12. Translocation and Reintroduction

12.1. Translocations

People often move amphibians between breeding ponds, especially within gardens. Common frog spawn in particular is frequently moved, either to 'get rid of excess spawn' or to populate newly created ponds. In reality such movement is usually either unnecessary or an unsatisfactory conservation strategy. Amphibian populations regulate themselves and fluctuate over time, so there is rarely need to intervene by moving 'excess' spawn to other sites. Creation of new ponds is a crucial conservation measure for amphibians and their siting should be planned to allow natural colonisation as far as possible (see *8. Landscape Ecology*). As a conservation measure, translocation should be an option of last resort.

Genetic studies indicate that in urban and suburban areas the natural movement of common frogs and toads may be hindered by barriers such as major roads. In such situations moving amphibians around may substitute for natural migration. There are, however, risks associated with moving amphibians between sites:

- Transfer of disease.
- Transfer of invasive plants.
- Unsuitability of new site.

The study of amphibian disease is still in its early stages and the impacts of two relatively new diseases in Britain are not fully understood (*5.3 Amphibian disease*). Until better information becomes available a precautionary approach avoids the movement of amphibians (and anything else) between water bodies.

Non-native invasive plants (Section 5.5) can severely harm ponds and their incidental transfer can be avoided by not translocating amphibians.

If amphibians are not present at a particular site this may be because the habitat is unsuitable. Introducing amphibians to such a site does not address this problem. In general most ponds fall within colonisation distance of existing populations of the widespread amphibian species. For example, a newly created pond in a suburban garden will almost certainly be surrounded by many other garden ponds, some of which will support amphibians. In most cases new garden ponds are colonised by amphibians in their first year, rendering assisted movement of amphibians unnecessary.

Only when natural colonisation is impossible should translocation be considered. This has been the case with natterjack toads because range restoration has involved sites that are in some cases isolated from remaining populations. Translocation was also the only option available to restoring the pool frog to England following its extinction. Translocation of frogs from Sweden involved thorough health screening of pool frogs and other amphibians resident at the donor site both prior to the translocation and for several subsequent years.

Reintroductions should adhere to procedures set out in Annex 1 of A policy for conservation translocations in Britain JNCC (2003), which in turn is based on the IUCN 1995 guidelines for re-introductions.

12.2. Natterjack toad reintroduction

The limited and widely dispersed range of the natterjack means that after it disappeared from some sites natural re-colonisation has not been possible. A programme starting in 1975 has successfully established populations in 19 out of 27 translocations (70%), with greater success on dunes than on heathland sites (Griffiths et al. 2010). Reintroduction is one of the actions of the *Natterjack Toad Species Action Plan* (The Herpetological Conservation Trust, 2009).

12.3. Site selection

To identify a site suitable for the reintroduction of natterjacks several factors require consideration:

Geographic location Priority should be given to those areas within the historical range and where declines have been greatest. These include: coastal dunes in Lincolnshire, Norfolk, Clywd and the Wirral, coastal saltmarshes in south Cumbria and heathlands in Norfolk, east Suffolk, north Surrey and the western Weald.

Site security Proposed translocation sites should have a sympathetic land owner and appropriate land management plus, ideally, nature reserve status and statutory nature conservation designation.

Habitat quality Both aquatic and terrestrial habitats should meet the criteria outlined in Section 9 or be readily restorable to such condition. Any necessary restoration should be completed prior to translocation.

Predators and competitors Large populations of competitors such as common frogs or common toads, and predators such as grass snakes, corvids, gulls, rats and aquatic invertebrates should be absent from a reintroduction site and its environs.

Absence of natterjacks Absence of natterjacks should be certain and confirmed through survey work. Where remnant populations exist the priority should be to rescue these through habitat management. Where natterjacks are definitely absent, the reasons for this absence must be identified to ensure that they have been remedied prior to a reintroduction.

Consultation and agreements It is essential to consult widely with and gain the approval of all interested parties including landowners and managers of recipient sites. Translocation proposals should be put to the Natterjack Toad Species Action Plan Steering Group, which can be contacted through Amphibian and Reptile Conservation.

Licensing Strict legal protection of the natterjack requires that any translocation be licensed by the appropriate statutory nature conservation agency (Countryside Council for Wales, Natural England or Scottish Natural Heritage). Once a translocation proposal has been approved by the Species Action Plan Steering Group, Amphibian and Reptile Conservation will apply for the necessary licence.

Oversight of the project Translocations tend to be most successful when the site manager or dedicated volunteers manage the project on a day to day basis to minimise tadpole loss.

12.4. Preparing a reintroduction site

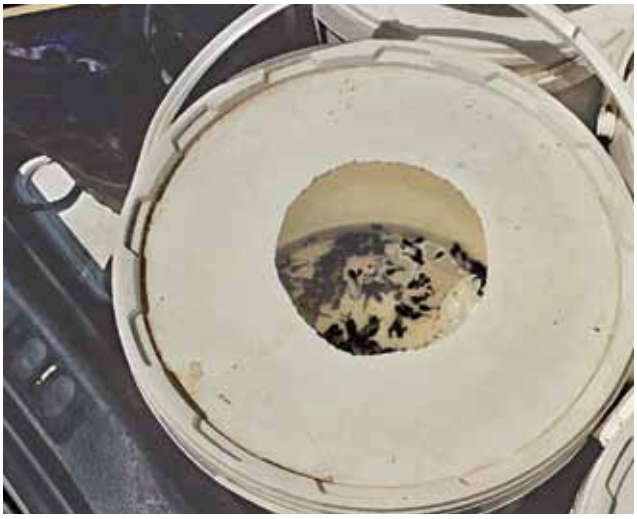
Where necessary the terrestrial habitat should be managed to meet the necessary criteria before ponds are created. Preference should be given to creating scrapes of differing depths based on the natural water table rather than using lined pools. An advantage of lined pools is that they may be topped up with water artificially and, even if not needed for the long term, temporary lined pools may be a useful insurance against desiccation at the start of a project. Artificial refugia should be provided to help maximise the number of toadlets surviving to disperse from the damp pond margins. Discarded roof tiles, slightly raised to allow toadlets to crawl beneath or leafy branches, e.g. sycamore, which dry to provide many hiding places, should be laid around the water's edge.

12.5. Translocating natterjacks

The donor population should be the closest one to the new site and certainly within the same geographical area.

To ensure the best chance of success a reintroduction should take place over three successive years. This establishes a mixed-age structure in the new population relatively rapidly.

The equivalent to at least two spawn strings (approximately 4,000-8,000 eggs), preferably made up from short sections of several strings to give a broad genetic base, should be obtained from the donor site. Freshly laid spawn is best because it travels well. Sections should be cut with sharp scissors and transported in a bucket containing approximately 5 l of water (at a depth of approximately 5-10 cm) from the ponds in which the spawn originated. Buckets with snap-on lids make good transport containers.



A hole cut in the centre of the lid allows ventilation but prevents water spillage during transport (John Buckley)

Spawn should be moved to the recipient site rapidly, certainly within one or two days. During transportation care should be taken to avoid exposing the spawn to extreme temperatures (for example leaving it in the sun).

Free swimming tadpoles without any signs of limb development can also be moved. Well developed spawn, or tadpoles showing signs of metamorphosis, should not be translocated because mortality during transportation can be high in these developmental stages.

Tadpoles are susceptible to suffocation and should be moved in cool water with minimal amounts of dissolved or suspended organic matter.

12.6. Releasing natterjacks

Translocated spawn should be released directly into the recipient pool(s). Spawn strings or segments should be laid out extended rather than coiled, in shallow water (approximately 10 cm deep) at the pond margins. It should be covered with suitably formed wire mesh if disturbance by birds or mammals is likely.

Releasing translocated natterjack spawn into the shallows of a recipient pond (John Buckley)

If water levels are likely to fall rapidly daily inspection will be necessary until the tadpoles have hatched and are free-swimming (approximately 7-10 days). If lowering water levels threaten spawn with desiccation, then it should be gently moved to avoid drying.

Translocation should be repeated over three consecutive years unless some form of catastrophe indicates that the project should be stopped. Toadlet production (many tens, preferably hundreds, and ideally more than a thousand) in two or three years is normally enough to start a colony. Adult males are likely to return to the pond(s) and call two years after the first translocation but females do not appear until a year later to spawn. Such spawning is a strong indicator of success but the appearance of spawn three years after that is the most convincing evidence that a colony has been established.

12.7. Head-starting natterjack tadpoles

When spawn is collected for translocation it may be appropriate to rear on (head-start) some tadpoles before release into the wild. Rearing large numbers of tadpoles requires a high level of commitment and becomes increasingly time consuming as the tadpoles develop and grow but it can be very successful in producing hundreds of large tadpoles for release. Cat litter trays have proved to be good tadpole receptacles/ containers for captive rearing. The trays should be filled to a depth of 5 cm with aged tap water (water left to de-chlorinate for 24 hours) and spawn introduced into several of them. The trays should be placed on flat ground where they can receive full sunshine for much of the day and not covered except perhaps for wire netting to prevent predation by birds such as blackbirds. On days when there is a lot of evaporation the trays will need to be topped up with aged tap water. Pond water should not be used as it may introduce predators or disease. In an emergency water straight from the tap may be used.

As the tadpoles become free swimming their density should be reduced to a few hundred per tray by gently lifting excess tadpoles with a plastic tea strainer into vacant water filled trays. The tadpoles should be fed with rabbit pellet food (compressed vegetable matter). About four pellets per tray per day is usually sufficient at the start. As they grow the tadpole density needs to be steadily reduced to <100 per tray and thus more trays are required. As soon as tadpole droppings become obvious on the bottom of the tray the water needs to be replaced with fresh aged tap water and rabbit pellets resupplied. There is a tradeoff between the number and size of tadpoles per tray and the frequency with which the water should be changed. Changing the water in every tray daily soon becomes the norm. A water change is best achieved by gently pouring the water and tadpoles into a plastic flour sieve, retaining the tadpoles, and returning them to fresh water. Unless feeding and water changes are carried out meticulously mass mortality will result.

The tadpoles may be released at any stage before they are fully grown and showing signs of limb buds. For translocation they should be collected when the water is cool (early morning) and placed into tubs of cool aged tap water just a few centimetres deep. The water should contain no food or sediment, be kept out of the sun and taken to the release site without delay.

12.8. Monitoring natterjacks

Monitoring is important to:

- Determine the success of a reintroduction.
- Assess the status of local populations.
- Contribute to national status assessment.

Most natterjack populations are monitored and data collated by Amphibian and Reptile Conservation to give an overview of national population status. Detailed guidance on monitoring natterjacks is given in *Natterjack Toad. Survey Guidelines* (The Herpetological Conservation Trust, undated).

Monitoring a reintroduction After the translocated spawn has hatched occasional visits should be made to monitor the development of the tadpoles and to determine whether, and approximately how many, toadlets emerge.

It is important to monitor introduction sites carefully for at least five years after starting a translocation and preferably longer.

Long-term monitoring Annual monitoring of spawn and toadlet production is useful in assessing the status of natterjack populations.

Natterjack reproduction can be erratic, with some females not breeding in some years or, more rarely, spawning twice in the same year. More typically each female produces one clutch of spawn annually. The clutches (two strings of spawn per clutch) are deposited in shallow water usually separate from one another so that the spawn from individual females can be readily identified. In situations where strings are deposited together they can be counted by gently moving them apart with a stick or similar, to count individual spawn strings. Counting the pairs of spawn strings (individual clutches) is useful because such counts are equivalent to the number of females spawning in a particular year. Spawning can be influenced by seasonal weather conditions before and during the breeding season but in the long term, spawn string counts give a good indication of the number of females in a population. In natterjacks the sex ratio is approximately 1:1, so spawn string counts also give an estimate of adult population size.

To count spawn strings:

- Each potential breeding pond should be visited at least once every 10 days from early April to early June.
- Night time surveys during this period to locate calling males can be useful in identifying likely breeding ponds.
- Once the first spawn is detected the frequency of visits can be increased.
- Each potential breeding pond should be searched by walking around the perimeter, and carefully through shallow water in the case of larger ponds.
- Spawn string locations should be noted and the counted strings discretely marked by pushing a small stick into the pond substrate, to avoid double-counting on a later visit.
- The total number of spawn strings recorded in each pond over the season should be recorded as the spawn string count.

Counts of spawn string pairs provide a useful estimate of the number of females breeding. The photograph shows two clutches of spawn, the strings of the clutch laid from left to right are deposited in the characteristic way. (ARC)

The production of toadlets from ponds is a useful indicator of breeding success in a particular year. The success of toadlet production may also give an earlier warning of local population problems than spawn string counts. Natterjacks are long-lived so females can potentially spawn for many years in a population where recruitment is actually low or absent due to repeated failure of tadpoles to achieve metamorphosis.

Metamorphosis occurs between mid-May and Mid-July but June is the peak month for most sites in most years. Metamorphosing toadlets are active by day. They emerge from ponds in a few favoured spots and often aggregate to conserve moisture.

To assess toadlet production:

- Visit breeding pond(s) weekly from mid-May to mid-July until the first toadlets are found.
- Once toadlets have been detected, increase the frequency of site visits.
- Walk around the margins of each breeding pond, taking care not to trample toadlets.
- Search under any debris that may be present around the pond margins.
- Estimate the number of toadlets to within an order of magnitude (zero, tens, hundreds, thousands etc.).

12.9. Literature

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