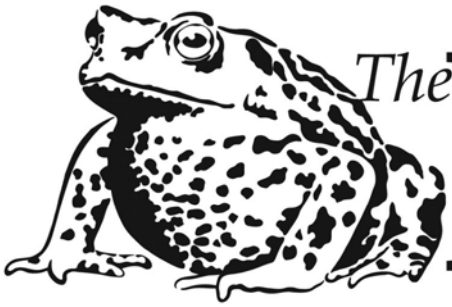

The HCT

Working for amphibians and reptiles since 1989

National Amphibian and Reptile Recording Scheme (NARRS), Phase 1 - final report

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Executive summary

The Herpetological Conservation Trust (The HCT) has been developing plans for a National Amphibian and Reptile Recording Scheme, in partnership with other organisations and stakeholders. In November 2005, the Esmée Fairbairn Foundation (EFF) funded a 9-month project development stage entitled 'NARRS Phase 1'.

Phase 1 has been carried out through an extensive and inclusive consultation and research programme, guided by a broad steering group. A set of shared objectives was drawn up to define aspirations for NARRS, and was signed by partners. Consultations, workshops, research exercises, and pilot projects were carried out to develop appropriate survey protocols and programmes. Existing HCT surveillance schemes will continue with adjustments, and a series of new programmes will be implemented, requiring survey of hundreds of locations across the UK. Licensing arrangements have been progressed with the statutory agencies.

A website was created with online recording facilities, and a register was created of people interested in participating in NARRS. As part of Phase 1, Froglife carried out a 'people involvement' scoping exercise to explore opportunities for recruiting survey volunteers. Subcontracts were awarded to the British Trust for Ornithology to obtain statistical advice, and to Inky Mouse Designs for web development.

Statutory agency funding for NARRS has not been forthcoming so far, and progress with potential charitable funders has been frustrating. Nevertheless, the HCT has identified sufficient internal funding to continue NARRS until the end of 2007.

With the completion of Phase 1, work has now focused on Phase 2, project implementation. Groundwork and preparations are well under way for the national roll-out of survey programmes in spring 2007.

Introduction

The Herpetological Conservation Trust (The HCT) is the largest amphibian and reptile conservation charity in the UK, employing 20 staff and managing 80 nature reserves. It is a Charitable Company limited by guarantee. The HCT coordinates the monitoring of Britain's rare herpetofauna species, is joint lead partner on Species Action Plans, and takes an active role in policy development across the UK and in Europe. It is widely acknowledged that the information needed on herpetofaunal status for conservation, policy, decision making, educational and other purposes is not currently available. Over the last few years, The HCT has worked in partnership with a wide range of other organisations representing the statutory agencies, government, wildlife NGOs, voluntary, academic and professional sectors, to initiate a national scheme to monitor the conservation status of all native amphibian and reptile species in the UK, and monitor the status of all non-native amphibian and reptile species. Phase 1 of the *National Amphibian and Reptile Recording Scheme* (NARRS) project was set up in 2005 to develop the project to the delivery stage (Phase 2). Phase 1 was largely funded by the Esmée Fairbairn Foundation (EFF), with additional funds coming from English Nature (EN; now Natural England, NE), Countryside Council for Wales (CCW) and The HCT.

Phase 1 has been coordinated by The HCT through a steering group representing a broad partnership of stakeholders. Running from November 2005 to November 2006, we have developed NARRS through partnership building, broad consultations, workshops, conferences, liaison, research projects, pilots, statistical advice, survey and sampling design, web and database development, and other activities. We will be in a position to roll out the national surveys in spring 2007. Some of these (e.g. sand lizard, smooth snake, natterjack, adder) are continuations of existing monitoring schemes with some changes. Others (e.g. widespread amphibians, widespread reptiles) are new specially designed schemes, using a combination of randomly selected 1km squares and ponds, and a set of higher quality sites such as nature reserves.

As part of Phase 1, we have produced a project design document for delivery of Phase 2: the *NARRS Implementation Plan* attached. We have created a register of over 250 potential participants, and will continue preparations for roll-out of Phase 2 over the next few months. We are currently confirming survey designs and sampling strategies, designing surveyors' packs and web interfaces, recruiting trainers and planning training events.

Aims of Phase 1

Phase 1 aimed to carry out the necessary project design stages needed to set up and implement NARRS. As well as gathering and bolstering a wide partnership of organisations, it aimed to design the details and mechanisms needed to run NARRS. It needed to describe the survey protocols for establishing scientifically robust conservation status monitoring schemes and surveys, whilst promoting research to improve population assessment techniques. It also aimed to develop a strategy for involving people in monitoring herpetofauna, identifying the broader social benefits, and opportunities to raise awareness and appreciation of herpetofauna. The primary output of Phase 1 would be a project design document for the implementation of NARRS Phase 2 – the full roll-out of the monitoring programmes.

NARRS Phase 1 aims can be summarised as follows:

- Establish partners' and stakeholders' shared objectives
- Agree methods and approaches
- Determine sampling strategies and protocols

- Investigate the benefits to people
- Produce a public involvement strategy
- Determine delivery mechanisms and logistics
- Design management structures
- Determine training needs
- Develop funding arrangements

Phase 1 project management

NARRS Phase 1 was coordinated by the HCT with input from Froglife, British Trust for Ornithology (BTO) and other partners, stakeholders and volunteers. A broad and inclusive Steering Group (SG) was initiated to guide Phase 1, and a comprehensive programme of stakeholder liaison was undertaken via meetings, workshops and consultations. Work areas were carefully demarcated to make full use of respective areas of expertise, and the most efficient and synergistic use of time and resources. The project followed a workplan in order to monitor progress against objectives. Phase 1 was project managed by the HCT's Research & Monitoring Officer, and supported by the NARRS Development Officer. Workload was divided between these staff and involved close liaison between them, Froglife, the SG, external contractors and a wide range of stakeholders. The production of final reports and deliverables was carried out by the two HCT staff, incorporating reports from Froglife and the BTO.

Steering Group

Quarterly SG meetings were held in London to guide the project, and regular email contact was maintained to ensure consensus from partners and stakeholders The SG comprised the following partner organisations:

- The Herpetological Conservation Trust (the HCT)
- Amphibian and Reptile Groups of the UK (ARG UK)
- Association of Local Government Ecologists
- Biological Records Centre (BRC)
- British Herpetological Society (BHS)
- Countryside Council for Wales (CCW)
- DICE, University of Kent
- English Nature (EN, now Natural England, NE)
- Environment Agency (EA)
- Forestry Commission (FC)
- Froglife
- Institute of Ecology and Environmental Management (IEEM)
- Joint Nature Conservation Committee (JNCC)
- National Biodiversity Network Trust (NBNT)
- National Federation for Biological Recording (NFBR)
- Pond Conservation (PC)
- Scottish Natural Heritage (SNH)
- The Wildlife Trusts (TWTs)
- University of Sussex

Shared Objectives

A set of *Shared Objectives for NARRS Partners* was developed to reflect the shared vision and goals for NARRS, as aspired to and supported by the partners. The aim was to produce

a set of aims and objectives that all partners could sign up to. The *Shared Objectives* document was agreed and circulated for signature by all SG partner organisations in spring 2006 (see below). Nearly all partners signed the *Shared Objectives,* thereby endorsing NARRS and showing their support. Two partners were keen to sign the document, but needed to wait for upcoming meetings of their organisations for the mandate to do so; and one partner opted not to sign the document at all. Additional potential partners have been identified recently for involvement in Phase 2, and will be invited to sign the *Shared Objectives* document in due course.

Shared Objectives for NARRS Partners

(National Amphibian and Reptile Recording Scheme)

The purpose of this document is to set out shared objectives that all NARRS partners can sign up to. Stating these desired outcomes and asking partners to endorse them is a tangible way of showing support for the project's aspirations and demonstrating the partnership we are building. It does not bind partners into any commitment.

The broad aims of NARRS are:

- To provide herpetofauna status information needed for conservation purposes.
- To bring conservation benefits by raising public awareness and appreciation of herpetofauna.

The key requirements to achieve this are:

- Cooperation between all organisations and individuals involved in, or benefiting from, NARRS.
- Robust monitoring regimes for assessing the conservation status of all herpetofauna species.
- A sufficiently comprehensive network of volunteers to meet all recording and monitoring needs.
- An effective system for encouraging, supporting and coordinating volunteer involvement.
- Effective information management, interpretation and dissemination to all potential users.
- Sustainable funding arrangements and in-kind support.

The specific objectives are to:

- Define measures of conservation status for all native amphibian and reptile species in Britain, including information on range, distribution, populations, abundance, habitat quality/extent, threats and prospects.
- Design robust and efficient sampling regimes for assessing conservation status at national, regional, local and site levels, monitoring the condition of herpetofauna interests on all SSSIs in the United Kingdom, assessing biological progress towards relevant BAP targets, and monitoring the status of non-native amphibian and reptile species in the United Kingdom.
- Build a cooperative partnership between all organisations and individuals that are involved, or could potentially be involved, in NARRS.
- Contribute towards a comprehensive, sustainable network of Amphibian and Reptile Groups and other volunteer groups, with training and support needed to contribute to NARRS.

- Promote standardised approaches and best practice for herpetofauna survey and monitoring by developing and promoting improved survey methods, models and approaches.
- Provide an efficient system of data collation, analysis and management; centrally managed but well connected to other nodes and recognising the importance of existing local initiatives.
- Following NBN principles, exercise an open attitude to data sharing, with effective dissemination to volunteers, Statutory Agencies, Local Records Centres, NBN Gateway, Local Authorities, general public and others.
- Distribute information to the respective Local Records Centres and the NBN Gateway.
- Disseminate information via all available media such as websites, atlases, reports, 'alert maps', articles, newsletters, circulars, and scientific papers.
- Report to the Statutory Nature Conservation Agencies, Government and others on the conservation status of European-protected species and widespread species, condition of herpetofauna interest features on SSSIs/ASSIs, progress towards BAP targets, and other information as appropriate.
- Supply information to Local Authorities and land managers to enable full consideration of herpetofauna in the planning process, land management, and other activities.
- Launch education and awareness campaigns that will bring tangible conservation benefits through changed attitudes and behaviour, public involvement in herpetofauna recording, and greater appreciation of herpetofauna in general.
- Promote targeted research to better understand threats and opportunities facing herpetofauna, aid decision-making, influence policy development and guide conservation actions.

People involvement

To investigate opportunities for recruiting members of the public to take part in surveys, and to identify the mutual benefits, a sub-project was assigned to Froglife, for which they received £7,500 from Phase 1 funds. Froglife was briefed to investigate opportunities for, and benefits from, people involvement in herpetofauna recording, and to produce a strategy for involving people in NARRS.

Froglife's role, as defined in the Phase 1 project proposal, was to:
- Investigate the scope for broader public involvement
- Scope the skills, capacity and resource implications for ARG involvement
- Identify potential audiences and ways to target them
- Propose activities and mechanisms for involving people in NARRS
- Produce a strategy for involving people
- Provide advice regarding public involvement in the project

Froglife surveyed the ARG network and other potential volunteer sources, and produced a report entitled *People Involvement Scoping Study* in August 2006. The findings and advice contained in this report were considered during the development of the *Implementation Plan.*

Statistical advice

In order to develop robust and efficient sampling strategies, an external contract was necessary with a biological statistician. We established an initial list of suitable contractors, and let the contract worth £4,000 to the BTO. Ten days of consultation were provided,

beginning with an initial one-day meeting, and followed by nine days analytical work, advice and reporting. Statistical consultation focused on power analyses to help calculate the most efficient and effective balance between sample size (and therefore volunteer force) and statistical robustness of the data. We also sought advice on how to plan sampling strategies with insufficient knowledge of detection probabilities and distributions, and on planning for contingencies such as insufficient volunteer numbers and uneven geographical distribution of volunteers. Iterative improvements to statistical approaches and data quality will almost certainly be required over time, particularly as the results of research projects feed into NARRS, and lessons are learnt through the implementation of Phase 2. The statistical advice received from the BTO has been incorporated into the sampling designs in the attached *NARRS Implementation Plan.* See also the attached report from the BTO. We aim to maintain a good working relationship with the BTO during Phase 2, both to seek further statistical advice, but also to share the herpetofaunal data that they collect as part of their Garden BirdWatch survey.

Consultations on survey design

As part of Phase 1, we needed to develop effective and workable reptile and amphibian survey designs. We therefore engaged in wide consultations to gather views on how to design effective and workable monitoring schemes. Anyone with experience of amphibian and/or reptile survey was invited to contribute, and we circulated several consultation documents and held several workshops. Previous consultation through a questionnaire survey (Gleed-Owen *et al,* 2005a,b) and workshops at the Herpetofauna Workers' Meeting conference in January 2006 had also canvassed the views of the ARG network and the HCT's existing volunteer surveyor network (together accounting for about 400 active recorders). These consultation exercises demonstrated great enthusiasm among existing volunteers and herpetofauna recorders about involvement in NARRS. Some ARGs expressed a strong interest in participating in pilot projects, and these opportunities were explored during Phase 1, with financial support from the facilitation budget. We wanted to make use of people's expertise in order to help us to design survey methodologies that would strike the right balance between our needs for good detailed data, and the needs of volunteers. We received a large amount of feedback on these consultations, which was duly incorporated into our development work, and we heartily thanked all those who contributed.

Key issues and concerns that cropped up regularly included the need for sufficient training, logistic support for the ARGs, equipment and financial support where needed, landowner permissions, maintaining volunteer enthusiasm, matching volunteer skills to the task, and practical considerations such as balancing time commitments for volunteers with limited free time. We also asked for views on what information ought to be recorded during surveys, and what techniques were most effective and/or most practical. We needed to agree fixed protocols so that all surveyors could survey in the same way, and the data from all over the country would be comparable. Feedback confirmed the existence of a range of protocols for a variety of ongoing local projects, which presents a challenge to the development of standardised methodologies. Nevertheless, the over-riding enthusiasm shown for NARRS was encouraging, and it is felt that workable solutions can be reached. Personal opinions had to be balanced with a pragmatic and objective synthesis into survey designs that would produce robust data and be acceptable to volunteers.

Developing survey protocols

The rationale for NARRS monitoring schemes is to assess trends in 'conservation status' of species, i.e. biological/ecological status in terms of populations, range, distribution and habitat, plus an assessment of external influences that would affect the prospects of each species at different geographical scales. Sampling units must be standardised and surveys

must be carried out in the same way everywhere. The number of sampling sites needs to be sufficient to make statistically robust conclusions of species status, but it also has to be achievable, especially given the uneven geographical distribution of the human population in the UK. Many sample sites would have to be randomly selected too, although this inevitably means they will include some poor quality sites.

For the rare species schemes, we will continue to monitor all sites for presence-absence, but a sample will be surveyed with more detailed effort-weighted counts, despite this being difficult at present to convert into population size/density measures. For the national widespread species surveys, which will often involve new and inexperienced volunteers, we have opted for presence-absence and optional count surveys for amphibians, and presence-absence surveys for reptiles, both with multiple visits. It is difficult to standardise count procedures everywhere, in a wide range of habitats and land uses, and we need better knowledge on the relationship between counts and population sizes to make them more useful. The EFF-funded research project coordinated by Richard Griffiths (DICE, University of Kent) and Trevor Beebee (University of Sussex) will advance our understanding significantly for amphibians. Similarly, a research project coordinated by the HCT and the University of Southampton (funded by the Landfill Communities Fund) will help to develop means of assessing reptile population sizes. Presence-absence surveys will give us occupancy rates for each species, i.e. the percentage of surveyed sites in which a species was found. We will welcome count data if volunteers wish to collect it, as many people already do this, and as long as their presence-absence data is collected, the minimum data requirements of NARRS would be met. For widespread amphibians, we opted to ask volunteers to survey single ponds rather than carry out blanket surveys of 1km squares, which would be too onerous for some volunteers. For reptiles, we chose 1km squares as the sampling unit, with survey focused on areas identified by the volunteers as the most likely reptile habitat to maximise the chances of detection.

Reptile survey design and pilots

Following on from our initial consultations, we launched a widespread reptile pilot survey in March. The first stage allocated 40 volunteers a random 1km square near to their homes, and required them to make an initial assessment visit. The purpose was to explore some practical and logistical aspects of survey design, such as:

- Logistics of survey visits
- Identifying reptile habitat
- Obtaining permissions
- Suitability for refugia

Participants completed a questionnaire on their experiences and findings. The feedback was extremely useful.

The squares appear to be fairly representative of the predominant land covers in Britain, i.e. most squares contained agricultural land and some squares were totally arable. They also contained variable amounts of urban and suburban land cover, forest, railways, grassland, scrub, heath, moor and other semi-natural habitats. Most initial assessments seem to have taken people 2-3 hours and were generally possible by walking public footpaths. Where permissions had to be sought from landowners, these were generally forthcoming after asking locally to identify landowners. Some surveyors asked about permission to lay refugia in the future, and received a generally positive response. It seems that material type (e.g. metal vs felt) and permanence would be potential factors in any permissions. A standard letter would evidently smooth the way, however, and was felt important. Judging by the squares surveyed so far, a walk of 2-8 kilometres would be necessary to identify all or nearly all areas of good reptile habitat; most being at the lower end of this range. Livestock and

public access were recurrent issues for concern for laying refugia, but most squares had sufficient areas of good habitat to lay refugia safely.

Surveyors estimated the percentage of land cover that would support each of four widespread species (common lizard, slow-worm, grass snake, adder). From the assessments received so far, mean percentages for each species were 20, 18, 17, 13% respectively, with ranges of 5-75, 0-70, 0-60, 0-70% respectively. Three squares were judged to contain no adder habitat, and one square each for slow-worm and grass snake had no habitat (the latter being upland habitat in Scotland). The mean cover of reptile habitat irrespective of species was 17%, with a range of 3-41% (3-41 hectares). This assumes that surveyors are reasonably adept at recognising reptile habitat for each species. Training must ensure that this is adequately dealt with.

We also held workshops in Derbyshire and Surrey in April, to share views and reach consensus on various survey issues. The discussion was lively and we thanked all those involved once again. At the workshops, we made the decision to use both refugia and visual search in NARRS reptile surveys, and considered standardising numbers of refugia. Although we had previously been reluctant to rely on refugia because of security concerns, we realised that the greatly increased detection made it worth pursuing; and if there were insufficient places to safely lay refugia, or permissions were not forthcoming, squares could be discarded after the initial assessment visit (and another one selected). In the pilot surveys, respondents' opinions varied widely on the number of refugia thought necessary to sample a square adequately, from 15 to 700 (the latter based on 10 per hectare of suitable habitat). The mean was 145 refugia per square (or 69 refugia if the anomalous suggestion of 700 is discounted).

Obviously the logistics of laying and checking refugia are important considerations, so deciding the number of refugia is a trade-off between detection and practicality. Refuge material was evidently an important consideration in determining how many refugia surveyors would be prepared to carry and lay. Two surveyors stoically said they would lay as many as required, whilst the others averaged 28 for metal and 60 for felt (ranges 8-50, 15-100 respectively). The workshop participants pointed out that the 'average' surveyor would be unlikely to be as keen as the pilot participants, and suggested it would not be reasonable to expect most surveyors to transport, lay and check more than about 20-30 refugia, assuming metal tins. We have since reached the conclusion that even this might be off-putting, and pragmatically we ought to leave the number of refugia up to the volunteers. Guidance ought to instruct volunteers to make their own choices on refugia use, according to their own assessment of what would be best for their particular study site.

The workshops discussed the relative merits of corrugated iron sheets ('tins'), corrugated roofing sheets (typical trade name Onduline), and roofing felt as refugia materials. The general feeling was that all have their own merits, but metal is most effective. Onduline is as good (or potentially better) in some circumstances. However, obtaining metal sheets and cutting to size is not easy or cheap; and may cause transport, permission and livestock problems. Roofing felt is the cheapest and simplest option. An 8x1m roll costs about £8-12 from DIY stores/suppliers and provides about 10-20 refugia (depending on size), i.e. about £0.50-1.00 per refuge. It can be carried easily and cut on site with a sharp knife. However, roofing felt is also the least effective material for attracting reptiles (except slow-worms), although by no means ineffective. Snakes and lizards do use roofing felt, but less so than Onduline or metal. A 2x1m sheet of Onduline costs about £9-12 from DIY stores/suppliers and could be cut into up to eight refugia, although some people have concerns about such small refugia sizes.

Cost and weight of refugia are potentially off-putting issues for volunteers, but if a light material is used and costs were met, it might be reasonable to expect surveyors to lay as many as 40 refugia on their site. Checking these would be achievable on one 2-3 hour visit.

The most effective size for refugia need further examination via research projects, and whilst many people use refugia of 0.75 to 1.0 square metre in area, smaller (and larger) sizes can be effective. Among the participants, and from HCT survey experience, small metal or Onduline refugia (approx 50x50cm or quarter of a square metre) attract reptiles of any species. Nevertheless, they are probably less effective than slightly larger sizes.

As it is not always safe or possible to use artificial refugia, a system is needed for dealing with such occasions when permission is not forthcoming or there are security concerns. At the workshops, it was felt that if refugia could not be placed in the large majority of the areas identified as good reptile habitat, then the square would have to be abandoned and another one sought. Refugia ought to be spaced as evenly as possible across the square (according to identified good habitat), but if security concerns or permission problems prevented survey in some areas, this would be a significant problem. If refugia have to be somewhat clustered, this is not necessarily a problem. The question is whether or not all the 'key areas' could be surveyed using refugia. Key areas would be areas that an experienced surveyor would intuitively expect to find reptiles; hotspots perhaps. They are areas that would significantly increase rates of detection for the square, or might even be crucial to finding a species at all, e.g. the only piece of adder habitat (without which adder would not be detected). In order to make this judgement, the initial assessment visit is necessary to identify (and map) all reptile habitat, and identify the key areas to target with refugia. After seeking permissions, each surveyor would have to make a decision on whether sufficient key areas can be surveyed. Perhaps a threshold of 80% would be an ideal minimum, but 50% might be more realistic to minimise the number of aborted squares.

We have since reached a pragmatic conclusion that refugia numbers, materials, and distribution might need to be left to the volunteers. We would give guidance on a size range for refugia though. Recording the survey method(s) and numbers of refugia would enable us to assess any affects/biases, and allow us to weight results accordingly.

For statistical analysis, it is important that surveys are as consistent and comparable as possible; therefore we need ways of standardising or correcting for differences in effort and chances of detection. Skill levels differ between surveyors, and visual search data would obviously reflect disparities between surveyors' skills. Emphasis on refugia would help minimise these effects, but as visual search data are valuable, we intend to collect these too, albeit within a prescribed route protocol. Training could instruct surveyors about suitable survey conditions, and multiple visits (3-5) would reduce variability further (and increase detection).

Clear instructions would be needed on the timing of survey visits (season, time of day, weather), and effective training on habitat recognition and survey fieldcraft would be crucial. The workshop participants thought it conceivable that the anticipation of checking refugia might make some surveyors over-enthusiastic, in which case it might be wise to cap the number of visits and direct their efforts to other survey squares.

Other effort-related variables need to be addressed; particularly time spent, number of refugia used, distance walked and/or area covered. We have received a range of views from the workshops and the questionnaires received so far, generally suggesting that effort should be standardised as much as possible through survey protocols. There are good reasons for permitting variation (and correcting for it later), but standardisation is eminently preferable (despite some inevitable variation). Standard protocols remove the need for *post-hoc* correction, and there is some benefit in asking fixed levels of effort from surveyors who might otherwise be put off by open-ended requirements. Also, if survey time is not limited to 2-3 hours, detectability can change dramatically in relation to time of day and weather variation. Standardisation will be achieved as much as possible by asking volunteers to set a regular fixed route (tailored to good habitat), a limit on time spent, and a limit on distance

walked. We have discounted area covered as a measure of effort, as it is difficult to measure, and search intensity within any area is difficult to standardise.

Ideally refugia ought to be distributed evenly in all areas of good habitat (or a representative selection where habitat is extensive), such that they can be checked on a fixed survey route (bearing this in mind when laying them). Visual searching for reptiles is obviously an effective way of increasing detection, and we intend to incorporate it into the survey design. Visual search effort would need to be standardised as much as possible, but following the refugia-checking route too strictly would hamper its effectiveness. Straight-line transects (and structured derivatives) may be a good way to survey reptiles along linear features such as footpaths, but in wider habitat strips and areas of open habitat it is too restrictive. It seems wise, therefore, to allow a limited amount of deviation from a fixed route in order to increase detection. A standard 'buffer' of perhaps 20m could be set, with visual search permitted up to this distance on either side of the route. As time constraints will be imposed on each survey visit, this ought to leave little scope for wandering 'off-route' and should not compromise standardisation.

Even with strict protocols, a significant part of the decision-making would be the responsibility of the surveyor. Where the route does not follow obvious 'hard' or linear features, the surveyor would need to exercise discretion and be careful to stay within route. Once again this highlights the need for good training and guidance, including ecological notes and photo-guides on habitat preferences, and tips for spotting reptiles and improving fieldcraft. Opportunities should be sought to allow new volunteers to shadow experienced surveyors, as this can be a very important way of transferring knowledge and technique.

Amphibian survey design

The rare amphibians (natterjack toad and newly reintroduced pool frog) are already subject to co-ordinated monitoring programmes, which will continue with some changes. The remaining widespread species (great crested newt, smooth newt, palmate newt, common frog, common toad) are more widely distributed across the UK, and will require the involvement of many surveyors to gather sufficient data for measuring national population trends.

Breeding ponds provide convenient and meaningful sampling sites for amphibians, so NARRS has developed survey protocols for this habitat and lifecycle stage. We engaged in a wide consultation process, talking to professional consultants and surveyors, academics and volunteers, inviting suggestions for procedures to follow and key data to collect during amphibian pond surveys.

There is a considerable amount of pond survey experience collectively held by professional and volunteer surveyors - and many surveyors have already developed their own standard survey protocols. Synthesising existing practices into a single protocol, which will meet the needs of NARRS (allowing changes in conservation status to be measured) has been a challenge. However, survey forms and explanatory notes were produced in spring 2006 and made available for field trials by participating ARG volunteers. Single-visit and multiple-visit versions of the survey design were piloted.

The protocols developed aimed to collect data concerning:

- The surveyor, pond location and ownership
- Data on the amphibians present
- Data pertinent to variables that might affect the ease of detection of amphibians
- Information about the pond habitat

- Notes on threats and benefits to the status of amphibians

Variables that may affect the ease of detection of amphibians may be important, as the issue of detectability is a rapidly developing area of ecological research that has questioned the validity of surveys that do not take this area into account.

A habitat suitability index developed for the great crested newt (Oldham *et al*., 2000) was included in the survey form to gather such information. Volunteers in Kent have used a version of this index successfully during great crested newt surveys co-ordinated by Kent Reptile and Amphibian Group. Although this index was developed for the great crested newt, it is anticipated that the index may also provide information of relevance to the other amphibian species.

On request to help with piloting use of the survey forms and protocols, six ARGs volunteered. The locations of these groups and a summary of their local project objectives and input to the pilot are given in Table 1.

Table 1. Summary of local groups involved in pilot

Geographical area	Contact	Objective	Summary
South Lancashire	David Orchard	Determine local great crested newt distribution in Bolton.	Trialled single-visit survey forms
Dorset	Dorothy Wright	Survey key areas identified by Phil Temple as survey gaps in likely habitat.	Did not use NARRS survey protocols or forms.
Hampshire	Rachel Urwin	Verify approx 50 great crested newt records which do not match up with ponds.	Used NARRS forms in local survey to locate great crested newt ponds.
Northants	Ruth Hawksley	Determine local palmate newt distribution.	Survey did not go ahead, due to administration issues.
NE Wales	Jacinta Williams	Survey sites on nature reserves.	No response.
Warwickshire	Jan Clemons	Survey of all great crested newt records over 10 years old.	Incorporated NARRS forms and protocols into local project.

Summary of feedback from local groups

Dorset
Feedback was provided by a telephone interview with Dorothy Wright, Dorset Amphibian and Reptile Network (DARN). NARRS forms and protocols were not used. Due to time constraints of a small team of volunteers, it was felt easier to continue with existing forms and protocols, rather than adopt new ones.

South Lancashire
Feedback was provided by a telephone interview with David Orchard, Amphibian and Reptile Group of South Lancashire (ARGSL). The local survey involved egg search only. Hence volunteers used the single-visit survey form. Time constraints and volunteer involvement were key issues. Of ten volunteers attending training only three carried out surveys.

Gaining landowner's written consent to access ponds was regarded as impractical. An appendix including the map relating to HSI factor 1 was regarded as desirable. There was some confusion with regard to water quality (in HSI scoring) and turbidity (with regard to

detectability-related variables). The requirement for recording wind speed was questioned. There is no box on the form to record the percentage shoreline searched by egg-search. It was felt desirable to modify the form so that a single visit could be recorded on one side of paper. It was desirable to have the option to make sketch maps of site visited.

Hampshire
Feedback was obtained by a telephone interview with Rachael Urwin, Hampshire Amphibian and Reptile Group (HARG). Approximately twenty volunteers were supplied with NARRS forms to use during a local project aimed at locating great crested newt breeding ponds. Volunteers used forms at some sites, but use of the form declined over the course of the season as the A4 recording form was found to be too cumbersome to use in the field.

Face-to-face contact with local landowners was key to gaining access to sites, but obtaining signatures from landowners presented administrative problems.

Data collected were sent to Hampshire Amphibian and Reptile Group, where records are maintained on a MapMate database.

Northeast Wales
No response.

Warwickshire
Warwickshire Amphibian and Reptile Team (WART) planned a survey of sites with existing, but old (older than 10 years) great crested newt records. WART kindly agreed to trial NARRS forms and protocols during this survey.

Volunteers attended a training course, to which John Baker was invited to explain NARRS and the piloting process.

WART volunteers were given records of sites to re-survey and were asked to use the NARRS survey forms, which were to be returned to WART along with a brief questionnaire. Completed survey forms and questionnaires from nine volunteers were then sent to The HCT. The small number of volunteers returning information means that these limited data have to be treated with caution, as they may not be representative of volunteers as a whole.

A summary of the survey effort (number of ponds surveyed) and the number of techniques used is given in Table 2. In most cases surveyors used one or two techniques, rarely opting for torchlight surveys.

Table 2. Number of ponds surveyed by each surveyor and number of survey techniques used at each pond.

Surveyor	Ponds surveyed	Number of techniques used (for each pond surveyed)
Jan Clemons	1	3
Lesley Davis	1	1
Katie Dodd	3	1, 1, 2
Bernie Higgins	2	1, 1
Ian Jelley	4	1, 1, 1, 1
Ralph Sanders	8	1, 1, 1, 1, 1, 0 (access denied), 0 (not found), 0 (not found)
Charlie Robertson	3	1, 1, 2
Peter Sanderson	1	2
Steve Stroud	4	2, 2, 2, 2

Obtaining landowner information was the most difficult aspect of the survey protocol (Table 3). Recording the HSI factors was moderately difficult, but no more so than recording other pond data.

Table 3. Ease of completion of sections of survey and form

	Easy - Difficult				
	1	2	3	4	5
Pond details		5	3	1	
Surveyor details	9				
Landowner details	1		3	2	3
Habitat suitability factors*		3	3	2	

*One form was not scored for ease of recording habitat suitability factors.

Most volunteers were prepared to make multiple survey visits to ponds (Table 4).

Table 4. Number of survey visits surveyors willing to undertake

	Number of visits			
	1	2	3	4
Good quality pond, or pond where amphibians found	3	2	2	1
Poor quality pond, where no amphibians found	2	1	2	1

Only two aspects were regarded as missing from the present forms (suggestions from surveyors).

- Amphibians reported by owner, and indication of reliability (Ralph Sanders).
- Amphibians found in terrestrial habitat around the pond (Steve Stroud).

Most of the surveyors had access to nets, torches and thermometers, but not all (Table 5).

Table 5. Access to survey equipment

	Yes	**No**
Pond net	5	4
High power survey torch	6	3
Thermometer	6	3

Other comments offered were:

- Electoral role available on web. Useful, but not free (Nigel Clemons).
- Late spring this year meant that survey season could have extended beyond pilot deadline (Ralph Sanders).
- More accurate grid reference and descriptions would help locate ponds (Katie Dodd).
- More accurate grid references (Ian Jelley).
- Locating ponds from grid references was difficult (Lesley Davis).
- Enjoyed doing the survey and look forward to more (Steve Stroud).
- Better pond location information needed. Landowners should be forewarned by letter prior to face-to-face contact (Charlie Robertson).

Discussion

The small sample sizes of the returned survey forms and questionnaires to a certain extent limit the conclusions that can be drawn from this pilot exercise. However, the lack of participation in the pilot exercise may be a true reflection on the constraints to volunteer involvement in NARRS. The constraints of time and low numbers of active volunteers was noted in Dorset and South Lancashire.

The survey forms themselves seemed fairly easy to use, although there were also requests for design modifications, namely reducing the form to a smaller size and trying to get all

elements of the form on a single side of paper. With regard to the type of information gathered, gaining landowner access was again reported to be the most problematic element of the survey and obtaining landowner signatures has been found problematic to the extent that this element of the form will be discontinued. Another concern was the accuracy of the pond location information given to surveyors. This aspect was an issue of specific to the local project rather than to NARRS.

Most surveyors reported that they were willing to undertake repeat pond visit (two or three). Most surveyors had access to survey equipment (torches, nets and thermometers), but some didn't, so it is important to consider how they might be provided with access to equipment. The provision of equipment is likely to increase participation in pond surveys.

Landowner permissions

The workshops, questionnaires and pilots generated some useful tips on identifying landowners and obtaining permission efficiently. Asking around locally, face-to-face contact, and posting notices in shops or through doors were suggested as tried and tested methods. Passers-by, dogwalkers, local residents and tradespeople often tend to know who owns the land in an area. The experiences of surveyors also suggest that there is a good chance that surveyors may be approached by inquisitive passers-by who could help identify landowners, and sometimes by landowners themselves. Maps, signs and notice boards may also help identify landowners. Workshop participants felt that it was not thought wise to ask landowners for written or signed permission, but that verbal agreement would be sufficient. A friendly face and 'people skills' were identified as important factors in winning over worried or suspicious landowners. Some generic guidance would be useful on how to describe NARRS in favourable terms, and an official introduction letter for landowners should be couched in appropriate language. It will be important for volunteers to obtain permissions before entering any land. It has been suggested that advance warning by letter might be necessary before face-to-face contact requesting permission to survey. Conversely, there is good evidence that the most effective and efficient way to contact landowners is by approaching them directly rather than by letter. Clearly a degree of discretion is required on the part of the volunteer surveyor. Surveyors should therefore be well briefed in obtaining permissions. They must also confirm when they submit their results that they have received permissions to carry out their survey visits.

Web design

An important part of Phase 1 was to set up a website to publicise the project and facilitate involvement in the project development process. The domain www.narrs.org.uk was purchased and a contract was let to develop a website. After exploring various potential contractors, Mikaella Lock (Inky Mouse Designs) was chosen as web designer. The website went online in July 2006, and has since been expanded to include detailed information on the project, background information, consultations, survey design, pilot surveys, project partners, *Shared Objectives,* recording forms, contact details, and an online registration facility for signing up to take part in NARRS. This latter has proved very successful, with several hundred registrants so far. The web design contract was initially for £1000 as budgeted, but spend has since reached £1300 and more is planned in the near future. The website will continue to develop over the next few months and provide the focus for volunteer involvement in NARRS. Pages will be added for each of the survey programmes, with identification packs, survey instructions, protocols, surveyor log-in mechanisms and online recording forms. To see the current NARRS website, go to www.narrs.org.uk.

Funding arrangements

Project funding presents an ongoing issue for all voluntary wildlife recording schemes. As part of NARRS Phase 1, we hoped to secure a package of funding from statutory data users and partners (essentially matched funding), and submit bids to charitable funders. Unfortunately there has been limited progress on either front, but we intend to continue with NARRS Phase 2 in 2007 using limited funds we have gathered internally. The immediate concern has been to secure funding for the second half of the 2006/7 financial year, to allow continuation from the end of Phase 1 funding from EFF, into the first survey season of Phase 2 in spring 2007.

Of the likely statutory funders (NE, CCW, SNH, JNCC), only CCW have been able to provide funds towards continuing NARRS into spring 2007. NE has recently undergone a large degree of upheaval during its transformation from EN; hence no funding is available for NARRS at present, although it is hoped that funds will become available in due course. SNH hope to find some funds in early 2007, to aid development of a Scottish volunteer workforce.

The most likely providers of larger-scale project funding were identified as the Heritage Lottery Fund (HLF) and EFF. However, neither appears to be an appropriate option at present. We met the HLF in summer 2006, to discuss options for a funding bid. Unfortunately their funding rules exclude projects that have already begun (which is the case for some elements of NARRS). One option would be to make a distinct break between Phase 1 and Phase 2, whilst the 8-month application process takes place; but this would delay the project until 2008. We reluctantly decided that this would mean an unacceptable loss of momentum, especially considering that there would be no guarantee of success.

We have sufficient funding to continue until at least mid-2007. The project manager post (Research & Monitoring Officer) is met by core funds, and we have sufficient funds to continue the NARRS Support Officer until mid-2007 and possibly beyond. We also have some funds for continuing database and website development, and providing financial support for volunteer training courses around the UK in spring 2007. We are continuing to fund-raise where possible.

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