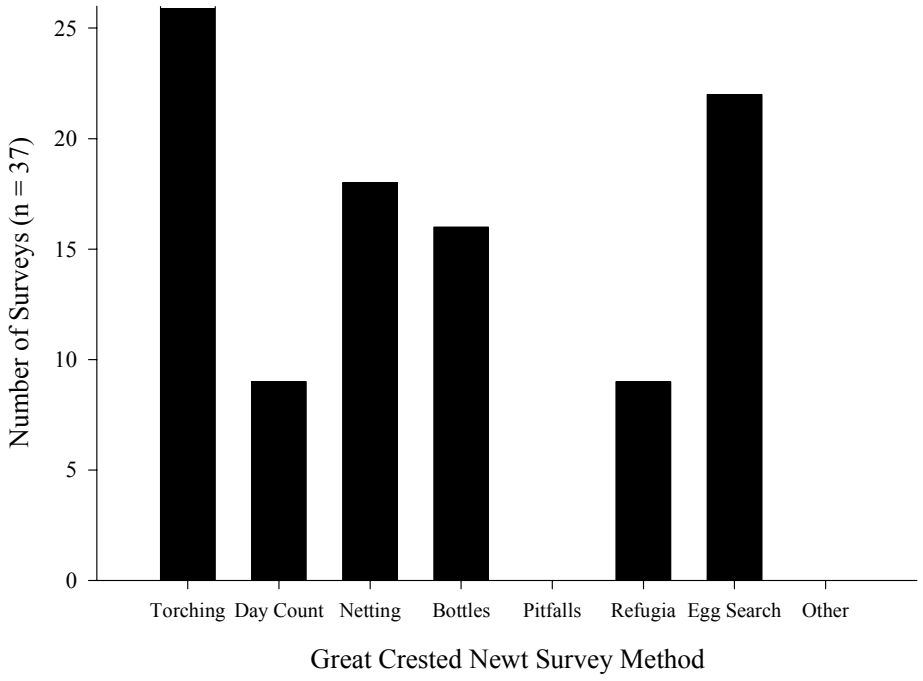

Figure 20. Methods used for post-mitigation surveys

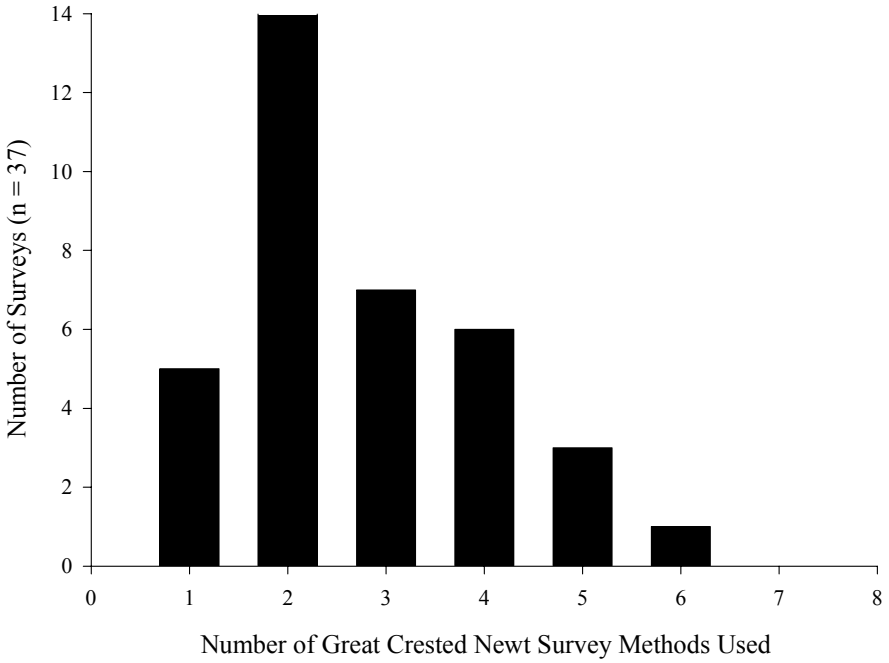

Figure 21. Post-mitigation survey methods – frequency of use

3.8.2 Monitoring results

For those mitigation projects where some post-development monitoring was carried out, results were provided in varying degrees of detail for 36 projects (ie 50% of returns) in total (35 projects plus one with fairly limited information). A mean of 2.14 seasons of monitoring were carried out for these projects. Numbers of newts were only supplied for 32 projects, with a mean number of 63.1 great crested newts recorded per season over the entire monitoring period. Table 15 shows the results of post-development monitoring for these 32 projects. Adult newts were observed at 87.5% of sites one year after the development with breeding confirmed at 56%. The number of receptor sites surveyed rapidly drops off after the first year and, although newts were still present (and breeding) in those ponds being monitored beyond this, it is impossible to know if newts successfully established themselves on the other sites.

Table 15: Post-development monitoring results

	Year 1*	Year 2	Year 3	Year 4	Year 5
Number of receptor sites surveyed per year of monitoring	32	13	7	5	3
Number of receptor sites with adult great crested newts recorded	28	12	6	5	3
Number of receptor sites with great crested newt eggs recorded	18	7	6	4	3
Mean number of adult great crested newts recorded per year	61.7	18.3	14.3	25.4	34.0
Standard Deviation	158.46	22.04	13.65	26.97	40.37
Range	0 – 848	0 – 74	0 – 31	3 – 70	1 – 79

* Year 1 refers to the first year that monitoring took place after the completion of development

A comparison of pre- and post-development monitoring results was attempted from the available data but has not been included here for a number of reasons. Firstly, available data was limited by the number of returns where this information was actually provided in full for both periods in the same questionnaire. Secondly, the monitoring methods employed were often not directly comparable for the two periods, with less comprehensive monitoring (using fewer methods) generally being carried out after development than before. Thirdly, information was not always broken down by individual ponds and it was difficult to compare monitoring effort where the numbers and sizes of ponds had changed. Although this comparison was seen as important to this study, the very limited data available rendered such an analysis rather meaningless. Clearly, it would be very useful to standardise pre- and post-development surveys in the future so that more reliable comparisons can be made.

Post-development monitoring reports were produced by consultants for all 35 mitigation projects where this work had been done to some extent. Although most were presumably submitted to the developers who paid for them, only 15 (42.8%) were sent to English Nature HQ in Peterborough and seven (20%) to the relevant local English Nature office. Only ten reports (28.8%) were sent to Defra. However, since many of these projects took place prior to the change in the licensing system and licence tracking is now more rigorous, this figure has undoubtedly risen. Moreover, some of the projects licensed by Defra may be ongoing and not yet completed. In addition, local planning authorities received these monitoring reports in only five (14.3%) cases and local biological records centres in a mere four (11.4%).

3.9 Post-development management

3.9.1 Management agreements

Virtually no information is available about post-development management of receptor sites simply because it was often either neglected, or – apparently – not required. Of the 72 mitigation projects examined, the state of post-development management included:

- required management not done at all – 32 projects (44.4%);
- management planned to be done by others – 10 projects (13.9%);
- management to be carried out by consultant – 9 projects (12.5%);
- management not yet agreed – 7 projects (9.7%);
- management not required (eg pipelines or no GCN translocated) – 5 projects (6.9%);
- information not available – 9 projects (12.5%).

For those projects for which information was provided, Figure 22 shows the agreed periods of post-mitigation management.

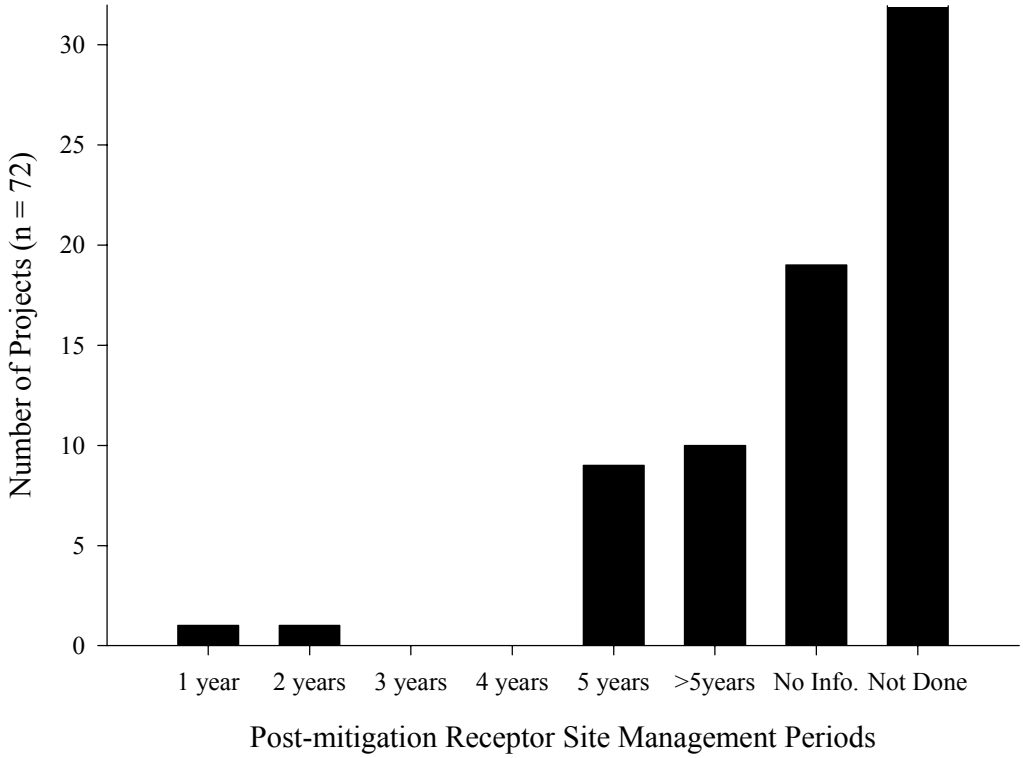

Figure 22. Agreed post-mitigation receptor site management periods

3.9.2 Management responsibilities

The responsibility for carrying out post-development management was reported for 48 projects and these include:

- the original developer (and presumably new consultants) – 24 projects (50.0%);
- the current consultant – 9 projects (18.6%);
- new site owner – 5 projects (10.4%);
- local planning authority – 4 projects (8.3%);
- Local Wildlife Trust – 1 project (2.1%);
- A specially created body – 1 project (2.1%);
- other bodies – 2 projects (4.2%);
- no clear responsibility – 2 projects (4.2%).

However, it seems clear that the work is unlikely to have taken place in many of these cases and the fate of the remaining 25 receptor sites (which includes two ex-situ sites for one project) is even more uncertain.

3.10 Problems encountered

3.10.1 Before or during mitigation project

Licence holders encountered a range of problems both before and during mitigation projects. This section of the questionnaire was completed by respondents for 68 projects and, of these, 32 (47.1%) complained that insufficient time had been allowed for pre-development assessments of great crested newt populations and planning of mitigation work. During the translocation of newts and receptor site preparation the following problems were also reported:

- damage to great crested newt donor sites – 18 projects;
- general vandalism to sites and equipment – 18 projects;
- great crested newts ignored by developers – 17 projects;
- insufficient time allowed for capture of newts – 10 projects;
- deliberate sabotage of sites and equipment – 8 projects;
- damage to great crested newt receptor sites – 4 projects;
- conflicts with other protected species – 3 projects.

Additional comments were also made about a range of further problems and some of the commonly raised comments are listed below. We should emphasize that although these are the views of some of the respondents, they are not necessarily representative of the overall body of respondents, or of the authors or English Nature:

Uncooperative or disinterested developers.

Problems with landowners, LPA and incompetent English Nature staff.

Bad advice from County Ecologists and the loss of a good County Ecologist.

EIAs missed great crested newts or identified good ponds as unsuitable.

No reference to external controls.

Lack of existing GCN data.

Delays in receiving Defra licences.

Inadequate receptor site for GCN in LPA/English Nature plan.

Various legal actions.

Inevitable problems caused by last minute rescue projects.

Poor communications with contractors and inexperienced/insensitive contractors.

Parts of sites sold off during projects, problems with different ownerships of receptor sites.

Loss of small mammals in pitfall traps.

Foot and mouth disease.

Gulleypots installed against advice.

Original planned ponds not being created.

Ground clearance started before GCN even discovered.

Contamination of ponds, including a diesel spill, preventing newt surveys.

Construction work stopped GCN migration and stranded newts.

Publicity resulted in large number of people collecting newts during the project.

Fly tipping by local residents during project.

Removal of drift fences and destruction of equipment (including a JCB).

Other developments on the same industrial estate did not consider GCN, client unhappy.

No time allocated to receptor site preparation.

Presence of fish not ascertained in advance.

Weather and ground conditions.

Serious conflicts with archaeologists and archaeological interests.

3.10.2 After mitigation project

This section of the questionnaire was only completed for 46 projects (63.9%), presumably because so little post-development management had been done that many respondents had had no further involvement with the receptor sites. Of the problems listed, the following were reported to have occurred after receptor site preparations and newt translocations had finished:

- no management at all – 16 projects;
- no funding provided – 16 projects;
- no monitoring of great crested newts – 13 projects;
- fly tipping onsite or in ponds – 7 projects;
- drying up of ponds on receptor site – 7 projects;
- introduction of fish to ponds – 6 projects;
- poor management – 6 projects;
- introduction of alien plant species to ponds – 4 projects;
- problems caused by dogs in ponds – 4 projects;
- succession effects – 3 projects;
- pollution of ponds – 2 projects;
- general public access problems – 2 projects;
- illegal collection of great crested newts – 1 project.

Additional post-project problems mentioned by respondents also included:

No requirements for any follow up work.

English Nature/LPAs not supervising planning conditions relating to wildlife.

Lack of clarity between LPA and others over future control of site.

Problems with dealing with more than three groups/organisations.

Receptor sites subsequently threatened or destroyed by more development/quarrying.

GCN translocation taking place but no development, future of ponds now uncertain.

Problems with pond holding water.

Water table decreasing post-development.

Turbidity and algal blooms in ponds.

Crassula helmsii introduced.

Continued heavy grazing of receptor site by cattle.

Owners trying hard not to fund any agreed monitoring at all.

Monitoring having to be done voluntarily.

3.11 Views and comments on mitigation practice

The last section of the questionnaire (Appendix I) provided respondents with the opportunity to comment on various issues relating to great crested newt mitigation. Perhaps not surprisingly, far fewer observations were made about actual newt translocations, or pond and habitat management techniques, than about aspects of projects that are outside the direct control of consultants. A full list of the comments provided is listed in Appendix II, while a general summary of the most frequently arising issues is given here. It is important to emphasize that the respondents were invited to provide comments under specific headings and that the number of responses on different issues may be a reflection of this. Overall, the most frequently arising comments within the responses were:

(1) The time it takes to obtain a licence is too long and the licensing procedure is too complex (12 respondents).

(2) Better guidance needs to be provided to mitigation practitioners and developers (10 respondents).

(3) Better post-development monitoring and inspection needs to be implemented on mitigation projects (9 respondents).

(4) Better briefing and training needs to be provided for LPAs and English Nature staff (6 respondents).

It was obvious from the responses that there are also widely differing views on some issues. For example, whereas some respondents called for more comprehensive mitigation guidelines, others suggested that they be simplified. Some respondents suggested that the mitigation process could be streamlined by allowing consultants greater freedom to decide upon the necessary activities; others considered incompetence among consultants to be a problem, and suggested greater regulation. Many of the responses provided comments that were project-specific, and which are difficult to embrace within a general framework, emphasizing the diversity in the types of issues that mitigation projects are likely to encounter. On a scale of 1 (useless) to 5 (invaluable), the current mitigation guidelines scored an average (±SD) of 3.8±0.85 (n=19), indicating that they were generally considered useful.

Although not explicitly asked to comment on whether they considered the mitigation project with which they were involved to be 'successful' in terms of planning and execution, only two respondents indicated that their mitigation projects had gone well. Indeed, the vast majority of respondents expressed reservations about current practice in mitigation planning and execution. Interestingly, respondents were not generally optimistic about the fate of great crested newt populations even in the absence of mitigation and development (Figures 23, 24). Just over half were of the view that the population would be 'stable' in the absence

of development, while over a third considered that the population would decline or go extinct whatever happened. However, some 80% of respondents were of the view that the population would decline or go extinct if development proceeded without any mitigation. Only 28% of projects received any wider publicity. However, about 86% of the publicity received was positive, highlighting that newts had been conserved or development delayed.

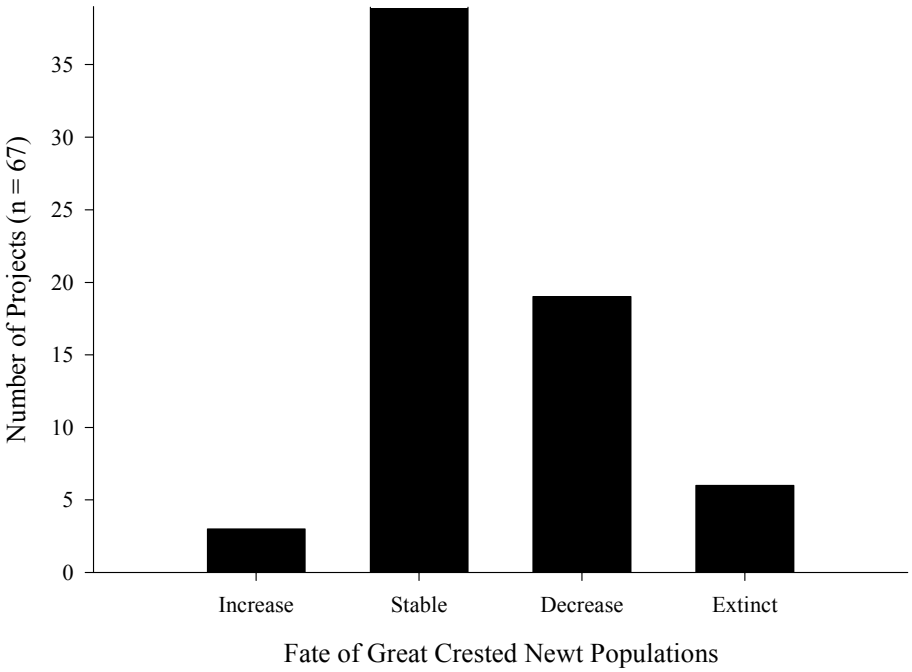

Figure 23. Predicted fate of sample populations with no development

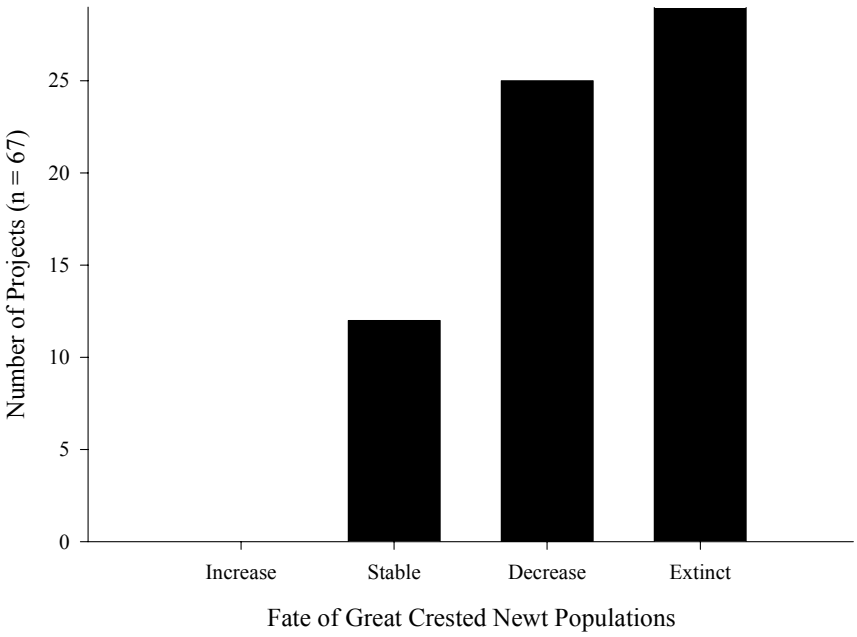

Figure 24. Predicted fate of sample populations with development but no mitigation

4. Discussion

4.1 Great crested newt mitigation procedures

4.1.1 Licensing and the planning process

Some respondents expressed frustration about the length of time taken to process licence applications, especially when only minor amendments are being made to an existing proposal. Clearly, many consultants face considerable pressure from developers to minimise delays. On the other hand, the dramatic proliferation in recent years in the number of great crested newt mitigation projects, without a corresponding increase in resources to deal with licence applications, has obviously put a serious strain on the Defra and English Nature staff concerned. However, if some of the issues concerning mitigation are to be resolved, the licensing agencies will require more details than have been supplied in the past so that project proposals can be assessed rigorously. Equally, it will be impossible to assess the success (or otherwise) of mitigation projects unless procedures are in place to ensure that a much higher proportion of projects can be adequately monitored.

Perhaps the most unsatisfactory aspect of the licence database held by English Nature remains the very poor return rate of reports of work undertaken under the licence. This loophole may now be closed as Defra have now implemented a policy of follow-up reminders. As the results of this project underline, it is very difficult to produce appropriate recommendations as to how mitigation practice may be improved if data on past mitigation projects is unavailable. The prospect of local planning authorities taking over the issuing of mitigation licences caused some concern among respondents, although a few considered that this might actually improve licensing procedures. Concern was also expressed about the possibility of licences being issued directly to developers, since this was seen as losing all external control of mitigation projects, and it was strongly felt that the licence holder should always be an independent consultant.

One problem encountered during large mitigation projects was the confusion created by complex development sites consisting of numerous plots (with more than one site name often being used) and involving several different developers and ecological consultants over long periods of time. In such cases it is usually not possible, at least under the current licensing system, to readily determine what is happening in terms of mitigation for the population as a whole. Indeed, reports of developers carrying out expensive mitigation work on one plot while little is being done for great crested newts on an adjacent plot were not uncommon. Although the reasons why a licence is required are now clearly laid down within the legislation and current mitigation guidelines (English Nature 2001), how these are interpreted varies. Not all development schemes may involve licensable operations, but some consultants may still apply for a licence as a precautionary measure. On the other side of the coin, some habitat management techniques that involve disturbance to a great crested newt 'resting place' would require a licence. Improving consistency in the interpretation of the law and its enforcement would go some way to resolving such issues.

It is obviously extremely difficult to reconcile mitigation for nature conservation with the planning process, not least because of the different timescales involved. In many cases, however, the presence of great crested newts was determined far too late in the planning process, rendering the design and implementation of effective mitigation projects all but

impossible. Very few formal Environmental Impact Assessments have been carried out at sites where great crested newts occur (and the newts have sometimes been missed by an EIA) but even the most basic nature conservation assessment of sites is often neglected. Likewise, the enforcement of Section 106 agreements and other planning conditions has not always been a priority. In addition, the relevance of the 'sustainable development' agenda to great crested newt mitigation, although this is clearly directly apparent, has been confused by varying interpretations of what this means.

4.1.2 Pre-development assessments and design of mitigation projects

The reliable assessment of great crested newt populations has clearly been problematic prior to many developments. Causes appear to be a combination of inadequately funded survey effort, the timing of developments and, occasionally, a lack of expertise. Particular concerns involved a perceived lack of flexibility in the current guidelines, and in the system as a whole, plus alleged inconsistency in the quality of advice received from English Nature local offices.

Simple counts of newts – especially torch counts – remain the most widely used method of assessing the status of newt populations both before and after developments. With qualification, such counts may provide a very general indication of population status (ie perhaps whether a population is 'small', 'medium' or 'large'), which may be adequate for conservation purposes. However, simple counts cannot provide a direct measure of population size as they are not adjusted for detection probabilities. This renders them unreliable as population estimators even when standard methods are used or correction factors applied (Schmidt, 2003).

There are two general problems associated with interpreting simple counts as a measure of population status. Firstly, the number of newts counted may depend very much on the nature of the site being surveyed. Torch counts, for example, are heavily influenced by aquatic vegetation and turbidity. This could result in some populations of newts being severely under-counted, or perhaps missed all together. Second, detection probabilities vary between recorders, between sites and temporally within the same site. Even with rigorous standardization, this can make even gross comparisons between different populations – or between counts of the same population done at different times – problematical. The present results suggest that a rigorous comparison of the number of newts pre- and post-development is difficult, as in many cases, different or non-standardized methods have been used before and after development, and the sites surveyed may have had different sensitivities to the methods used. Better standardization of pre- and post-development surveys might improve our knowledge of the fate of great crested newts during mitigation.

Attempted translocations of entire newt populations appear to be declining in relation to in-situ population management. Although there is no legal obligation to ensure that a substantial proportion of the newt population will be translocated, data emerging from such studies would be extremely useful for conservation purposes. This can only be achieved by a systematic population study involving mark-recapture analysis or depletion modelling. Given that the average mitigation project probably costs between £15,000-£20,000, such studies are not necessarily expensive, and we would encourage future projects to consider them if appropriate as the information gained would substantially benefit future mitigation practice.

4.1.3 Translocations and exclusions

Despite the fact that the number of mitigation projects has increased considerably in recent years, the number of great crested newts translocated per project has declined. Indeed, on average, over three times as many newts were translocated per project between 1990-1994 as there were between 1995-2001. There may be several reasons for this change. As the trends in in-situ and ex-situ projects confirm, there has been an increasing tendency to manage great crested newts within – or adjacent to – development sites. This has resulted in smaller numbers of animals needing translocation and relatively fewer projects involving population-wide translocations. Equally, with greater survey effort in recent years, it is possible that more of the smaller populations are being identified and embraced within mitigation practice. The decline in the number of newts translocated is unlikely to be related to a decline in survey effort, as it appears that a greater diversity of survey methods is now being used than ever before. This was supported by the fact that there were overall positive correlations between the numbers of newts translocated and the area of habitat destroyed, the number of survey methods used, the number of days spent capturing newts and overall project effort.

Clearly then, the bigger the scale of the project and the greater the survey effort, the larger the number of newts translocated. This does not necessarily imply that larger numbers equates to a more effective mitigation project – it is likely that many newts remain uncaptured and are killed by the subsequent development work in many projects. Although many mitigation exercises involve translocations that are based around a component of a wider population, in many cases the numbers of newts translocated per project in recent years are rather low, particularly when compared to estimates of actual population sizes derived from other studies (eg see review by Arntzen & Teunis, 1993), which themselves may be biased towards smaller populations. Moreover, it is difficult to relate the numbers of newts translocated to the sizes of the pre-development populations for several reasons. Firstly – and as alluded to above – the survey methods used before, during and after the developments were often not standardized, making comparisons problematical. Secondly, as only a single study used mark-recapture analysis to estimate the population size, the actual numbers of newts present are not known in the vast majority of cases. Thirdly, in many follow-up surveys it is difficult to distinguish between translocated newts and those that have colonized the receptor site naturally. And fourthly, the short-term nature of most follow-up surveys makes the assessment of 'success' difficult.

4.1.4 Post-development monitoring and management

Whereas most respondents understood the importance of post-development monitoring and management, it is obvious that it has been difficult to get commitments from developers to resource such activities, or to honour agreements even when resources have been committed. Financial constraints, inadequate guidance, weaknesses within the legislation and lack of support from English Nature officers were all cited by respondents as reasons why post-development monitoring and management have been inadequate.

A previous review by Oldham & Humphries (2000) of 178 translocations carried out between 1985 and 1994 showed that in more than half the cases there was insufficient evidence for judging success. This observation is borne out by the present study. Using the liberal criterion of the presence of a population one-year after the translocation, Oldham & Humphries (2000) classified 37% of cases 'successful' and 10% 'unsuccessful'. However, it is important to qualify what can be defined as 'success'. Dodd & Seigel (1991), for example,

point out that the presence of breeding individuals at a site cannot constitute 'success' unless there is evidence that the population is stable. Unfortunately, few translocation programmes have been able to carry out long-term post-development monitoring, making it difficult to judge whether the translocation of newts has resulted in the establishment of viable populations. In some cases it possibly has, while in others it probably has not. Despite the very low number of studies in which long-term monitoring has been carried out, it is clear that newts have been observed at receptor sites for up to five years post-development. What is less clear is whether these animals are present as a result of the translocation or whether they colonized the receptor site naturally. These problems are illustrated by Cooke's (2001) study of a translocated population in Cambridgeshire. Six years after the translocation of 38 great crested newts, torch counts failed to reveal the presence of any newts. However, after eight years the population started to increase, although it was not clear whether this was due to an existing population growing, natural recolonization or another unrecorded translocation (Cooke, 2001). Encouragingly, the present study showed that most receptor sites seemed to be connected to wider great crested newt populations, so natural colonization is certainly possible. Identification of individual newts combined with long-term monitoring would be needed to identify the relative roles of natural colonization and translocation in population establishment and development. Such data would assist the design of mitigation projects by identifying where effort and resources should be best channelled.

There was no post-development site management in over half of the mitigation projects surveyed. In some cases, this may have been because management was unnecessary (eg, in pipeline projects where the habitat is restored after the mitigation) or because no newts were translocated. Where management was apparently agreed, the responsibility was often passed over to another party. Delegation of such responsibility can lead to communication problems and a mechanism for following up on agreements made by the developer would help ensure that post-development monitoring is carried out on schedule.

A comparison needs to be made between 'good' (ie mitigation cases that have followed recommended guidelines closely) and 'not so good' (ie mitigation cases that have encountered problems) case studies, with a view to further elucidating those factors that are important in establishing viable populations of newts.

4.2 Overall effectiveness of great crested newt mitigation projects

4.2.1 Adherence to legal obligations

As Harrop (1999) points out, the emphasis of UK and European legislation on single species, coupled with a failure to address comprehensive inter-species and habitat relationships, has frustrated the comprehensive preservation of biodiversity. These concerns are reflected in the legislation afforded to protect great crested newts. For many great crested newt mitigation projects the mitigation work commissioned is often the minimum required to meet legal obligations. Clearly, without better planning some projects will continue to involve, at best, a minimum amount of necessary mitigation work that is unlikely to have conservation benefits or maintain 'favourable conservation status'.

Conversely, in the case of very small great crested newt populations living in marginal habitat, adhering to the letter of the law may involve huge expense for the developer, again with little conservation gain for the species. From an ecological viewpoint, it may be more cost-effective in such cases to use the resources that would otherwise be devoted to

mitigation to create new great crested newt habitat in a more promising area elsewhere. However, it would be difficult to set such a precedent under the current legislative framework.

A further issue is that habitat creation and management, as well as post-development monitoring of the receptor sites, are often not seen as priorities once the newt translocation has been completed, even when these have been agreed in advance. Section 106 agreements and other planning conditions are often neglected and the ultimate fate of the newt populations concerned is therefore often uncertain

In addition, information about a substantial number of past mitigation projects is not available simply because many consultants and other licensees have not sent in licence returns. Although some may well have been forwarded to local English Nature offices, rather than to the licensing office in Peterborough, there has been a severe lack of reporting on great crested newt mitigation projects in general. This situation is now improving, as Defra have a policy of actively pursuing the submission of reports that are overdue.

4.2.2 Meeting great crested newt ecological requirements

Since post-development monitoring and management are frequently neglected, there have been few scientific studies following up on specific translocations (but see Oldham & Humphries, 2000; Cooke, 2001). Because of the variability in the design and execution of mitigation projects – and the fact that mitigation projects are not designed to test explicit hypotheses concerning ecology – this project has been unable to shed much light on the effectiveness of mitigation projects in meeting great crested newt ecological requirements.

In general, it seems that receptor sites have been reasonably well chosen, at least as far as project constraints allow, and pre-development preparation work appears to have been mostly undertaken according to the mitigation plan. The increasing trend to select in-situ receptor sites is to be welcomed as newt populations are potentially more likely to survive in the immediate vicinity of their former habitat and breeding ponds than when they are translocated to a distant ex-situ site. Encouragingly, at most receptor sites connections to appropriate adjacent great crested newt habitat have been maintained. Sites completely isolated by development – where great crested newt populations are probably doomed to extinction in the long term whatever the size of the population (Griffiths & Williams, 2000) – are thankfully rare.

A metapopulation structure may be important to maintain viable great crested newt populations (eg Swan & Oldham, 1993; Miaud and others. 1993; Griffiths, 1997), and well-designed new ponds may be readily colonized providing they lie within the dispersal distance of an existing population and the intervening terrestrial habitat favours dispersal. The survey showed that pre-existing ponds retained within the development have frequently been improved by management activities such as the reduction of shade, fish removal and control of invasive aquatic plants. Ponds on urban fringe receptor sites, however, may suffer abuse, dumping, introduction of exotic plants and animals, public access pressures (particularly disturbance by dogs), damage to butyl pond liners and pollution.

Pre-development terrestrial habitat creation typically entails the seeding of grassland, in some cases with additional planting of scrub/woodland. Existing habitat improvements predominantly involve the construction of artificial hibernacula. Although data are lacking to

show that this improves great crested newt survival it may well be beneficial. However, post-development management of terrestrial habitat (as well as ponds) has not been undertaken in a large number of cases so the long-term survival of many translocated newt populations is questionable.

There sometimes appears to be a basic lack of clarity about what great crested newt mitigation projects are trying to achieve. When looking at the context of any development, there needs to be some target to work towards and against which the impacts on great crested newts can be assessed. This would also be valuable for setting mitigation objectives and meeting great crested newt ecological requirements. A sequential approach to assessing a project should be independent of whether a licence is required but nonetheless essential in determining if a licence should actually be granted.

4.2.3 Enhancing great crested newt conservation status

Derogations under Article 16 of the Habitats Directive require that there is no detriment to the maintenance of the populations of the species concerned at a favourable conservation status (FCS). In the UK there is no explicit definition of, or appropriate means of assessing, FCS for great crested newts (a species on both Annexes II and IV of the Habitats Directive), let alone a mechanism for ensuring it is being maintained or enhanced through mitigation projects. Deriving a workable definition of FCS that embraces the concept of maintaining viable populations (eg Griffiths & Williams, 2000; Griffiths, 2004), is therefore urgently needed for the great crested newt in order to provide more meaningful mitigation targets.

However, interaction between the concept of FCS and the requirement from Article 12 of the Habitats Directive to implement a 'system of strict protection' is not fully clear, even though obligations towards conserving populations of great crested newts are explicit within the Directive. The application of derogation measures permitted through the Directive – which forms the basis of our licensing system – needs to be examined to ensure that this provides scope for some 'damaging' activities but does not prejudice the maintenance of – or progression towards – FCS for species. This is a difficult area as the requirement to 'strictly protect' and the need to maintain FCS are not necessarily the same. Moreover, there is little flexibility in the system, although there may be scope in Article 16 to allow this – ie through governments defining how they derogate while placing the emphasis on maintaining FCS.

In the current study, the areas of new or improved terrestrial habitat and the numbers and overall sizes of ponds created in mitigation for newt habitats lost to development clearly fall well short of achieving any overall conservation gain for this species. Although many affected great crested newt populations would have probably declined or become extinct without mitigation work (Figure 24), it appears that the conservation status of the species was not enhanced in the majority of cases.

Implicit in many of the mitigation projects was the notion that, with appropriate habitat management and enhancement, a newt population could be maintained (or perhaps even increased) within an area smaller than that which it originally occupied. Modelling population responses to trade-offs between 'habitat area' and 'habitat quality' could be a useful theoretical approach to resolving this issue, as empirical data are lacking on how newt populations fare under such scenarios (but see case study by Cooke, 1997). In the meantime we would urge caution in assuming that populations can be maintained in the long-term within a subset of the original habitat by the simple act of habitat enhancement.

Although the great crested newt is now one of the best-studied amphibians in Europe (eg Cummins & Griffiths, 2000; Thiesmeier & Kupfer, 2000; Krone, 2001), it is clear that designing effective mitigation is severely limited by gaps in our knowledge of many aspects of population ecology and terrestrial habitat related issues. For example, determining such population parameters as carrying capacity, connectivity, dispersal distances and density dependence is difficult and requires long-term study.

Consequently, practitioners and observers of great crested newt mitigation often express frustration at the perceived complexities and weaknesses that lie within the legal framework. On the other hand, the widespread distribution of the crested newt, and its presence in many thousands of ponds in England, often leads to a sense of frustration among developers (who fail to understand why the species warrants such an apparently high level of protection) and, indeed, some conservationists (who believe that scarce conservation resources would be better focused on more threatened species and habitats elsewhere). Such conflicts are not unusual in species conservation, and it is important that lessons learnt from other taxa - and other parts of the world - are embraced within great crested newt conservation strategy (eg Harrop 1999). Resolving the issues will require a multidisciplinary approach in which all stakeholders are involved.

5. Recommendations

As this report covers the period 1990-2001 and some of the issues raised within this report have been addressed within the current guidelines issued by English Nature (2001), the recommendations below are intended to complement those already in existence:

Recommendation 1. A fully relational database should be established for compiling and managing licence applications and returns. This will allow more streamlined and rapid processing of applications, better cross-referencing (to keep track of projects involving multiple licences and consultants) and automatically generated reminders for reports.

Recommendation 2. Better dissemination of information about great crested newt ecological requirements and mitigation guidelines to Local Planning Authorities and English Nature local teams should be implemented. In particular, specific guidance should embrace:

1. Aquatic habitats. When pond creation is carried out to compensate for ponds loss to development, attention needs to be given to both the number of ponds and the overall area of aquatic habitat. The aim should be to maintain or enhance the overall area of aquatic habitat lost to development by pond creation. This may involve the replacement of one large pond with several smaller ponds, and if so, the total area of small ponds should be commensurate with the area of aquatic habitat lost. However, it is important to ensure that any new ponds are similar in size and quality to those that are known to support great crested newts in the geographical region concerned.

2. Monitoring. Pre-development and post-development monitoring need to be carried out using a standardized methodology that will allow – as far as possible – comparisons of the status of the population over time. There needs to be consistency in the type of equipment used, the survey protocol and the expertise of the surveyors. When variation in detection

probabilities is likely to compromise the interpretation of population status, mark-recapture analysis of the population should be suggested in the Guidelines.

Recommendation 3. Follow-up studies of great crested newt translocations should be undertaken. There is considerable variation in the design and execution of mitigation projects and the quality of the data that emerges from them. We therefore believe that taking a random sample of mitigation studies would be inappropriate as (1) a large – and probably impractical – number of studies would be needed and (2) drawing general conclusions would be difficult. We therefore propose that any follow-up studies should be stratified, and include at least two apparently 'good' mitigations (defined as those which have been able to follow current best practice as far as possible) and at least two 'not so good' mitigations (defined as those which have encountered obvious problems in design and execution).

In selecting sites for follow-up monitoring, it will be important to take account of the chances of natural colonization of receptor sites, if the data are not be confounded. Because single-season, 'snapshot', surveys can give a misleading idea of the status of a population, we recommend that follow-up surveys continue for at least three successive years at each site using a standardized methodology. In addition to a standardized survey protocol that employs a consistent methodology for surveying the newt populations at all the sites, it may be necessary to carry out a mark-recapture analysis (probably using a photographic belly-pattern recognition technique) to determine population sizes and recruitment levels between years. In addition, surveys of both aquatic and terrestrial habitats will be carried out to monitor habitat development in relation to the pre-development situation and any ongoing management plan.

Recommendation 4. Population viability analyses to explore the effects of habitat loss, habitat subdivision and translocation on crested newt population persistence should be conducted. Such models could utilise existing demographic and dispersal data for crested newts, and combine this with sensitivity analyses of other parameters that are more difficult to assign (eg carrying capacity, minimum number of newts required for translocation). The sensitivity analyses would highlight those areas where future research effort should be directed.

Recommendation 5. Research is needed to (1) explore the relationship between the numbers of newts detected by widely used counting methods (eg torch counts, bottle trapping) and the numbers of newts actually present in a population; and (2) determine the capture effort needed to remove a significant proportion of the population present.

Recommendation 6. A working group of relevant bodies and ecological consultants, ideally coordinated by English Nature and/or a well-founded NGO, should be established to monitor trends in great crested newt mitigations and advise on policies and working practices and also work on a revision of the English Nature Guidelines. The working group should meet at least once a year to consider progress in great crested newt mitigation and to make recommendations for modifying policy and practice as appropriate.

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Appendix 1. Example of great crested newt mitigation project questionnaire

Great crested newt mitigation project questionnaire

1. General details

All respondents please complete this section as far as possible

Licence Information

1. Your name:

Do you wish your name to appear in the acknowledgements in the final report? ☐ Yes ☐ No

2. Please state the full name of the consultancy/organisation responsible for carrying out this mitigation project (if this has recently changed, please give the name used at the time the work was carried out):

3. What type of consultancy/organisation was this at the time? *(Please tick relevant box)*

☐ Individual/sole trader ☐ Partnership ☐ Limited Company ☐ Voluntary body

☐ Voluntary body ☐ Other *(please specify here)*:

4. Contact Details

Current address:

Post Code:

Telephone number:

E-mail address:

5. Mitigation project name (eg site name or name of development):

6. Please give a six-figure grid reference for the centre of the development site:

7. County (or Counties) where this development site was located:

8. Number of first great crested newt licence issued for this mitigation project:

9. Date of first licence issued for this project/development site):

10. Licensee's name (if different from your name above):

11. If known, please list any further licences (with names of licensees, if different) issued for this project:

Licence number	Name of licensee	Date of issue

Tick this box if other licences have been issued for the project but you are unaware of the details ☐

Details of the development requiring great crested newt mitigation

12. Name of development company/body responsible for instructing work on this mitigation project:

13. Nature of the development (*please tick the most relevant box or boxes*):

a. Building developments:

☐ Residential housing development. Please indicate approximate number of houses built: ☐

☐ Commercial development (offices, factories, etc) ☐ Recreation/leisure centre

☐ Demolition works/redevelopment of existing built site ☐ Mixed building development

b. Sports developments: ☐ Sports fields ☐ Golf course ☐ Playground

c. Minerals/landfill: ☐ Mineral extraction only ☐ Landfill only ☐ Mixed extraction/landfill

d. Permanent linear developments: ☐ Road ☐ Railway ☐ Runway ☐ Cycle/footpath

e. Temporary linear developments: ☐ Pipeline (eg gas/water) ☐ Cables (eg power/telecom)

f. ☐ Other development type *(please specify here)*: ☐

14. Date of first major ground disturbance: Month: ☐ Year: ☐

15. Completion date of development: Month: ☐ Year: ☐

16. Total area of development site, including areas not affected by the development (ha): ☐

17. Total area of development site actually built on or destroyed (ha): ☐

18. Approximate area of great crested newt habitat, including ponds, built on or destroyed (ha): ☐

19. For permanent or temporary linear development projects: Average width of working area (m): ☐

Total length of working area (km): ☐ Length (km) actually affecting great crested newts: ☐

The planning process

NB. if no planning permission was required for the development (eg because of permitted development rights) tick this box and go to Question 26 ☐ *- otherwise please complete this section where possible*

20. Name of Local Planning Authority(s) involved:

21. Name of English Nature office covering the mitigation site

22. Name of local English Nature contact officer(s) involved (if any)

23. Were any legal or planning conditions, or other agreements, associated with this project?

☐ Section 106 agreement ☐ Informal undertakings ☐ None ☐ Don't know

☐ Other *(please specify here)*:

24. At what stage in the planning process was the issue of any great crested newts on the site confirmed?

☐ Before outline planning permission granted ☐ After full planning permission granted

☐ Between the granting of outline and full planning permission ☐ Don't know

25. Were great crested newts included in a wider, formal Environmental Impact Assessment of the proposed development (submitted at the planning stage)?

☐ Yes ☐ No ☐ Don't know

Mitigation project work breakdown

26. Estimated amount of time spent on mitigation project related activities - please include work done (as man days or work sessions) by all consultants, fieldworkers, contractors, site staff, office/administration staff, volunteers, etc, either employed by, or directly supervised by, you or your organisation.

NB. this question is concerned with attempting to assess the approximate proportion of time spent on the different aspects of the project, ***not*** *with comparing individual consultant's rates. Please count one site visit (eg for newt survey or checking pitfall traps) as one session and equate this to half a man day. If details of the mitigation project work are not known, or not available, tick here and go to Section 2* ☐

Mitigation project work	Estimated No. of man days/sessions					Don't know
	<10	11-30	31-60	61-90	>90	
Project management (meetings, project planning, production of reports, etc)	☐	☐	☐	☐	☐	☐
Pre-mitigation great crested newt population assessment (fieldwork only)	☐	☐	☐	☐	☐	☐
Development site preparation (trap lines, fencing and maintenance, etc)	☐	☐	☐	☐	☐	☐
Receptor site preparation (pond construction, habitat management, etc)	☐	☐	☐	☐	☐	☐

Mitigation project work	Estimated No. of man days/sessions					Don't know
	<10	11-30	31-60	61-90	>90	
Actual capture and translocation of great crested newts	☐	☐	☐	☐	☐	☐
Post-mitigation great crested newt population monitoring (fieldwork only)	☐	☐	☐	☐	☐	☐
Post-mitigation management of receptor site (combine work to date with projected)	☐	☐	☐	☐	☐	☐
General administration, office support of project staff/fieldworkers	☐	☐	☐	☐	☐	☐

2. Pre-development assessment details

Please complete this section as far as possible if you assessed newt populations and habitats before development started. If you were not responsible for this assessment tick here and go to Section 3 ☐

Existing great crested newt survey information

27. Did you have access to pre-existing great crested newt survey records for the development site or its immediate surrounds?

☐ Yes ☐ No

If Yes, was this information:

☐ **a.** Merely confirming the presence of great crested newts (without any count data)?
☐ **b.** Simple count data (involving torching/netting/bottle trapping, etc)?
☐ **c.** A detailed population estimate (involving mark/recapture, pitfall trapping, etc)?

Specially commissioned pre-development great crested newt survey

28. Was a pre-development great crested newt survey undertaken by you specifically for this project?

☐ Yes ☐ No

If Yes, how long before the start of the mitigation project did this survey commence?

☐ Less than 6 months ☐ 6 - 12 months ☐ More than 12 months

29. Total number of pre-development survey visits: ☐

30. Methods used for pre-development great crested newt survey (please tick boxes as necessary)

☐ Torching ☐ Day counts ☐ Netting ☐ Bottle traps ☐ Pitfall traps

☐ Refugia searches ☐ Egg searches ☐ Other survey methods

Please specify any other survey methods used here:

31. Please indicate the maximum numbers of great crested newts recorded during any pre-development survey of the proposed development site (combine the totals for all ponds).

Adults: ☐ Sub-adults: ☐ Larvae: ☐ Were eggs also found? ☐ Yes ☐ No

32. Please state any other organisations that were provided with the survey results

☐ English Nature ☐ Local Planning Authority ☐ Wildlife Trust ☐ Don't know

☐ Other organisation *(please specify here)*:

Pre-development assessment of great crested newt habitats

33. Pre-development assessment of **all** habitats within, and adjacent to, the development site. Please indicate in the table the degree to which these habitats were ultimately affected by the development using the simple scoring system below:

0: habitat not present **1:** habitat unaffected by development **2:** less than 25% affected
3: 26-50% affected **4:** 51-75% affected **5:** 76-100% affected

NB. 'adjacent habitats' include all areas within 500m of the development site boundaries and will mostly score 0 or 1 in this column (although some areas may be affected by access roads, etc.).

Alternatively, please tick this box if no habitat information is available (then go to question 34) ☐

Type of habitat	**Development site habitats**	**Adjacent habitats**
Deciduous woodland		
Coniferous woodland/plantation		
Scrub/hedgerows		
Unimproved/semi-improved grassland		
Improved/amenity grassland		
Gardens/allotments		
Pasture		
Arable		
Disturbed land (eg quarry floors, etc.)		
Built land (buildings, roads, hard standings, etc.)		
Aquatic habitats (ponds, lakes, ditches, etc.)		
Wetland (marshland, bog, etc.)		
Other *(please specify):*		
Other *(please specify):*		

34. Total number of ponds on the development site: ☐ Number affected by development ☐

35. Pre-development assessment of all ponds surveyed on the development site (please complete relevant sections of the table below for each pond on the site). *Tick box if no pond information is available* ☐

Pond Number	Approximate Surface Area (m^2)	Estimated Maximum Depth (m)	Was the Pond Used by Breeding Great Crested Newts? (Yes/No/Don't Know)	Was the Pond Destroyed, Retained or Improved? (type D, R or I below)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

(Please copy or request another questionnaire if more than 10 ponds were affected)

3. Mitigation project details

Please complete this section as far as possible if you carried out the mitigation. If you were not responsible for carrying out the actual mitigation work, tick here and go to Section 4 ☐

General Information

36. Methods used to capture/exclude great crested newts *(please tick as many boxes as necessary)*

☐ Pitfall traps ☐ Drift fencing ☐ Artificial Refugia ☐ Netting ☐ Bottle traps

☐ Hand search ☐ Destructive search ☐ Draining down of pond(s) ☐ Night search

Other methods used *(please specify here)*: ☐

37. If pitfall traps were used, please indicate below the approximate number of traps installed for the capture of great crested newts. *Alternatively, state the exact number of traps here (if known)*: ☐

☐ Less than 50 ☐ 50 – 200 ☐ 200 – 500 ☐ 500 – 1000 ☐ More than 1000

38. If drift fencing was used, please indicate below the approximate length erected for the capture or exclusion of great crested newts. *Alternatively, state the exact length in metres here (if known)*: ☐

☐ Less than 50m ☐ 50 – 200m ☐ 200 – 500m ☐ 500 – 1000m ☐ More than 1000m

39. Please indicate below the numbers of great crested newts translocated during this project. *If details of the different sexes and life stages are not known, state the total number of all animals moved here*: ☐

Adult males ☐ Adult females ☐ Undistinguished adults/subadults ☐

Subadults ☐ Metamorphs ☐ Larvae ☐ Eggs (approx. numbers only) ☐

Receptor site details (in-situ translocations). *NB. 'in-situ' refers to the movement of newts within the development site itself or to an adjacent managed area less than 500 m away. If the movement of newts was greater than this (ie an ex-situ translocation), or was to the far side of a newt dispersal barrier, such as a major road, please tick this box and go straight to Question 45* ☐

40. Please indicate any measures taken to improve or enhance any ponds that were retained on, or adjacent to, the development site for great crested newts *(please tick as many boxes as necessary)*

☐ Pond enlargement ☐ Clearance of pond vegetation ☐ Reduction of shade (eg from trees)

☐ Treatment/removal of alien aquatic plants ☐ Removal of fish ☐ Removal of terrapins

☐ Re-lining ☐ De-silting ☐ Installation of silt trap(s)

☐ Alterations to drainage ☐ Re-profiling of pond(s) ☐ Clearance of rubbish/debris

☐ Treatment of pollution effects ☐ No work done ☐ Information not available

☐ Other measures taken *(please specify here)*:

41. Were any new ponds created for great crested newts on, or adjacent to, the development site?

☐ Yes ☐ No ☐ Don't know If Yes, please complete the table below

Tick this box if details of any new ponds created are not known/not available ☐

Pond number	Area (m^2)	Maximum depth (m)	Pond base (butyl liner/clay, etc.)
1			
2			
3			
4			
5			

(Please copy or request another questionnaire if more than 5 new ponds were created)

42. Please indicate any measures taken to improve or manage terrestrial habitats retained on, or adjacent to, the development site for great crested newts *(please tick as many boxes as necessary)*

☐ Woodland/scrub/hedgerow planting ☐ Woodland/scrub/hedgerow management

☐ Re-seeding of grassland ☐ Grassland management ☐ Provision of artificial hibernacula

☐ Provision of other artificial refugia ☐ No work done ☐ Information not available

☐ Other measures taken *(please specify here)*:

43. Where is the 'in-situ' receptor site located in relation to the original development site?

☐ Now isolated within the original site by the development ☐ Within the site but on the periphery

☐ Outside, but directly adjacent to, the development site ☐ Within 500m of the site boundaries

44. Following the development, how is this receptor site now physically connected to other potential great crested newt habitats/breeding ponds?

☐ Continuous with suitable habitat on at least one side ☐ Connected via terrestrial habitat corridors

☐ Poor connection via sub-optimal habitats (eg gardens/arable) ☐ Site now more or less isolated

45. To your knowledge, has further development (requiring additional great crested newt mitigation) affected this site since the original project took place?

☐ Yes ☐ No ☐ Don't know

If Yes, please provide the following details (if known), if you have been directly involved.

Licence Number	Name of Licensee	Date of Issue

Receptor site details (ex-situ translocations).

NB. 'ex-situ' refers to the movement of newts more than 500m away from the boundaries of the original development site (or to the far side of the nearest newt dispersal barrier, such as a major road). Please photocopy this section, or request another questionnaire, if more than one receptor site was used for the translocation. If you have already filled in Questions 40-45 (for in-situ translocations), please tick here and go to Section 4 ☐

46. Name of the 'ex-situ' receptor site:

47. Grid reference:

48. County:

49. Total area of receptor site (ha):

50. Distance (km) from the development site (ie from site centre to site centre):

51. Ownership of the receptor site *(please tick relevant box)*

☐ The original developer ☐ Local planning authority ☐ Private ☐ Wildlife Trust

☐ Other landowner *(please specify here)*:

52. Was the receptor site surveyed for great crested newts prior to the translocation?

☐ Yes ☐ No ☐ Don't know If Yes, were great crested newts:

☐ Confirmed to be present only? ☐ Recorded breeding? ☐ Not recorded on the receptor site?

53. Please indicate work required to ensure the suitability of the receptor site for great crested newts

☐ Site already considered suitable ☐ Breeding pond(s) created ☐ Terrestrial habitat created

☐ Existing breeding ponds improved/enhanced ☐ Existing terrestrial habitat improved/enhanced

54. Please tick relevant boxes in the table below to indicate the presence of **all** habitats within the receptor site, including habitat types that were either increased in area or specially created for this project

Type of Habitat	**Present Before Mitigation**	**New Areas Created**
Deciduous woodland	☐	☐
Coniferous woodland/plantation	☐	☐
Scrub/hedgerows	☐	☐
Semi-improved/unimproved grassland	☐	☐
Amenity grassland	☐	☐
Gardens/allotments	☐	☐
Pasture	☐	☐
Arable	☐	☐
Disturbed land (eg quarry floors, etc.)	☐	☐
Built land (buildings, roads, hard standings, etc.)	☐	☐
Aquatic habitats (ponds, lakes, ditches, etc.)	☐	☐
Wetland (marshland, bog, etc.)	☐	☐
Other (please specify)	☐	☐
Other (please specify)	☐	☐

55. If existing terrestrial habitats were improved for great crested newts, please indicate how by ticking one or more of the following boxes:

☐ Woodland management ☐ Scrub management ☐ Hedgerow management

☐ Provision of dead wood ☐ Grassland management ☐ Ditch management

☐ No work done ☐ Information not available

☐ Other measures taken *(please specify here)*:

56. If new terrestrial habitats were specially created at the receptor site, please indicate how by ticking one or more of the following boxes:

☐ Woodland planting ☐ Scrub planting ☐ Hedgerow planting ☐ Seeding of grassland

☐ Construction of artificial hibernacula ☐ Provision of other artificial refugia

☐ No work done ☐ Information not available

☐ Other measures taken *(please specify here)*:

57. Please provide details of all ponds (both pre-existing and/or specially created) on the receptor site.
Please tick this box if pond information is not available and go to question 58 ☐

Pond number	Area (sq. m.)	Maximum depth (m)	Was the pond pre-existing or specially created?	Existing ponds	New ponds
				Were crested newts already present? (Yes/No/Don't Know)	Pond base (butyl liner, clay, etc.)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
12					
14					
15					

Please copy or request an another questionnaire if there are more than 15 ponds on the receptor site

58. If any existing ponds were improved for great crested newts, please tick one or more of the following to indicate how:

☐ Pond enlargement ☐ Clearance of pond vegetation ☐ Reduction of shade (eg from trees)

☐ Treatment/removal of alien aquatic plants ☐ Removal of fish ☐ Removal of terrapins

☐ Re-lining ☐ De-silting ☐ Installation of silt trap(s) ☐ Alterations to drainage

☐ Re-profiling of pond(s) ☐ Clearance of rubbish/debris ☐ Treatment of pollution effects

☐ No work done ☐ Information not available

☐ Other measures taken (please specify here):

59. Period between the completion date of new pond/terrestrial habitat creation and the start of the great crested newt translocation

☐ Less than 1 month ☐ 1- 6 months ☐ 7-12 months ☐ 13-18 months

☐ 19-24 months ☐ 25-30 months ☐ 31-36 months ☐ More than 36 months

60. Adjacent Land Use, ie within 500m of site boundaries (please check boxes as necessary)

Deciduous woodland ☐ Coniferous woodland/plantation ☐ Scrub/hedgerows ☐

Semi-improved/unimproved grassland ☐ Amenity grassland ☐ Gardens/allotments ☐

Pasture ☐ Arable ☐ Disturbed land ☐ Built land ☐ Aquatic ☐ Wetland ☐

Other types of land use adjacent to the receptor site (please specify):

4. Post-development Monitoring

Please complete this section as far as possible if you were involved with monitoring of the receptor site, whether 'in-situ' or 'ex-situ', after mitigation. Please copy or request another questionnaire if more than one receptor site was involved. If you were not directly involved in any monitoring, please give the name of the organisation(s) that were in Question 61. Alternatively, if no post-development monitoring was agreed upon, or carried out at all, please tick this box and go to Section 5 ☐

61. If your organisation was not responsible for carrying out any of the post-development monitoring please state the organisation(s) responsible below (if known) then go to Section 5:

62. Agreed post-development great crested newt population monitoring period:

☐ 1 year ☐ 2 years ☐ 3 years ☐ 4 years ☐ 5 years ☐ Longer (please specify)

63. Years when post-mitigation monitoring has taken place to date:

64. Average number of post-development survey visits per year to date: ☐ Not known

65. Who funded the post-development monitoring? ☐ The developer? ☐ Another organisation?

Please specify other organisations here:

66. Methods used for post-development great crested newt monitoring *(please tick boxes as necessary)*

☐ Torching ☐ Day counts ☐ Netting ☐ Bottle traps ☐ Pitfall traps

☐ Refugia searches ☐ Egg searches ☐ Other survey methods

Please specify any other survey methods used here:

67. Maximum numbers of newts recorded on the receptor site for each year of post-development monitoring. *Please combine the totals for all ponds on the site and complete a separate row for each year – if actual numbers of newts are not available please indicate their presence or absence instead. Tick this box if this information is not available* ☐

Year	Adults/immatures	Subadults	Larvae	Eggs (present/absent)

Please copy or request another questionnaire if you need to add more information)

68. Who were the monitoring reports/returns submitted to? *(please tick as many boxes as necessary)*

☐ English Nature (Licensing Section, Peterborough) ☐ English Nature (local team office)

☐ Defra ☐ Local planning authority ☐ Local Wildlife Trust ☐ Other organisation

Please specify any other organisations receiving reports here:

5. Post-development management

Please complete this section as far as possible if you were involved with management of the receptor site, whether 'in-situ' or 'ex-situ', after mitigation. Please copy or request another questionnaire if more than one receptor site was involved. If you were not directly involved in any management, please give the name of the organisation(s) that were in Question 69. Alternatively, if no post-development management was agreed upon, or carried out at all, please tick this box and go to Section 6 ☐

69. If your organisation was not responsible for carrying out any of the post-development management please state the organisation(s) responsible below (if known) then go to Section 6:

70. Who is responsible for post-development management of the receptor site?

☐ The original developer ☐ Your organisation ☐ The County Wildlife Trust

☐ New owner/occupier (commercial/business/industry) ☐ New owner/occupier (private)

☐ Local planning authority ☐ A specially created organisation/trust ☐ No clear responsibility

☐ Other body *(please specify here)*:

71. Please indicate any mechanisms for ensuring delivery of post-development site management:

☐ Section 106 agreement ☐ Planning agreement ☐ Other legal agreement

☐ Covenant ☐ No existing agreement ☐ Information not available ☐ Other

Please give details of any other management agreements here:

72. Has a management plan been produced for the receptor site? ☐ Yes ☐ No ☐ In preparation

If Yes, who produced this plan?

73. Agreed period for post-development receptor site management

☐ 1 year ☐ 2 years ☐ 3 years ☐ 4 years ☐ 5 years

☐ Longer period (please specify here):

6. Problems encountered/comments

(NB. any comments made below are confidential and will not be quoted verbatim in the final report)

74. In your opinion was enough time allowed for the pre-mitigation assessment? ☐ Yes ☐ No

If No, please state why not:

75. Were any of the following problems encountered **before** or **during** the mitigation project? *(Please tick as many boxes as necessary)*

☐ Conflicts between mitigation objectives and requirements of other protected species

☐ Planning conditions or other agreements decided without reference to newt survey data

☐ Site damage occurring due to pre-development activity (eg archaeological survey)

☐ Damage to the receptor site (for in-situ translocations) associated with the development activity

☐ General vandalism ☐ Deliberate sabotage

☐ Insufficient time allowed for this mitigation project

☐ Insufficient time allocated for the post-development monitoring of great crested newts

☐ Information not available ☐ Other problems

Please specify any other problems here:

76. Were any of the following problems recorded at the receptor site after the mitigation project? *(Please tick as many boxes as necessary)*

☐ Introduction of alien plants ☐ Introduction of fish ☐ Pollution ☐ Fly tipping

☐ Public access effects (eg trampling of terrestrial habitat) ☐ Dogs swimming in ponds

☐ Illegal collection of newts ☐ Ponds drying up ☐ Succession (silting, shading, etc.)

☐ Agreed management poorly implemented ☐ Agreed management not undertaken at all

☐ Funding for agreed monitoring not provided ☐ Agreed monitoring not undertaken at all

☐ Information not available ☐ Other problems

Please specify any other problems here:

77. Please tick relevant boxes below if the mitigation project or the development resulted in any local or national publicity (press, radio, TV) with the following general themes:

☐ Protected newts conserved in mitigation project (ie positive message)

☐ Development delayed to protect newts (ie positive message)

☐ Development costs escalate because of newts (ie negative message)

☐ Jobs/services/development threatened by newts (ie negative message)

☐ Other type of publicity *(please specify here)*:

☐ No publicity received

78. In your opinion, how would the great crested newt population on the original development site have fared in the future if:

a. There had been no development at all?

☐ Increased ☐ Remained stable ☐ Decreased ☐ Become extinct

b. The development had proceeded without this mitigation project being implemented?

☐ Increased ☐ Remained stable ☐ Decreased ☐ Become extinct

79. If you consulted English Nature's *Great Crested Newt Mitigation Guidelines* for this project, how useful, on a scale of 1-5, did you find this document? *(N.B. 1 = useless, 5 = invaluable)*:

80. Please include any additional comments or observations, eg about this project in particular, great crested newt mitigation work in general, if you consider that the licensing process could be improved and so on *(Please use additional sheets if necessary. N.B. for e-mail questionnaires, the text box below will automatically continue onto extra pages)*:

Appendix 2: Consultants' comments

The following selection of comments have been included to illustrate the viewpoint of a cross section of ecological consultants involved in great crested newt mitigation projects. Italicised alternatives have been used wherever specific sites or names were mentioned, otherwise these are the consultants' own words. However, most were transcribed from handwritten responses on the questionnaires (with a few from telephone conversations) so any errors are the responsibility of the authors of this report. In most cases, the full response has been included, while in others the less relevant portions have been edited out.

1. Licensing and legislation

"A quicker turnaround in licence applications is required."

"It took five months to get the licence so all the methods had to be altered."

"There was a delay in obtaining a licence for the second phase of the development, which involved keeping the existing newt fence in place. We only required a time extension, but we had to submit a full and detailed application – very bureaucratic and unnecessary considering we had done this for the original licence."

"The crucial issue is timing. Since most detection is likely to be in spring/summer, it is helpful if the licensing procedure can be quickly administered. In this instance…. considerable delay in issuing a site specific licence (12 ½ weeks) precluded any protective measures until almost too late in the season."

"The new format licensing applications (Defra) are much improved, requesting more detail and demanding monitoring of schemes. However, it would be beneficial if licences were issued for the whole area of development and post development monitoring (where this is a reasonable period) so that consultants have better leverage to justify monitoring work."

"This scheme had English Nature's approval prior to Defra's involvement in the licensing process for protected species. Despite this we were asked to apply for a license part way through the implementation of the scheme."

"Complexity of multi-plot sites and difficulties of multi-ownership of adjacent plots of land need to be considered carefully in any licensing, and will need special attention under the latest Defra EPS proposals (but should be more controllable in the long term if LPAs have sufficient resources)."

"Ensure that licensing procedures and requirements are the same in England, Scotland and Wales (not currently the case). Clearly define when a licence will or will not be required."

"Why is GCN legislation only applied to planning issues? Where is this set out in the legislation? The Guidelines should include some statement as to which individuals are allowed to harm newts within the law."

"What is the point of protecting terrestrial habitat if the definition of this is so woolly? What does eg a farmer have to do to damage terrestrial habitat to an illegal extent? Reseeding old grassland? Ditching? Hedgerow removal? Is there any effective protection at all for terrestrial habitat?"

"Licensing process could be improved. Would like to see more clear directions from Defra/English Nature – this would help consultants with clients who are inexperienced or just difficult. At present we rely on our own interpretation of guidelines, which may vary from site to site, and situations – doesn't always lead to client conviction. Clear guidance, which also understands planning and development needs, would be very welcome…. Please, please, try and keep it simple – maybe even provide a developer's package. It is also exceptionally costly in time and finances to fill in application forms and details, which are simply repetitive/disorganised. Sorry – but English Nature needs to take the lead in an authoritative and clear way. We rely on it, as do Defra!

"Site responsibility should be removed from the licensee where they are not employed on site all year."

"Why does an offence have to be committed in public? The police always ask whether the complainant had a right to be on the land where an offence is committed, eg dumping in and filling of ponds. Why is privacy a defence for criminals?"

"Why can English Nature and the Wildlife Trusts ignore GCN when managing nature reserves….? Are they excepted from the law in the same way as landowners?"

"The management of nature reserves supporting GCNs mostly involves work where planning permission is not normally required, but where management could result in the death of great crested newts… In theory the typical management of some nature reserves may require the issuing of several licences a year…. Therefore are we to conclude that every grass-cutting project on reserves with GCNs will require a licence and full mitigation applied? Myself and several of my colleagues feel that issues relating to GCN licensing are becoming increasingly complex and I could provide more examples of anomalies and difficulties that we have or might encounter in the future…."

"Fundamental changes are required to the way in which licenses to derogate from the protection offered to Schedule 2 species are issued. The separation of the licensing process from the planning system caused confusion with both the developers, Local Authorities and in some instances their consultants. It is likely that the majority of licenses could be challenged in the courts. In most cases the requirement to consider Sections 44 (2) (e) and 44 (3) (a) is not being carried out by either Defra or the Local Authority. In order to remedy this PPG9 needs to be revised and changes are required to the Habitats Regulations similar to those currently proposed by the Welsh Assembly."

"Although there have been many improvements in the licensing procedure, the stages involved increase the potential for delays and create negative PR. A fast track approach could be developed…. English Nature would be responsible for determining reasons for licence issue. There would be only one consultation with English Nature, and therefore only one stage of the Defra processing, which would reduce the time necessary for determination."

"The method for assessing the impact of minor modifications to the original Defra licence (while the original Defra licence application is still being considered) is inflexible. The system by which the consultant is asked to provide two complete copies of the new Defra licence method statement is too onerous when in the majority of cases the documents are lengthy, and the changes are minor and may even be positive. Minor amendments could simply take the form of a paragraph with the place of insertion clearly identified…."

"Very real concerns with respect to the new licensing regime proposed by Defra – LAs do not have the expertise to deal with licensing. Feel local English Nature teams need better knowledge of protected species issues and should possibly be going to LAs to help them understand the various protected species issues (bats to newts). Defra are impartial to the planning process!"

"Difficulties were experienced throughout the annual period of the licence – if, however, the licensing system were ever to be changed to make the developer the licence holder (with the zoologist an accredited agent only) it would have been impossible to exercise any restraint on them. Many developers already believe the have 'the over-riding power of the cheque book' – as a licence holder as well, some would become impossible by threatening to appoint a new (ie more co-operative to them!) accredited agent. Appointing new accredited agents would be seen as much easier than appointing new licence holders."

"What happens if, as looks likely on one of my other sites, my client decides to sell the land with the newts on to someone who then refuses to pay for the works agreed on the licence? The licence holder should not be the only responsible party – I think that the developer should have to sign a binding commitment to the works required over the lifetime of the licence to protect the licence holders from having a responsibility to Defra that they cannot fulfil…. I think there should be some agency responsible for ensuring that developers honour their licence commitments."

"All licences should require data to be sent to local biological records centres."

2. The planning process

"The presence of great crested newts was not confirmed until relatively late in the planning process: planning conditions therefore could not be as comprehensive and as binding as would be desired, and flexibility in site design was not available."

"I welcome the proposals to integrate planning and licensing processes as this <u>should</u> give greater weight to (i) resolution of issues prior to planning determination, (ii) the full implementation of mitigation schemes and (iii) enforcement of mitigation/monitoring work."

"District ecologists who think they know about newts should keep their noses out. They should leave the mitigation planning to the consultant if he is competent, not set the limits and specifics in advance."

"This was a relatively small project – however, the council should have dealt directly with the consultant. In future I would make a point of liaising directly with the relevant appointed officer."

"The developer asked me to check out this site. The District Council ought to be more pro-active…. Proper training for LAs is required."

"Local authorities desperately need education in nature conservation planning, including how to deal with great crested newts. LPAs should require a nature conservation assessment for most planning applications, whether a formal EIA is required or not. However, there will still remain the conflict between planning and nature conservation, both in terms of principle and programming. The timescales required to produce full assessment and mitigation are sometimes incompatible with successful planning."

3. Pre-development assessment

"There is no satisfactory method of assessing populations 'accurately' without significant survey works (ie pitfall trapping etc.)."

"There are many cases where initial survey is completely inadequate, arising from the issuing of survey licences to incompetent individuals. In particular, it appears that large ecological and planning consultancies have no difficulty whatsoever in obtaining licenses for paper ecologists with no field experience…. Clearly it is to the advantage of developers to employ those consultancies who do a lousy job. The less they find, the less trouble they cause."

"Local ecologists should be given greater capacity to determine the most appropriate mitigation, even if this does not fit neatly with the Guidelines."

"Although in 5.8.2. of the English Nature Guidelines it is accepted that is futile to comprehensively assess terrestrial habitat use through survey (a point I wholeheartedly agree with) and that there are practical problems in detecting newts away from ponds, we are still being requested (by LPAs, Wildlife Trusts and some English Nature offices) to undertake terrestrial surveys (in varying detail). It would be very helpful to consolidate the guidance on this."

"I think that licence holders should be given more freedom to decide what mitigation work is necessary. Sometimes it appears that the only qualification for being a local officer with English Nature is to have lived away from sunlight for 20 years. We have people who would not know the species if they found it in their salad insisting that developers should spend large sums on pointless mitigation. The Guidelines say it is up to the licence holder to decide what level of mitigation is necessary, yet bureaucrats in English Nature regional offices can contradict this. If English Nature staff want to insist on licence conditions, should not their names go on the licence?"

"Licensing must be tightened up, starting with survey licenses. Two instances in last year:

a). I received, by e-mail, an image of a GCN larva from a 'Scientific Officer' with a national consultancy, asking me to identify it. How can this be?

b). A licensed surveyor, who has written a local BAP for GCN and who works on a part-time basis for English Nature was unable to recognise GCN larvae."

"The actual extent of impacts is sometimes not known until the development has actually taken place. In some cases these are negligible and a huge amount of money has been spent with no obvious benefit for great crested newts."

"Only in exceptional circumstances would a pipeline endanger a newt population. This is not reflected in the mitigation process…. No effort has been made to "strike a deal" over mitigation requirements under Defra licensing versus specific conservation work on farmland ponds to secure real benefits for great crested newts in accordance with the UK BAP."

"Destruction of "potential" newt habitat (especially if temporary), where no direct impact on breeding (or non-breeding) ponds occurs, should be dealt with much faster than at present."

4. Translocations and exclusions

"It would be helpful to develop more specific best practice guidance (beyond the details in 8.4.2. of English Nature's Guidelines) over the lengths and orientation of drift fencing away from ponds, and the periods of trapping, to maximise the effectiveness of terrestrial capture operations."

"The mitigation comprised an exclusion fence as specified by the local council to prevent GCNs wandering onto an already heavily disturbed quarry and being harmed. It is my view that this scheme would not have impacted upon the population and the licence was not necessary (ie it makes a farce of the system that otherwise plays an important role). It was an ill informed planning authority that conditioned this work to be done. I believe that exclusion fences to protect newts from harm (and that do not restrict movements to useful habitat) should fall outside the licensing system."

"More research is needed on newt movement/habitat use on land, plus ways to avoid mammal deaths in pitfall traps."

"I feel very strongly that we should not be held responsible for newt fence maintenance. We are not on site, the developer rarely pays for this and they know it is the ecologist who holds the licence. Once work (newt translocation, etc.) is finished the staff should be trained to inspect/maintain *the receptor site* by the ecologist and the company should hold the licence. They would then have more incentive to undertake checks properly."

5. Post-development monitoring and management

"Monitoring post development has always proved difficult to execute properly since developers lose interest once a site is developed. It is helpful to have the developer countersign the licence application but some form of policing would help consultants get the 'message' across. We spend a lot of time and effort 'justifying' the need for monitoring even when a license is approved with a period proposed. Quite often we are then perceived to be nagging – rather than every party being quite clear about their responsibilities."

"English Nature and Defra rarely, if ever, visit the sites and in effect the consultant becomes the 'enforcer' in many cases."

"External auditing/inspection of schemes by Defra/English Nature officers or some other way of monitoring progress and compliance of licensed work during development would be welcomed, though I appreciate the burden this would place on local officers."

"Mitigation work should be subject to inspection and scrutiny by the SNCO and penalties exacted for deliberate non-compliance."

"There must be vetting of mitigation schemes. A retrospective testing that mitigation has been carried out properly, say independent monitoring by a separate consultant in the fifth year after implementation. Developers must make provision for monitoring and remediation during this period."

"Each site should be visited by an officer from English Nature to advise and the site should also be visited by the local authority to see if mitigation procedures are being carried out. Neither of these has happened."

"Evidence of an agreement in writing should be required with licence applications to ensure any habitat mitigation measures proposed on land not within the ownership of the client are fully committed to."

"Regular policing by the SNCO would put pressure on developers to resource projects better and allow implementation of management and maintenance to proceed more smoothly. The perception of developers appears to be that once planning permission is granted the detail of the management programme is unimportant because there is rarely an inspection of work undertaken."

"New guidelines (August 2001) - the number of days suggested for surveying works/monitoring works are very likely to be viewed as 'excessive' by clients – particularly where monitoring for a number of years has already been agreed…."

"There is no central body co-ordinating the findings of GCN monitoring (so far!). Although much insistence is put on monitoring at the planning stages, without using the findings these monitoring studies are more of a paper pushing exercise in that lessons cannot be learnt."

6. English Nature Guidelines

"The English Nature 2001 guidelines are useful in that they set a standard and act as a reference and reinforcement for consultants' recommendations and opinions, whilst allowing room for project specific judgements to be made."

"English Nature Guidelines do not seem to be always accepted by English Nature! On other schemes where different English Nature officers have been involved, the onus has been for the developer to prove that GCNs do not cross major roads and that arable land (high intensity) is not that good; ie English Nature do not always accept the section of the Guidelines referring to these barriers and types of favourable habitat. Adherence to the Guidelines would help to ensure consistency of response."

"Why does English Nature turn a blind eye when their favoured consultants ignore the Guidelines?"

"English Nature is held in very low esteem in *this region*. Their officers have no understanding of GCN and try to apply the rigid terms of the Guidelines (which fit very few real cases) because they don't have sufficient personal knowledge to introduce flexibility. I don't mind saying this. Many others agree with me quietly. Let's have a lot less bureaucracy and at least a little bit of conservation. Maybe Chairman Mao was right. Send the bureaucrats into the field for a change!"

"There are many improvements that could be made to the Guidelines but the whole subject is much too complex to be covered by a few rigid guidelines. At present they serve to show how little is known about the species. Much of the newt industry seems to be based on mythology. English Nature must try to break away from the chain of employment that sends students to college into project officerdom then to English Nature without ever seeing daylight."

"The Guidelines are very rigid and centre around new planning applications only. They do not clearly address scenarios where great crested newts are discovered adjacent to active development sites, where planning permission has been granted several years earlier. Our company has recently become involved in such a scenario and I feel that this is an issue that will become increasingly common in the future, therefore I consider that clear, specific guidelines should be provided to cover issues where GCNs can enter operational industrial sites."

"English Nature's Guidelines are often unhelpful as contradictory, unclear and also sometimes unreasonable. The project described here was my 1st translocation and I learnt a lot which I take with me to future projects. But the mitigation Guidelines don't allow for adaptation/personal experience of consultant."

"We need greater clarity within the Guidelines and much less scope for repetition."

"I would welcome the establishment of a 'Peer Group/Steering Group' to assist revision of English Nature Guidelines. Such a group could include active consultants, developers and planners from LAs."

7. Comments about specific mitigation projects

"A more flexible approach by the local English Nature office *to this project*, taking into account the ecological consultant's local knowledge and expertise, would have saved the developer a considerable amount of unnecessary expenditure (>£10,000) on drift fencing and pitfall traps."

"*This housing* project only came about after building had begun. The pond belonged to one company, the surrounding land had been sold off to another. I believe that there was no requirement for an initial survey prior to planning permission being granted. The local council refused permission for splayed kerbs instead of vertical. Both developers denied responsibility for post mitigation monitoring. Nobody was interested in enforcing this. The project was undertaken purely to "fire-fight" against the total destruction of the habitat/pond in an attempt to ensure the survival of a very small population. In my honest opinion, it was turned into a farce and I am glad to have walked away from it. Hopefully the stricter rules will prevent anything like this from happening again."

"There were 1500+ smooth newts on site and only 2 great crested newts. No further monitoring was undertaken. Smooth newts benefited but the great crested newt population was too small for survival? It would have been good to have a response from the statutory authorities on further work."

"This was a site that was barely viable and the GCN population was not proven to breed in the pond – it could have been breeding somewhere else. The site was half cleared before any concern was raised. The pond and surrounding land was sold off and there does not seem to have been involvement of the local Wildlife Trust or Parish Council as had been envisaged and there has been no official monitoring."

"As part of the Section 106 agreement for this development a pond should have been created on the site. Due to a difference of opinion between the planning authority and the developers the pond has to date not been created."

"The water table has since decreased and no hydrological impact assessment was undertaken. At other sites I have had unsatisfactory hydrological surveys commissioned by developers, ie they get engineers to run hydrological models – although independent companies, they are not always independent in terms of having a vested interest in the project."

"At this site, GCN mitigation was treated as an inconvenience by the local authority, who wanted to translocate the population, although the proposed receptor sites were completely inappropriate. The developer was eventually persuaded to conserve the population in situ, with temporary fencing installed under licence for the duration of the construction work."

"This was not an official pre-meditated newt translocation. It was an emergency rescue because *the local authority* and English nature were not fully seized with the problems on site. This development nearly caused the extinction of a SSSI population of crested newts…. Those of us who have held several licenses and who regularly lecture on crested newts and other amphibians should surely get a permanent licence to do these sort of emergencies and minor rescues and for educational purposes."

"This project highlights the importance of the planning authority having all necessary information to hand before planning *permission* is granted…. Having granted permission, no mechanism for pond management/fish removal was available other than by adjacent landowner consent, which was not forthcoming. Despite the improvement and increase in available terrestrial habitat this population is likely to become extinct whilst if the issue had been dealt with during the planning process the development …. could have been used as a means of ensuring the long-term survival of the colony."

"The cost/benefit ratio of this project was skewed. One GCN was present in a pond (with a large population outside the development site) but the cost of the whole mitigation project must be circa £50-100,000."

"This is a very depressing site which would have once supported great crested newts. Since I have worked here I have seen the habitat destroyed and little effort has been made to recreate it. The statutory organisations have been informed of the problems. The strength of their response has not been strong so the developers have done the minimum."

"At this site the developer is well aware that no statutory body (English Nature/Defra) visits the site. They comply with other legislation as, for example, they know that the Environment Agency will take samples to check drainage consents, etc."

"At *both* mitigation projects I feel that the local English Nature office should have taken a much more robust stance against the developer's demands. For *one site* they effectively gave English Nature a June deadline saying that they were starting work then, newts or no newts, they gave no assistance to me and were not required to provide any land or ponds for a receptor site."

"Ponds, in particular, in urban fringe locations like this site are almost inevitably destined to decline in quality (ie no SUDS on this site, addition of alien species). The long term suitability of the site seems likely to be low."

"This is **the worst** site I have worked on and so much more has been lost including a good toad population and some stunning wetland habitat."

"So far, I believe this project has worked well…mainly due to the time available. Development has been delayed for other reasons so I have been able to capture four cohorts of GCN metamorphs at the pond, passively….. Time allows: newts to be caught and ponds and terrestrial habitats to be **observed** and managed gradually and sensitively."

"We are quite proud of this project because it has been successful from the point of view of all parties (developer and LPA) and the newts themselves. In hindsight, detailed survey information would have helped us explain to the client about how long the trapping might take. The data gathered over 3-4 months of trapping was very useful to us in terms of understanding newt ecology and emergence patterns – information we have put to use in other schemes. The scheme has been used for training days and breeding continues to be successful at the receptor site."

8. General comments about great crested newt mitigation

"Typically, developers don't expect to have to allow for as much time and money as projects take."

"The emphasis in mitigation schemes must be on habitat creation and improvement rather than the animal rights approach of rescuing every last newt. If new habitat is suitable, the newt population will expand to fill it. If it is not, then all those newts, caringly and expensively shifted into unsuitable receptor sites, will starve to death or be predated before they can breed. Since there is evidence that the majority of translocated newts very probably perish, why is this activity not seen as causing injury or death to newts? The guiding principle appears to be 'out of sight, out of mind'. Why is it alright to design a pond in which the total loss of a year's larvae is acceptable (Guideline 8.3.1), when to cause injury to a single newt is an offence under the Wildlife and Countryside Act?"

"The focus should be on increasing the local population of GCN rather than protecting a few individuals from disturbance."

"Greater emphasis should be placed on avoiding ponds and on habitat creation/enhancement vs. resources directed at precautionary fencing, etc."

"Advice on what to do when a population is nearly extinct is needed. Maybe a database for these sites as receptor sites in the future?"

"There is a commercial newt lobby influencing the formulation of mitigation practice in such a way as to give maximum financial benefit to consultants. I hear of cases where mitigation schemes have cost between £6000 and £10000 per newt caught and translocated. What happens to translocated newts? In two cases where I have had some involvement after translocation, more than 90% of several thousand newts in total seem to have gone missing. At *one* bypass this spring, where miles of TAF had been erected, I was told that not a single GCN had been caught. It seems that most of the money spent on GCN is to the benefit of consultancies rather than conservation."

"The principal problems associated with effective implementation for great crested newts arise from Defra's requirement for a detailed planning consent to be in place before licensable operations can begin. English Nature's original guidance was that effective translocation operations should take place over up to 3 successive seasons. In many cases developers consider a delay of 3 days between the granting of consent and a start on site to be unacceptable, let alone 3 years! The wholesale change in the approach to licensing experienced when responsibilities moved from English Nature to Defra has taken a long time to filter through the planning system and in many situations, in practise, other considerations still outweigh the need for extended periods within which to undertake mitigation work. The result is, and continues to be, less effective mitigation and, in particular, that too few non-breeding animals are captured during translocation operations. This situation may or may not be improved if licensing responsibilities change again, with LPAs taking over most (or all) of Defra's role."

"Ecological consultants want the best for newts, which costs developers money, and this can be seen as 'creating work'. Without back up and insistence to protect newts by English Nature/Defra the developers will do the minimum necessary."

"A problem that often occurs is that 'newt' specialists are often brought in as a 'separate' item. We are rarely informed of the whole site survey work, ie an EIA, and are not involved in management or restoration plans."

"It can be a nightmare working for 'bad' clients because there is no mechanism to enforce or police any agreement, so they do more or less what they want and can effectively get away with destroying a major population of GCNs with virtually no mitigation. It can also be a nightmare dealing with 'good' clients, especially where a GCN population is small, since they may be forced to pay ridiculous sums of money on mitigation work for a tiny handful of newts. Occasionally, and no thanks to the current system, a mitigation project works well, everyone is happy and the newts actually benefit!"

"Because of the way mitigation works at the moment, the costs of some projects are totally obscene – how can conservation bodies expect to retain any credibility with developers or LPAs when it can sometimes cost many thousands of pounds to move a couple of newts that probably die anyway?"

"Great crested newts are pretty adaptable, and mitigation techniques are fairly well known, so a properly planned and supported project should work well and result in real conservation gain for the species. Unfortunately this often doesn't happen in the real world."

"My first GCN monitoring project involved a four year programme at a pond which required yearly management to prevent encroachment from *Crassula*, reedmace, Canadian pondweed etc. Now that the monitoring has stopped, no one is managing the pond. The population will therefore decline and disappear as the pond becomes choked with vegetation. Where is the conservation benefit to the newts here? Ultimately, one could argue that all these translocations may as well not be carried out at all, since the long-term effect, without long-term management, will be local extinction."

"I have had to struggle on several occasions to get clients to carry out the work that they off-handedly agree to when they are in a hurry to have the newt issue resolved on their site. Once the newts are out of the way, they immediately begin to resent the continued costs of monitoring, habitat creation etc., and they start trying to renege on their commitment. Not all clients are like this, but a significant minority can be, and this creates real problems for those of us on the ground who have to deal with it."

"There is a need for more support from English Nature/planning authorities, which in turn means more Government funding as most are too busy to help with protected species work."

"Common theme for these kinds of developments – many different aspirations difficult to balance well – some issues can suffer, and it takes quite a bit of effort to ensure nature conservation requirements remain a priority – no 'champion' within planning department makes it quite difficult to resolve."

"With many mitigation projects involving GCNs, and other protected species, mitigation measures and the presence of newts in the first place are not fully considered at planning and a requirement for survey as a condition of planning is not made. This means that GCNs are an afterthought and, as such, the protection of habitat and species is not considered as an integral part of site design and planning. Even under the new licensing (Defra) system this approach by LPAs continues for Habitats Regulations (Schedule 2) species. As such, enforcing monitoring and aftercare once development has ended is precarious."

"This is the first examination of mitigation of which I am aware; unless mitigation is examined and the relevant information collated, there is no way of determining best practice."

"Lastly – this questionnaire was not particularly 'fast and simple' to fill in!"

ENGLISH NATURE

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Top left: Using a home-made moth trap.
Peter Wakely/English Nature 17,396
Middle left: Co_2 experiment at Roudsea Wood and Mosses NNR, Lancashire.
Peter Wakely/English Nature 21,792
Bottom left: Radio tracking a hare on Pawlett Hams, Somerset.
Paul Glendell/English Nature 23,020
Main: Identifying moths caught in a moth trap at Ham Wall NNR, Somerset.
Paul Glendell/English Nature 24,888