

10. Specific Habitats



Dense planting around this garden pond provides habitat for amphibians within a formal garden setting (David Orchard)

10.1. Gardens

Gardens can be excellent habitat for the widespread amphibian species. Ponds are popular garden features and provide breeding sites for common frogs and smooth newts and, to a lesser extent, common toads and palmate newts. Gardens with plenty of vegetation and other features offering shelter for amphibians and their invertebrate prey usually provide favourable terrestrial habitat as well.

In spite of the great potential habitat contained within gardens, there are indications that this is not always achieved. For example, the movement of amphibians between ponds in developed areas, where most gardens are found, is limited compared with that seen in the open countryside (Hitchings, 1997). Built-up areas, including other gardens, are generally unfavourable habitat. The latter apparent inconsistency may be due to the fact that although an individual garden managed favourably for wildlife can provide excellent amphibian habitat, most gardens are not managed this way and may conversely create areas of unsuitable habitat.

There are steps the individual garden-owner can take to make a garden favourable to amphibians but to exploit the full potential of wildlife gardening requires more people doing it.

Information on encouraging amphibians (and reptiles) in gardens is provided in the booklet aimed at garden owners, *Dragons in Your Garden* (Baker *et al.*, 2009), available from Amphibian and Reptile Conservation.

In general following wildlife gardening principles as provided by many publications (e.g. Natural England's website) will benefit amphibians.

The single most beneficial activity for amphibians is to create a wildlife pond:

- Create a pond with gently sloping sides
- Allow vegetation cover to develop around the pond's edges
- Take care in sourcing pond plants
- Do not stock with fish

Create a pond with gently sloping sides Many preformed ponds have steep sides. Using a pond liner gives the flexibility to create the desired pond profile.

Take care in sourcing pond plants Although allowing natural colonisation by plants is recommended practice for ponds in natural (or semi-natural) environments, garden pond owners are likely to want more instant vegetation. Care should be taken in sourcing plants for garden ponds. Invasive non-native plants (section 6.5) are found in many garden ponds so care should be taken to identify potential donations from a neighbour. Native pond plants can be obtained from garden centres or can be taken from nearby 'natural' ponds with the landowner's permission.

Allow vegetation cover to develop around the pond's edges. Extensive paved areas around a pond should be avoided. Instead, aquatic and terrestrial vegetation should be allowed to develop around the pond edges to provide damp cover for young amphibians leaving the water.



This rural garden includes a small pond set within a meadow area which provides ideal terrestrial habitat for amphibians (ARC)

Do not stock with fish Fish can be significant predators of some amphibian tadpoles (section 6.1) and other pond dwellers. Goldfish seem to be particularly harmful to newts. Pond weeds may provide tadpoles with some refuge from fish predation. Fish may be beneficial to common toads but generally, fish should not be stocked in garden ponds for amphibians.

The remainder of the garden should be managed to provide refuges for amphibians and habitat for their invertebrate prey. In general dense vegetation should suit amphibians. Additional steps may also help:

- Allow grass to grow into 'meadows'.
- Create a compost heap.
- Create a log pile.



A combination of lawn, dense plantings, meadow areas and hedgerow (Lee Brady)

Allow grass to grow into 'meadows' Closely-mown lawns are poor habitat for amphibians and their invertebrate prey. Allowing areas of grass to develop as meadows provides habitat for amphibians and their prey. Meadows should be cut during winter and cuttings raked up and placed on a compost heap.

Create a compost heap Compost heaps provide habitat piles for amphibians and invertebrate prey. Open heaps are better than enclosed bins.

Create a log pile Stacking logs or other woody cuttings is another way of creating a habitat feature that may be useful to amphibians. As wood ages and decomposes it holds more moisture and offers an increasingly favourable habitat. Amphibians prefer to shelter in small spaces rather than large cavities, so packing some of the spaces in a log pile with loose soil or wood chippings should improve its value.



Decomposing wood in this log pile holds moisture and provides habitat for amphibians and their invertebrate prey (ARC)

10.2. Sustainable Urban Drainage Systems

Sustainable Urban Drainage Systems (SUDS), or Sustainable Drainage Systems, as they are now more usually called, manage rainwater by using the landscape to regulate water flow, volumes and pollution. Typically such approaches include permeable surfaces, filter strips, filter and infiltration trenches, swales (shallow ditches), detention basins, underground storage, wetlands and ponds. Increasingly the use of SUDS is becoming regarded as best practice and well designed systems offer considerable benefit to wildlife as well as providing effective management of the water resource.

SUDS offer several opportunities for amphibians as they:

- Remove risks associated with traditional gully pot drainage systems (see *10.5 Roads*).
- Provide additional habitat, both terrestrial and aquatic.
- Serve as corridors for migration.

The main principle of SUDS is to mimic the natural drainage of a site. Rainfall is captured and as much as possible allowed to evaporate or soak away. SUDS should achieve a controlled flow of clean water discharging into natural water courses at a rate comparable to that prior to development. In a well designed SUDS most of the storage and treatment is performed by the upstream control elements, ensuring that the water is largely clean before it passes further through. Ponds and wetlands provide open areas of shallow water that provide temporary storage during rainfall events and will, by ensuring a slow flow of water over an extended period of time, allow final 'polishing' of the water to remove any remaining pollution.



Pond drainage system alongside a road in Oxfordshire (Tony Gent)

Design considerations In designing any SUDS system professional advice is needed and for all but the smallest of developments consent from the Environment Agency or Scottish Environmental Protection Agency (SEPA) obtained. SUDS need to be designed to ensure that their primary functions of water management and flood control are achieved and have due regard to safety. This is especially the case in an urban environment or as a feature, for example in a school. However within these constraints there are usually opportunities to further wildlife conservation or provide opportunities for people to experience and enjoy nature.

Although SUDS ponds are unlikely to fit two criteria for good wildlife ponds – clean water source and independent supply (*4.3 Water source*) – they can be created using the same design principles as amphibian ponds given in *4.9 Pond design* – gently sloping sides, a range of depths and irregular shape.

Other considerations that may benefit amphibians include:

- Establishing wildlife 'sanctuary areas' with limited public access, where SUDS areas are large enough.
- Creating a series of different wetland features rather than a single large pond.
- Varying sizes of ponds to offer a range of conditions and hydroperiods at any one time.
- Locating and designing to discourage the introduction of unsuitable species – notably fish and non-native plants (see *6. Other Pond Species*).

SUDS systems provide challenges for designers and should combine the skills of the landscape designer and ecologist with those of SUDS engineers to ensure maximum benefits can be obtained.

Gradients within SUDS ponds should not exceed 1:3 for reasons of health and safety, to prevent erosion and for ease of maintenance. Gently sloping sides also tend to be better for wildlife.

SUDS can be especially beneficial if the network connects to adjacent areas of other potential habitat (fields, allotments, gardens, road verges).

Consideration should also be given to wildlife hazards, such as adjacent roads, discouraging movement towards these and providing alternative corridors if possible. Where fencing or other 'hard landscaping' is provided measures should be included to prevent these forming barriers to amphibian movement. For long-term value of any SUDS scheme for amphibians, all the features needed to sustain a population of the species during all stages of its life cycle should be provided within the immediate area or connected directly to it.



The SUDS system at Hopwood Park motorway service station includes a series of small ponds, some of which have been colonised by amphibians including the great crested newt (ARC)



Golf courses provide excellent habitats for amphibians where areas of 'rough' are interconnected and where water features are created (Tony Gent)

10.3. Ditches

On some sites amphibians breed in drainage ditches. At Offham Marshes, designated as a SSSI on the basis of its amphibian populations, alterations in ditch management had major consequences for the resident common toads. Changing from a regime of total clearance on a rotational basis to partial clearance, removing vegetation from only one side of the ditch, coincided with a crash in the toad population. Reversion to the original management system allowed population recovery.

It seems likely that clearance of only one side of a ditch allowed invertebrate predators to increase rapidly at the expense of the toad tadpoles. Toad tadpoles do best in open water, which presumably allows them to escape from invertebrate predators.

10.4. Other land uses

Opportunities exist for amphibian conservation in a wide range of other land uses. Sometimes relatively minor changes in management can considerably increase the value to wildlife generally and specifically for amphibians by following the principles outlined above.

In urban areas green spaces such as parks, allotments and schools form significant refuges for amphibians and offer opportunities for people to find and experience them. Features such as church yards provide valuable habitat in both rural and urban settings, benefitting from long periods without significant ground disturbance or cultivation. Sports grounds, and especially golf courses provide large areas where positive wildlife conservation measures can be implemented without compromising their primary use.

Allotments are local havens for amphibians; their value can be improved by leaving some areas uncultivated and reducing the use of chemical fertilisers and pesticides.



The amphibian value of green spaces such as allotments can be increased by leaving some 'wild areas' and adding a pond (ARC)

10.5. Roads

Roads are barriers to amphibian dispersal and may have adverse effects on nearby populations through the numbers of animals killed by road traffic or, less frequently, road salt. There are several measures that may reduce the impacts of roads on amphibians:

- Planning the location of new ponds.
- Road tunnels and fencing.
- Modifications of gully pots and kerbs.
- Assisting amphibians across roads.
- Informing motorists by road signs.
- Temporary closure of roads during sensitive periods.

Amphibian and Reptile Conservation produces a booklet *Common toads and roads* (Barker and Benyon, 2009) to provide more detailed guidance for planners and highways engineers.

Road tunnels and fencing Specially designed tunnels have been installed at several sites to allow migrating amphibians to safely cross underneath roads. Low fences are used to guide amphibians to the tunnel entrances. Construction materials have been adapted for these purposes and so are commercially available. Nevertheless there is uncertainty about

the effectiveness of amphibian tunnels, especially as animals appear unwilling to enter some of them. Lack of maintenance may also contribute to a lack of effectiveness.

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



Toad tunnel and fencing in the Netherlands (Jelger Herder RAVON/DigitalNature.org)

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

Tunnel shape	Length of tunnel			
	< 20 m	20-30 m	30-40 m	40 m +
Rectangular (width x height)	1.0 x 0.75 m	1.5 x 1.0	1.75 x 1.25	2.0 x 1.5 m
Circular/pipe (diameter)	1.0 m	1.4 m	1.6 m	2.0 m

Guiding fences should be as close to the road as possible to minimise the length of the tunnel. The guiding fence should be at least 40 cm high and it should have u-shaped returns at the open ends to contain amphibians. The panels should be smooth to prevent amphibians climbing over and ideally the top edge of the fence should be bent over. The ground along the bottom of the fence should be kept free from vegetation to allow amphibians easy progress as they follow the fence.

It is essential to maintain and monitor use of tunnels after construction to ensure the system continues to help animals effectively. Information gathered 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.

Modifications of gulley pots and kerbs Amphibians attempting to cross roads can become trapped in gulley pots. This problem is exacerbated by high kerbs which act as barriers, deflecting animals towards gulley pots. New building developments can take simple steps to modify the placement of gulley pots and the design of kerbs to minimise their impacts on amphibians.

Gulley pots should be located to allow a gap of approximately 10 cm between them and the kerb to allow amphibians following the lower edge of the kerb to bypass the gulley pot. Alternatively, the kerb can be inset to allow a similar sized gap around the edge of the gulley pot. ACO Wildlife produces an amphibian kerb which includes a recess for the same purpose.

Kerbs should be lowered at intervals to allow migrating amphibians an easy route off the road. In some situations allowing gaps in the kerb lining a road or car park may serve the same function.



Toad migrations across roads put them at risk from traffic and from hazards such as high kerbs and drainage gulley pots (Ben Driver)



Road closed during amphibian migration in the Netherlands (Jelger Herder RAVON/ DigitalNature.org)

10.6. Literature

Baker, J., Benyon, L. and Howard, J. (2009). *Dragons in Your Garden*. Amphibian and Reptile Conservation, Bournemouth.

Barker, F. and Benyon, L. (2009). *Common toads and roads. Guidance for planners and highways engineers (England)*. Amphibian and Reptile Conservation, Bournemouth.

Bray, R. and Gent, T. (1997) *Opportunities for amphibians and reptiles in the designed landscape*. English Nature Science Series No. 30. English Nature. Peterborough

Duff, J.P., Colville, K., Foster, J. and Dumphreys, N. (2011). Mass mortality of great crested newts (*Triturus cristatus*) on ground treated with road salt. *Veterinary Record*, March 12, 282.

Hitchings, S.P. (1997). Ecological genetics, conservation and extinction – a case study with frogs and toads. *British Wildlife* 8(6), 341-347.

Humphreys, E., Toms, M., Newson, S., Baker, J. and Wormald, K. (2011). An examination of reptile and amphibian populations in gardens, the factors influencing garden use and the role of a 'Citizen Science' approach for monitoring their populations within this habitat. BTO Research Report No. 572.

Luell, 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.

Robert Bray Associates and Islington Borough Council (2010). *Promoting Sustainable Drainage Systems: Design Guidance for Islington*. Islington Borough Council.

www.islington.gov.uk/environment/sustainability/sus_water/SUDS.asp

Sherwood, B., Cutler, D., Burton, J. (2003), *Wildlife and Roads: The Ecological Impact*. Imperial College Press, London.

SEPA (2000) *Ponds, pools and lochans. Guidance on good practice in the management and creation of small waterbodies in Scotland*. Scottish Environment Protection Agency.

www.sepa.org.uk/water/water_regulation/regimes/engineering/habitat_enhancement/best_practice_guidance.aspx#Ponds

Wilson, S., Bray, R., Neesam, S., Bunn, S. and Flanagan, E. (2010). *Sustainable Drainage: Cambridge Design and Adoption Guide*. Cambridge City Council.

www.cambridge.gov.uk/ccm/content/planning-and-building-control/urban-design/sustainable-drainage-systems.en

Woods-Ballard, B., Wallingford, H.R., Kellagher, R., Martin, P., Jefferies, C., Bray, R. and Shaffer, P. (2007) *The SuDS Manual*. CIRIA C697.

www.ciria.org.uk/suds/publications.htm