Common toads and roads

Guidance for planners and highways engineers (England)

amphibian and reptile conservation

Amphibian and Reptile Conservation would like to thank the following people for their comments and input into this booklet: Brian Armstrong (Peterborough City Council), John Baker, Greg Carson (Ecology Network), Jim Foster (Natural England), Tony Gent, Andy Glencross (Wokingham Borough Council), Jules Howard, Ross Leal (Kirkby and Diamond), Rob Oldham, Daniel Piec, John Poland (ARG UK), Andy Ross (Royal Haskoning), John Wilkinson and Dorothy Wright.

Edited by Francesca Barker. Designed by Lucy Benyon.

This booklet was produced with financial assistance from Patagonia Environmental Grants, ACO (www.aco-technologies.com) and Greenwillows Associates Ltd (www.greenwillowsassociates.co.uk).

OUR KEY MESSAGES

- All public bodies have a 'biodiversity duty' (Section 40 of the Natural Environment and Rural Communities [NERC] Act 2006) to have regard for biodiversity conservation when carrying out their functions.

- Common toads *Bufo bufo* are recognised as being of principal importance for the conservation of biodiversity under Section 41 of the NERC Act 2006.

- Therefore, legislation requires that planning authorities need to ensure that common toads are protected from the adverse effects of development.

- This guidance is intended to assist planners and highway engineers (both in the public and private sector) to be aware of the necessity to identify important toad habitats and migration routes, before planning and implementing any road or other developments. Planners and highway engineers must avoid or mitigate for any adverse effects of schemes.

Contents

4 Your responsibility
6 Toad ecology
8 Spotting issues early
10 Assessing toad populations
12 Actions for toads: Mitigation guidance
14 Actions for toads: Tunnels and kerbs

Why are toads disappearing?

- Loss and degradation of breeding ponds.
- Roads crossing migration routes.
- Isolation of toad sites, meaning populations are more vulnerable.
- Loss of land habitats through intensive farming and development.
- Threats from newly emerging diseases.

Your responsibility to act

In 2007, the UK Biodiversity Action Plan (UKBAP) listed the common toad *Bufo bufo* as a priority species. Recent research suggests that toads have declined by 50% or more in central and eastern/south-eastern regions in Britain (Carrier and Beebee, 2003).

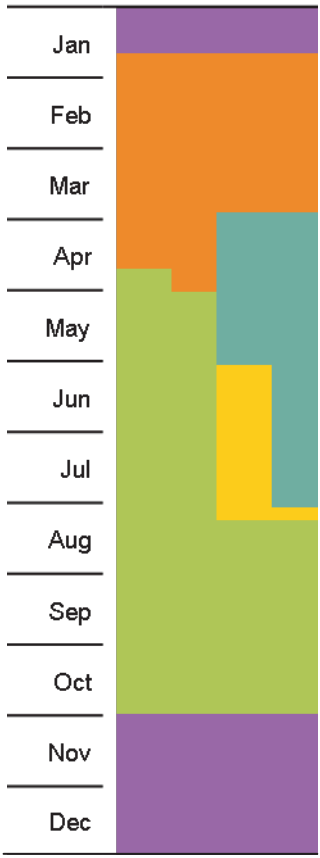
Since 2008 this inclusion has been reinforced in England under Section 41 of **The Natural Environment and Rural Communities (NERC) Act 2006**, where UKBAP species were recognised as of principal importance for the conservation of biodiversity. **Section 40 of the NERC Act 2006** requires all public bodies to have regard for biodiversity conservation when carrying out their functions. This is commonly referred to as the **'biodiversity duty'**.

Planning Policy Statement 9 (PPS9) urges local authorities to take measures to protect the habitats of toads (PPS9:16) from further decline. Planners should be provided with up to date information from developers to make informed decisions (PPS9:1i), and aim to maintain, enhance, restore or add to biodiversity (PPS9:1ii). It is also important that natural habitats which provide routes for the migration, dispersal and genetic exchange of toads in the wider environment should be maintained (PPS9:12).

Road developments that disrupt migration routes, breeding and land-based habitats can be **harmful to toad populations**. Specifically, direct and indirect toad mortality from roads is due to:

- **Traffic mortality**.
- **Raised kerbs** which prohibit toads from reaching the other side of the road and inadvertently guide them into gully pots.
- **Gully pots** which toads fall into and can not exit.
- **Fragmentation of migration routes** between breeding ponds and terrestrial habitats.
- **Destruction of key habitats** such as **breeding ponds** and **terrestrial habitat** during road construction.

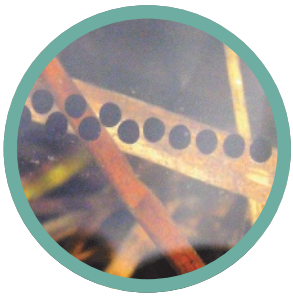
Figure 1. **Life cycle of the common toad.** Exact stages will vary according to location and local environmental conditions.



Toad ecology

Common toads are **widespread** in most of the countryside**,** as well as in **habitats intensively modified** by humans, such as suburban areas, village ponds and gardens. Toads are therefore likely to occur on sites subject to road development.

Toads breed in **large ponds, drainage ditches and lakes**, but live on land for most of their lives. They prefer slightly **deeper water** to breed in than our other native amphibians, and unlike great crested newts, can tolerate the presence of fish. Every year in spring, adult toads **migrate** *en masse* from their hibernation site, often in **woodland**, to their breeding pond (which can be more than 1km away). After breeding, toads gradually return to their previous summer habitats to forage, and will migrate to their hibernation site again in late autumn. The same route may be used for many years. Toads do not necessarily migrate along natural cover such as hedgerows or rough grassland, and will often use bare ground or roads as an easier migration path.



Toads emerge from hibernation slightly later than common frogs, and **migrate to ponds on mild evenings (5°C+)**, often during or after rain. Their **spawn is laid in strings** rather than clumps. Common toad **tadpoles are black** and may form **shoals**.

Toadlets **leave the pond, often in huge numbers, in early summer**, frequently during or after heavy rain. Juvenile toads, like adults, have **'warty' dry skin** and are usually a shade of **grey/green or brown**. They can sometimes be very dark or brick red.

Terrestrial habitats used by toads include **woodland** and **rough grassland**. In **gardens** and other man-made areas they can be found sheltering or hibernating under **paving, decking, compost heaps** and **log piles**.

Will toads be affected by the road development?

When considering the ecological impact of a proposed road development, it **may be necessary** to undertake **a risk assessment** (Figure 2, right).

This risk assessment should only be undertaken if a **standing water body of more than 200m² is present within 1km of the road boundary**. If so, the risk assessment should be undertaken by **experienced consultants** to identify the likely threat of the road to a toad population. The risk assessment should consider **habitats up to 1km away from the road**. Consultants should assess the factors below to identify whether the proposed road development will constitute a high, medium or low risk.

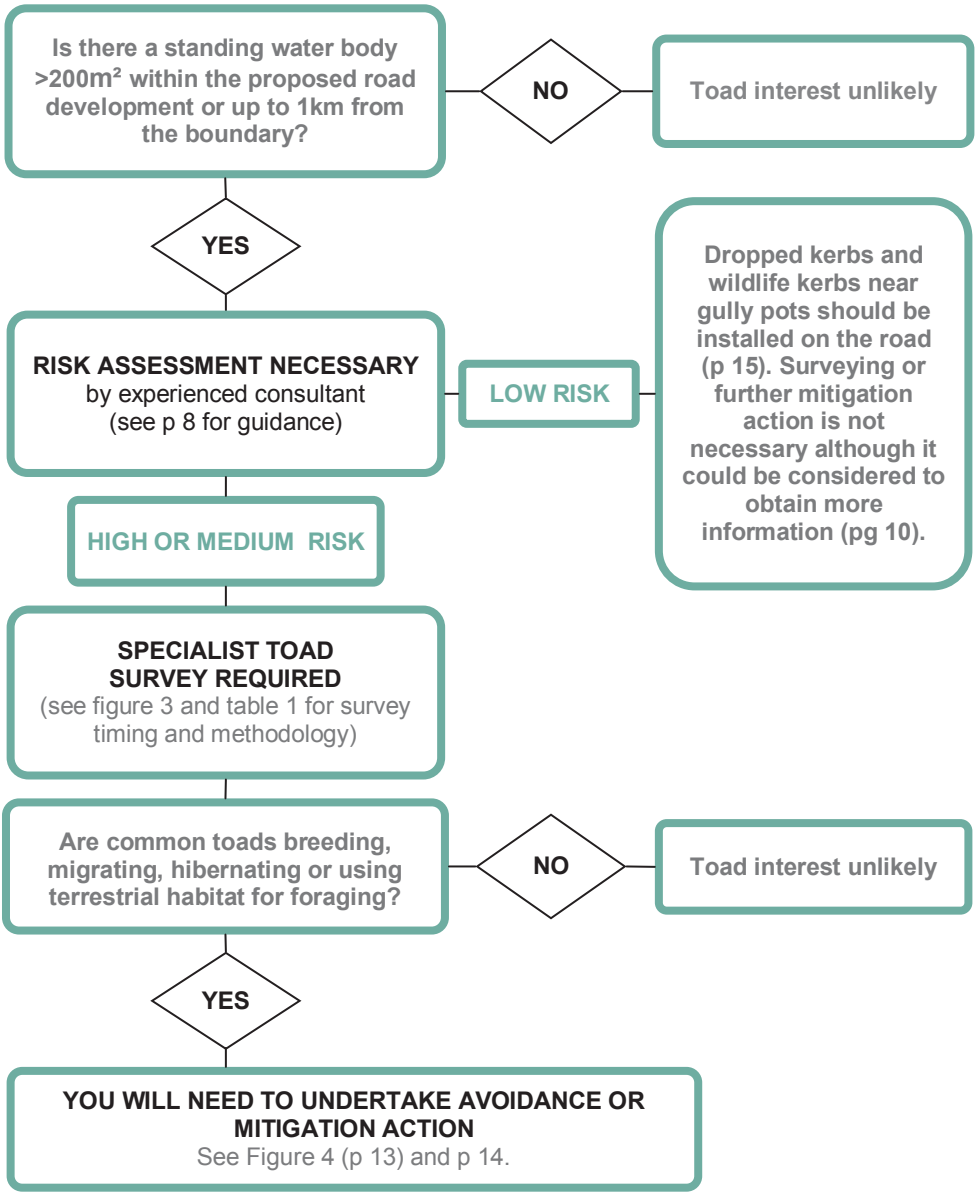
Factors that contribute to a **high risk** are:

- Development of a 'Local Distributor Road' or larger.
- Water body of >500m² present.
- Good vegetation cover, including woodland and rough grassland.
- No major barriers to dispersal such as existing major roads or urban development.

Road developments that are likely to pose a **high or medium risk** to a toad population (as determined by an ecological consultant) will require a **specialist survey** to gather more information (table 1, p 11). These surveys should also be conducted by experienced consultants as part of an impact assessment at the onset of the planning process.

If a road development is likely to constitute a **low risk** it is unnecessary to undertake any further surveys, although **dropped kerbs and wildlife kerbs** should be installed on the new road to minimise any potential mortalities (more details p 15).

Figure 2: **Are toads likely to be affected by the road?**



Identifying existing toad populations

The survey approach (figure 3 and table 1) should identify the **migration routes**, determine the **size class of the breeding population** and assess the **quality and extent of terrestrial habitats**. A specialist amphibian consultant should be employed by the applicant to undertake this survey.

When assessing the breeding population, consultants should classify the population using the following size classes (taken from Herpetofauna Workers' Manual, 1998 (p 97)). Surveys must take into account the proportion of pond surveyed and the quality of the pond.

Population size classes:

Low : < 100 counted individual toads
Good : 100-1,000 counted individuals
Exceptional : > 1,000 counted individuals

Resources to help planners and highways engineers:

Determining known toad distributions:

- Toads on Roads website: www.arc-trust.org/toadsonroads
- National Biodiversity Network Gateway: http://data.nbn.org.uk/
- Amphibian and Reptile Groups of the UK (ARG UK): www.arguk.org (contact details for local groups).

Information on surveying:

- Gent, T and Gibson, S (1998), Herpetofauna Workers' Manual, Joint Nature Conservation Committee.

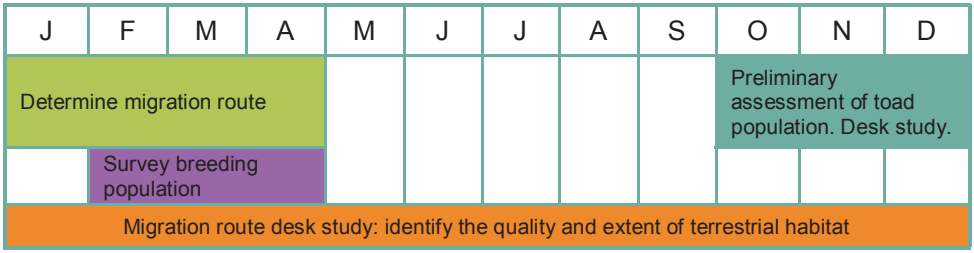


Figure 3: **Actions to take, by month.**

Table 1: **Assessing toad populations and migration routes**

Objective	Timing	Method
Search for existing data	Before migration starts (before January)	**Desk study**—ascertain presence and size of toad populations in the area: • Visit Toads on Roads online map. • Contact local records centre and Amphibian and Reptile Group (ARG). • Talk to landowners and local people. • Check National Biodiversity Network Gateway.
Determination of migration route	Any time	**Desk study**—determine potential migration route: • Visit Toads on Roads online map. • Contact local ARG. • Study maps/ aerial photos/ online maps for features such as ponds and woodland and identify potential migration route between such features. Toads don't necessarily migrate along natural cover such as hedgerows or rough grassland, they will often use bare ground or roads as an easier migration path.
	January - April (depending on region)	**Site survey**—undertake one of the following surveys. Method choice depends on site circumstances. • Night time visual searches* for migrating animals (preferred method). • Ring fencing and pitfall traps around pond. • Pitfall traps along proposed road.
Assessment of breeding population size class	February to late April	**Site survey**—night time toad counts in breeding pond. At least four visits are needed over a **14 day period from the first paired toads** in the pond (as long as weather conditions remain suitable). It is difficult to judge the right time to survey and often peak breeding can be missed altogether.
Assessment of the quality and extent of terrestrial habitat	Any time	**Walkover survey and analyses of aerial photos.** Good terrestrial habitat includes rough grassland, woodland, gardens and extended wetlands. Habitats up to 1km from the development should be considered.

* Survey for migration route can be targeted immediately after the first toads have been seen in pond; the migration may be interrupted if weather conditions are unfavourable, surveying should take this into account.

Actions for planners and highway engineers if toads are found

Objectives:

- Conserve, enhance and, where possible, improve toad habitat.
- Maintain connectivity between aquatic and terrestrial habitats.
- Maintain connectivity between toad populations.
- Avoid killing and injuring toads.

If the planned development is likely to negatively affect a toad population, planning authorities and developers should consider redesigning the route to remove, or at least reduce, the impacts.

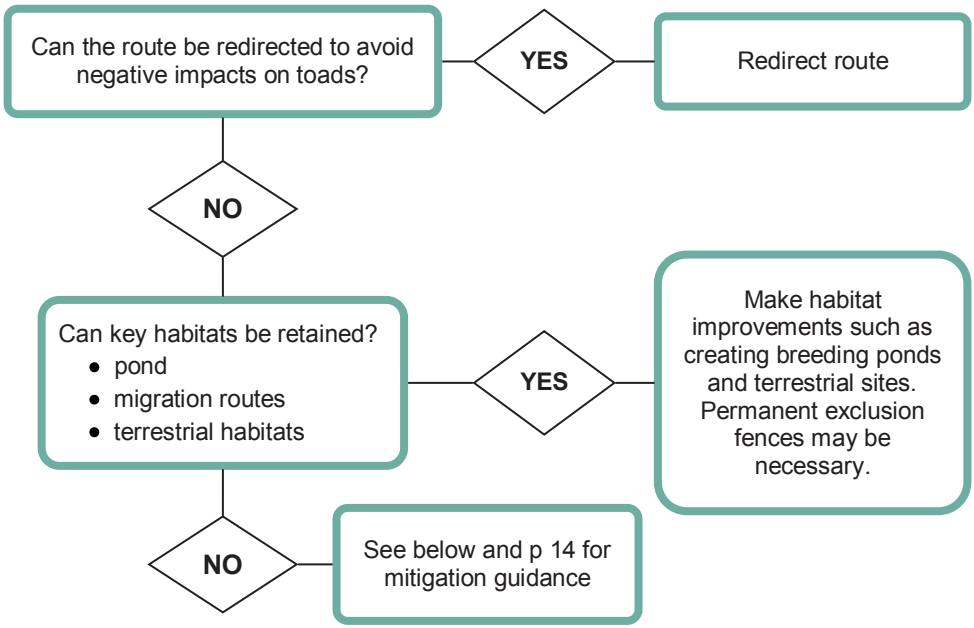
Only when it is not possible to redesign the route should the planning authorities consider mitigating or compensating for the impacts. Figure 4 (right) offers guidance on whether mitigation will be required.

Mitigation approaches might include:

- Temporary traffic ban during migration.
- Reduction of drain related mortality through the use of modified kerbs.
- Exclusion/deflection fences.
- Alternative habitat creation.
- Underpass/tunnel construction.
- Overpass (this is only considered necessary as part of a combined mitigation approach with other larger migrating animals such as mammals).

Maintaining and improving both aquatic and terrestrial habitats used by toads at different times of year, and ensuring that individuals can move between these habitats, is essential to conserving populations.

Figure 4: **Action if toads are found.**



Mitigation guidance

Correct mitigation depends on individual site circumstances. An experienced consultant should use the risk assessment (p 8) and survey information (p 11) to design an effective mitigation strategy for toads.

As a guide, **tunnels/underpasses** (p 14) should be considered only when the toad population is exceptional or approaching exceptional (p 10) and the breeding pond is <100m from the proposed road development. A breeding pond should also be present on both sides of the road and should be created in addition to the installation of tunnels or underpasses if they are not present.

In cases where tunnels or underpasses are not installed, **habitat creation** will be necessary when the road **fragments or destroys the breeding and hibernation sites**. Ponds (>500m²) should be created on the side of the hibernation/ terrestrial habitat. Permanent exclusion fences may need to be installed as well.

Reduction of drain related mortality through dropped kerbs and wildlife kerbs (p 15) will be necessary when toads could cross the road. This could be combined with a temporary traffic ban during the migration period.

Using amphibian tunnels and modifying kerbs

Amphibian tunnels can reduce habitat fragmentation. However, experience shows that toad tunnels are often poorly installed and maintained resulting in ineffective mitigation. It is therefore **vital to consider the following factors** that are crucial for a successful tunnel system:

- Knowledge of the exact location of the migration route (table 1, p 11).
- Correct tunnel design (table 2, below).
- Correct installation.
- Presence of guiding fences (see below), to guide animals into tunnels or safer routes across roads.
- Pond creation (>500m²) on side of hibernation site.
- Annual maintenance.
- Monitoring.

Tunnels should be **placed every 50-60m** and those with a **rectangular cross-section** are preferable; if round pipes are used, the bottom of the pipe should be filled with concrete. For construction, **concrete** is preferable. **Water should drain easily** from tunnels and they should be neither completely waterlogged nor completely dry.

Table 2: **Minimum size requirements for amphibian tunnels.** Taken from COST 341 Wildlife and Traffic (Iuell *et al*, 2003).

	Tunnel length			
Tunnel shape	**<20m**	**20-30m**	**30-40m**	**40m+**
Rectangular tunnel (clear width x clear height)	1.0m x 0.75m	1.5m x 1.0m	1.75m x 1.25m	2.0m x 1.5m
Pipe (diameter)	1.0m	1.4m	1.6m	2.0m

Guiding structures should be as **close to the road** as possible to minimise the length of the tunnel. The ends of the guiding fence should be **u-shaped** to contain the toads and it should be at least 40cm high. The **top edge of the fence should be bent over** and the **panels should be smooth** to prevent toads climbing. There needs to be a surface along the bottom of the fence **free from vegetation** to easily allow movement by the toads.

Maintenance and monitoring

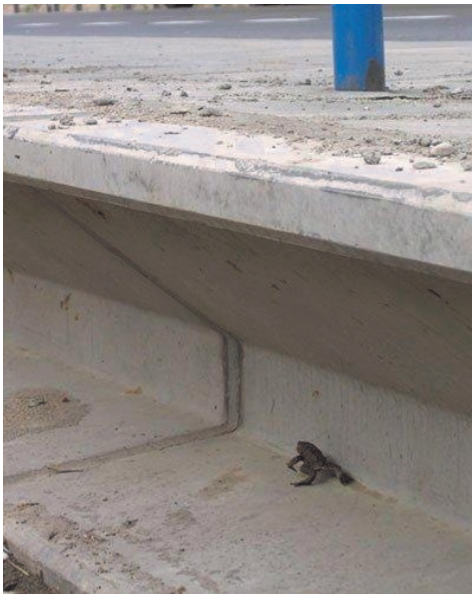
It is essential to **maintain and monitor** use of toad tunnels after construction to ensure the system continues to help toads effectively. This information will also help inform future guidance. Monitoring should take place over a seven-day migration period.

Responsibilities for annual maintenance and monitoring should be agreed upon during the planning stages. Maintenance includes clearing blockages and repairing fences.

Modifying kerbs

To minimise toad mortality **modification of kerbs near gully pots will be necessary**. Designs such as a wildlife kerb (right) provide amphibians with a safe route around gully pots. Lowering the kerb periodically will also be necessary to allow the toads to completely cross the road.

© ACO Wildlife



Above: Guiding fences need to have a vegetation-free surface along the bottom. Right: Examples of tunnel entrances. Photos © Lars Briggs

Further reading

- Carrier, J. and Beebee, T.J.C. (2003), Recent, substantial, and unexplained declines of the common toad *Bufo bufo* in lowland England, *Biological Conservation 111 (3), 395-399.*
- Gent, T. and Gibson, S. (1998), Herpetofauna Workers' Manual, Joint Nature Conservation Committee.
- Highways Agency, (2001), Design Manual for Roads and Bridges: Volume 10, Section 4, Part 6. Nature Conservation Management Advice in Relation to Amphibians.
- Iuell, B., Bekker, G.J., Cuperus, R., Dufek, J., Fry, G., Hicks, C., Hlavac, V., Keller, V., Rosell, C., Sangwine, T., Torslov, N., Wandall, B., (eds.) (2003), COST 341 Wildlife and Traffic: A European Handbook for Identifying Conflicts and Designing Solutions. KNNNV Publishers, Brussels.
- NERC Act (http://tinyurl.com/nfphm9).
- Planning Policy Statement 9 (http://tinyurl.com/65nyfz).
- Sherwood, B., Cutler, D., Burton, J. (2003), Wildlife and Roads: The Ecological Impact. Imperial College Press, London.
- The Herpetological Conservation Trust (HCT) (2009), Common Toad Species Action Plan (www.arc-trust.org/species/saps.php).

amphibian and reptile conservation

About Amphibian and Reptile Conservation

Amphibian and Reptile Conservation is a national wildlife charity (Registered Charity 1130188) committed to conserving amphibians and reptiles and saving the disappearing habitats on which they depend.

Cambridgeshire
a: 2A Flag Business Exchange, Vicarage Farm Road, Fengate, Peterborough PE1 5TX
t: 01733 558844

Dorset
a: 655A Christchurch Road, Boscombe, Bournemouth, Dorset BH1 4AP
t: 01202 391319

e: enquiries@arc-trust.org **www.**arc-trust.org

Thank you to our funders: patagonia®

ACO

greenwillows associates ltd
Ecological Surveys • Habitat Management • Training • Legal Services