

Amphibian and Reptile Groups of the United Kingdom

Advice Note 11

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Managing Habitat for Adders: Advice for Land Managers

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1. Preamble

This note provides advice for land owners and managers, by highlighting sympathetic management practices for adders, and identifying ways in which conflict with other land uses can be minimised. Although written primarily for land managers, it may also be of use to other stakeholders including: conservation and statutory bodies, local authority planners and local volunteer groups.



Adder (Nigel Hand)

2. Background

2.1. Conservation status

In the UK, the adder *Vipera berus* has declined dramatically since the mid part of the 20th Century. Whilst still relatively widespread in some parts of the UK, in many other areas, particularly central England, populations comprise isolated groups surviving in fragmented pockets of habitat. These small populations are vulnerable to local extinction.

Adder declines are due to a number of causes, primarily habitat loss, but also: persecution, predation, disturbance and burning their habitat. Agricultural intensification and commercial forestry are some of the biggest direct causes of adder habitat loss, and adders have suffered more than other reptile species because they have restricted habitat preferences and are less able to colonise new locations. In addition, despite some changes in attitude, adders are still sometimes deliberately killed, even though this is illegal, further diminishing already small and fragmented populations. Adders also appear to be sensitive to repeated disturbance by recreational site users and photographers (Baker, 2015).

Even on protected sites adders may struggle, as many standard habitat management practices do not favour them. In some cases, unsympathetic habitat management, particularly removal of hibernation sites, over-grazing, burning and extensive scrub management, can lead to severe declines and local extinctions. Conversely, lack of positive management, leading to degradation of key microhabitat features, may also negatively impact upon adders.

2.2. Legal status

In England and Wales all reptile species are listed on schedule 5 of the Wildlife and Countryside Act 1981 (as amended in England and Wales). Under this legislation, adders are protected against killing, injuring and unlicensed trade. In Scotland all reptile species are protected under the Wildlife and Countryside Act 1981 (as amended in Scotland), which affords the same protections as in England and Wales, and also includes reckless killing or injuring as an offence.

2.3. Annual life cycle

Adders emerge from hibernation from early spring, if the weather is mild, and males can be

observed from January (in southern England and West Wales) or February-March (elsewhere). Emergence is followed by basking or 'lying out', often very close to the hibernation site, which can last for several weeks. This is an important time for the males, which need to bask in preparation for successful mating, and it is essential that disturbance is minimised at this time. Following the lying out period, males shed their skin (slough), after which they become much more active, competing for females and eventually mating. Females slough around a month later, and both sexes slough again later in the summer.

Dominant males may mate with several females during the spring. Gravid females are relatively sedentary and spend the summer basking before giving birth to 3-18 young during August and September. Birthing areas should be undisturbed from late spring through to late summer, as females are particularly vulnerable at this time.



Male adders in combat (Nick Saunders)

Adders can remain active through to late October or early November in southern parts of the UK, although the activity period is much shorter in the north of Scotland. Mainly a diurnal species, adders may also be active at night during very warm weather.

Although some adders can move over distances of up to 2km through the year, other animals may move no more than a few tens of metres, and can be very site faithful. Adders return to their traditional hibernation sites in late summer, and this is often where the females give birth. This high degree of site fidelity is one reason why hibernation and birthing sites are critical to managing habitat for adders.

3. Habitat requirements



Good adder habitat, comprising a mixture of vegetation at different heights, open areas for basking, and a brash pile which could act as a shelter or hibernation site.

Six key habitat requirements for adders are:

- Slopes with southerly aspects or varied topography, usually on well-drained soils.
- Diverse or 'mosaic' vegetation structure, creating open areas adjacent to cover.
- Habitat edges/transitional zones, for example between scrub or woodland and rough pasture, heathland or grassland, with a favourable aspect for basking.
- Habitat connectivity. Adder dispersal abilities can be limited so connectivity of areas of suitable habitat is very important both within a site and beyond its boundaries.
- Abundant prey, mainly voles and small mammals, but also amphibians and common lizards.
- Access to safe, undisturbed, dry and climatically stable sites for hibernation.

4. Assessing habitat suitability

4.1. Reading the landscape

Before starting site management it is useful to assess habitat suitability, or 'read the landscape'. Factors to consider should include: soil type, aspect, topography, vegetation structure, refuge potential etc. In general, adders require dry, open, sunny areas with adjacent dense ground cover, since they need to be able to bask safely, but escape should a predator approach. Adders can also be found in wetter areas around ponds, lakes, bogs or mires (especially in the summer) providing there are dry banks or grass tussocks for basking.

4.2. Importance of overwintering sites (hibernacula)

In Britain adders overwinter by hibernating in a secure and sheltered spot. Hibernation sites must be frost-free, humid (but not wet) and safe from flooding and predators. Adders usually hibernate underground, or less often within above-ground structures. However, hibernation sites almost always have a south-facing aspect, and are normally in full or partial sun. They tend to be located on slopes with southerly aspects or varied topography and in voids in natural and/or artificial structures (e.g. windrows). Typical hibernation sites include: mammal burrows, rotted tree stumps and root holes, large grass tussocks, ant-hills, old walls and building foundations, large old bracken banks, piles of rubble and other debris and under large logs and fallen trees.

Adders may make seasonal movements to hibernation sites and often hibernate communally, with up to several dozen snakes using an especially suitable site, which they may even share with other reptile species. Communal hibernacula are critical features for adders, and inadvertent damage to a single, large hibernaculum, can be catastrophic for a small population. Even removal of vegetation cover from a hibernaculum can increase the potential of predation when the adders emerge in spring.

4.3. Site mapping

This information forms the basis of a 'site map', dividing the area into high, medium and low areas of suitability.

High	Potential hibernation sites, sheltered basking areas or birthing sites – management needs care and attention to timing.
Medium	Habitat that may be used temporarily (foraging, migration) – conventional habitat management techniques may be applied, with minor modifications.
Low	Unlikely to be used – no management issues for adder.

5. Habitat management

5.1. Overview

Managing habitat for adders essentially involves maintaining areas in a mid-successional state, and providing a favourable vegetation structure at ground level. However, even within suitable sites adder distribution may be patchy, and whilst some microhabitats can support many individuals other nearby, and apparently similar, areas may rarely be used.

Identification of hibernation and birthing sites is critical to managing habitat for adders. We recommend that these areas should always be managed with a 'light touch'. Recreational site users, particularly dog walkers, should be discouraged from visiting these areas.

Maintaining corridors of vegetation cover between the different areas used by adders reduces the risk of predation while they are on the move.

Habitat management should aim to achieve the following:

- Suitable adder habitat should be identified and maintained/managed appropriately.
- Favourable habitat should be extended where possible.
- Adjacent patches of suitable habitat could be connected – by creating banks with rough grass or pasture, extending hedge lines or encouraging belts of light scrub.
- Hibernation and birthing sites should not be worked on with heavy machinery.

5.2. Cutting, mowing and grazing

Cutting, mowing and grazing are the most usual means of maintaining reptile habitats, and removal of some scrub, bracken and trees is often essential to retain the open character of sites. However, large-scale removal of vegetation, conducted within a very short period of time, and particularly by tractor-mounted mechanical flail, can be catastrophic for local adder populations.



Large-scale removal of vegetation structure can be catastrophic for adder populations. Left: well-structured lowland heathland habitat, home to a number of native reptiles including, adder and common lizard, as well as other nationally scarce species. Right: After mechanised clearance, removing vegetation cover and hibernacula (A. Julian).

We recommend that 'sensitive areas', where adders have been recorded, should be managed using hand tools, rather than by tractor-mounted mechanised means. Where necessary, mechanised hand tools, including brush cutters and pedestrian mowers, can be used on regularly managed areas during the winter months, (November to end of January). However, we recommend that these are used only by trained and experienced operators.

5.3. Grazing

Grazing has an important role in the management of grassland, wood pasture, heathland and upland sites and is an essential component of many conservation management plans. It is also an important income generator for many landowners, and is often specified in agricultural payment and Sites of Special Scientific Interest (SSSI) schemes. Grazing can also benefit reptiles, by preventing encroachment of scrub and woodland, and creating a more diverse vegetation structure.

However, high density grazing, or grazing the same piece of land over long periods, can have very deleterious effects on reptiles and particularly adders. Over-grazed sites have little vegetative diversity, and may have little of the structural cover that adders require. Heavily grazed sites are often characterised by few or fragmented islands of scrub with little or no connectivity to other suitable habitat. Other impacts are enrichment of soil and trampling, both of which can reduce vegetative diversity and structure; though conversely these can also improve habitat by creating areas of bare ground, and encouraging a greater diversity of invertebrates to support prey species.

Three factors influence the outcome of grazing regimes. These are: species/breed of livestock, timing and stocking density. For adder sites we recommend careful design of grazing schemes with low stocking densities and, where possible, native or heritage breeds. Consideration should also be given to whether additional protective measures need to be undertaken for the most important landscape features for the adders.

- **Livestock type** - Cattle are often used for grazing on conservation sites, as they 'grab and pull' tufts of vegetation leading to an uneven sward structure and a 'tussocky' surface. Cattle will also eat the longer, coarser grasses and create open spaces by pushing their way through scrub and bracken. At a low stocking density, ponies have also been effective for conservation grazing, and can eat bracken in small amounts. By contrast, sheep tend to graze everything down to a short, even layer removing much of the floral diversity; although the native hill breeds are browsers, and better suited for scrub control on upland areas. Other species that are used for conservation grazing, depending on terrain and security of the site include, water buffalo, deer and goats.



Belted Galloway, low density grazing on a grassland site (A. Julian)

- **Timing** - Grazing regimes should be tailored to the individual requirements of each site. One means of achieving this is by using 'flying flocks' of animals moved around on rotation. Large land holders e.g. The Wildlife Trusts and the National Trust, are well placed for this, but even on smaller holdings it is possible to invite contract graziers for specified periods. Grazing rotation is hardest to achieve where there are commoners' grazing rights, and there may be a need to negotiate with the commoners over this, and fence off the most sensitive areas for adders. As a general rule the longer the period that the land is continuously grazed for, the lower the stocking density should be.

We recommend removing grazing animals (or fencing off sensitive areas) during the adders' spring emergence and the breeding period, from February to the end of May. Grazing animals on these sites during this period could be detrimental to adder breeding.

- **Stocking density** – As a rough guide for cattle on land containing adders, we recommend a maximum of 0.2 livestock units per ha. Low intensity grazing with just five native Exmoor ponies, supplemented with tractor mowing in some areas, has worked well on a 50-ha Butterfly Conservation-managed site (Nigel Hand pers. obs.). However, it is not always possible to predict the impact of grazing and, even at low densities, livestock can sometimes favour specific areas, causing a greater local impact than expected. It is important to monitor the grazing regime and be prepared to adjust the density of animals where necessary. Some conservation landowners fit GPS tracking collars to cattle to assess how they use the site, as it is often difficult to predict where problems might lie in the early stages. Another option is to fence off the sensitive areas for the adders, such as hibernacula or important basking areas, using post and wire or temporary electric fences. A line of fencing located a few metres from a wall or hedge bank to create a wider buffer strip could substantially improve the connectivity of an important landscape dispersal feature for the adders.
- **Use of refugia** – We do not recommend using refuges for reptile surveys on a grazed site, particularly where there are heavier animals such as cattle, water buffalo and ponies, unless they can be located where the grazing animals cannot stand or lie on them. A large herbivore could easily crush an adder sheltering under a refuge.

5.4. Managing bracken

Bracken is an important plant for adders. Adders are cryptic, and their dorsal zigzag pattern is well suited to camouflaging them in bracken. The beige-brown-orange background coloration of females and juveniles lends itself particularly well to concealment within bracken litter. Bracken is also home to a variety of other species, including: meadow pipit, woodcock, snipe, nightjar, short eared owl, dormouse, harvest mouse, amphibians (common frog and common toad), butterflies (e.g. pearl-bordered fritillary) and many other invertebrates.



Cutting small areas of bracken with brush cutters and hand tools to create rides and glades, but minimising the impact on animals using the bracken to forage or shelter from predators (Nigel Hand)

Adders often hibernate and thermoregulate within bracken. Indeed, on many upland hillsides across the UK, where grassland is intensively grazed by sheep, bracken may be the only significant remaining cover for reptiles. In early spring, bracken thatch provides important cover when surrounding vegetation is still low. Radio telemetry has revealed that adders spend long periods under dead bracken or in damp bracken humus, where they may be sheltering from inclement weather conditions, or searching for prey (Nigel Hand pers. obs.).

Bracken, however, is often regarded as a 'nuisance' and heavily controlled, either through cutting and collecting, rolling or the use of herbicides such as Asulam 'Asulox' (recently restricted under EU law, and unlawful from 31 October 2018) or glyphosate 'Roundup'. Unfortunately, mechanised cutting, collecting and rolling can be extremely damaging to animals sheltering within the bracken.

Harvesting bracken for biofuel, or as livestock bedding, involves cutting, collecting and baling, causing the soil and humus layer to be compacted by machinery, and snakes crushed and killed. Hence adder sites are not suitable sources of commercial biofuel harvest.

When considering bracken management we recommend the following best practices:

- Assess the importance of the bracken on site for reptiles through survey before deciding on management. If the site has a mosaic of other vegetation habitats such as bramble, gorse, scattered birch and rough grassland, then bracken management may be less critical, as adders have some alternative habitat. However, on sites where the sward is heavily grazed and bracken is the only cover, extensive bracken management could severely impact adder populations.
- Locate important features within the bracken, such as: hibernation areas, sloping banks and ditches. Layers of bracken thatch that have built up over time could also represent important areas to adders.
- Avoid running heavy machinery such as tractors and flails over south facing bracken banks and damaging or compacting the ground.
- Avoid cutting and rolling in late summer/early autumn. This reduces the risk of harm to gravid female adders, which may be slow to disperse from machinery and may retreat a short distance only, under dead thatch or into the humus layer, where they could be crushed by machinery. Prior to starting works a survey walkover is important and if snakes are seen then use of hand tools would be preferable.
- Use cutting or rolling only for large, continuous, dense stands of bracken. We recommend cutting or rolling tramlines and scallops into the bracken, leaving some stands as a refuge, but breaking up the bracken dominance. Mechanised work should be carried out by a light machine such as an AGT Alpine tractor.
- In areas where the bracken is less dominant, especially if there is moss and rough grassland set below sparse bracken, cutting should be avoided. Ideally, particularly when dealing with small bracken blocks, we recommend working with hand tools and brush cutters, to cut rides and scallops. Another option is to cut out patches or 'keyholes' in tall bracken, particularly along path edges so that adders can remain hidden and secure from public disturbance. Open glades and rides can be maintained in the long term with brush cutters or pedestrian flails. This can be combined with light conservation grazing for short periods on larger sites. Experience tells us that where this approach has been carried out for a number of years the resulting habitat mix of grassland and bracken is often ideal for adders.



Sympathetic use of mechanical cutting; a large cut by tractor and flail were used to create tramlines whilst retaining uncut areas. (Nigel Hand)

5.5. Managing woodland

Woodlands are an important habitat for adders, especially in areas where tree cover is less dense. Key areas may include: open ride or path edges, wide fire-break corridors, young plantations and

clearings where trees have died off. Windrows can become favoured basking and hibernation areas, and wayleave areas under pylons also provide suitable open corridors for adders and other reptiles.

Forestry sites containing coniferous plantations, particularly the deciduous larch, can be strongholds for adders. This is because active forestry management programmes create a mixture of habitats including permanently clear-felled areas and blocks of differently aged trees interspersed with ride corridors. By contrast, large areas of densely planted conifers do not allow reptiles to thrive, and maturing conifer stands can become a problem for adders once they have reached ten to fourteen years of age, when the dense canopy limits the availability of open, sunny basking areas. If the only options for basking are the track edges, then the animals will be more susceptible to predation or disturbance by recreational site users

Once a stand has been clear felled, depending on soil type, it often regenerates as lowland heath, and can provide excellent habitat for adders, which may recolonise in as little as two to three years if they are already present in adjacent land, provided there are no major barriers to dispersal. Adders may flourish within forestry if areas are managed sensitively, following a long-term conservation plan which aims to reduce the shading effects of maturing plantations.

There is a trend to create a more open wood pasture, by grazing woodlands with livestock, such as pigs and ponies. Whilst short-term grazing with low stock numbers in a large area of woodland will have management benefits, large numbers of animals penned within small woodland areas, and particularly adder hibernation areas, may be extremely detrimental. Within the Forest of Dean the rooting and grubbing behaviour of feral boar has caused serious damage to adder habitat. Reptile survey 'tins' have been moved and turned by foraging pigs and the soil beneath dug over with any sheltering occupants presumably consumed.

Mechanised harvesting of commercial woodlands can be detrimental to adders as the work often involves large and heavy machinery, which can be damaging to the soil structure and potentially crushing animals, if not operated with due care.

In some private woodlands, the intensive rearing and large concentrations of pheasants around ride edges can be detrimental to adders and common lizards. This has been observed during a long-term adder monitoring project in the Wyre Forest, where initial high counts declined as the forest matured, exacerbated by pheasant feed hoppers placed along the last remaining open ride edges. This encouraged aggregations of foraging game birds which quickly picked off the remaining adders. Even where animals are too large to be easily preyed, pheasants may still peck at the head and eyes, rendering the animal blind and unable to forage.

On woodland or forestry sites we recommend the following best practices:

- Avoid dense planting of rows of monoculture trees. In timber plantations, the spacing of transplants is typically very close (2m x 2m spacing) to encourage self-pruning of the side branches to produce knot-free timber. Wider spacing may therefore be limited to woodlands where timber quality is of less importance. Grants and other financial support may also prescribe a minimum stocking density, which will need to be considered.
- The woodland planting plan should be orientated to include wide east-west rides. These could be further scalloped (cut half circles out), to maximize their south-facing edges.
- Leaving the corners of the cross-rides un-planted, will allow for larger open areas at these intersections which will benefit the adders, as well as other reptiles, butterflies and plants.
- Shrub belts along ride edges, will allow a graduated height transition from the mature woodland to the ride.

- Ideally, include a mix of native deciduous species in the planting plan. Birch thrives on heathland sites where it can cope with poor sandy soils. On suitable sites, hazel coppice worked on rotational coupes, can provide important habitat for many species including, nightingale, nightjar, yellowhammer, dormice and fritillaries, as well as reptiles.
- Thinning out invasive saplings from deciduous species such as birch or sycamore from open glades and the ride edges, helps to prevent encroachment.
- Periodic thinning of rapidly growing conifers is routinely undertaken to open crown space and maximise timber fields, and this provides an opportunity to create wider, scalloped glade areas off major public tracks and pathways. As well as providing greater optimal habitat, this will reduce the possibility of snakes basking close to path edges where there is potential conflict with cyclists, walkers or dogs.
- Maintain large areas of permanently open habitat within plantations.
- Manage some areas with hand tools where possible, rather than cutting all open areas with tractor and flail. Flails should be set high, ideally working from tracks and pathways to avoid driving over important adder habitat features.
- Leave a range of vegetation heights for structure and cover rather than flailing tall vegetation to a uniformly short height.
- If grazing management is introduced, ensure that stocking densities are low.

5.6. Controlled burning and reducing the impact of wildfires

Adders are strongly associated with heath and moorland sites across the UK. Areas of gorse and heather are particularly valued as both summer (feeding, breeding) and winter areas, with adders hibernating in cavities around gorse root systems.

Left unmanaged, these habitats can develop a high 'fuel load' through the accumulation of dense, woody material. During late spring and summer, there is a risk of uncontrolled fire, set by accident or arson. Uncontrolled summer fires tend to burn deeper and longer than winter burns, and can be catastrophic for reptile populations and other wildlife. As well as immediate killing, fire can also affect the long term prospects of the surviving animals which may have to travel over longer distances to find prey, or new basking or hibernation sites, thereby exposing them to predation.



Cutting fire-breaks into heathland or coastal sites as part of a burn management plan can help control the spread of wildfire (Sam Langdon)

Controlled burning (known as muirburn in Scotland) is a widely practiced management technique, particularly for large areas of upland heath or moorland. However, even cyclical, planned burns over a large area can be devastating for reptiles. The burning season lasts until 15th April (and for muirburn can be extended until 30th April with landowner permission), and so often takes place just as adders are emerging from hibernation and are highly vulnerable (i.e. March and April). It is believed that the effect of repeated burning over the last few hundred years has virtually extirpated adder populations from vast areas of upland Britain.

For some sites burning may be the most logistically practicable management option. For adder conservation, however, burning should not be used except under exceptional circumstances and where surveys have been carried out beforehand to ensure that important areas are not affected.

If burning is necessary on adder sites, then we recommend that it be conducted before the spring emergence period (from January to April, depending on location).

5.6.1. Developing a burn management plan

Whilst on many sites, hand cutting woody material can be a practical management option, on large heathland areas or steep coastal sites, the use of controlled burning may be the only viable way to reduce fuel load and manage the habitat. This method requires creation of fire-breaks, up to 6m wide, to divide a site into smaller burning patches. As well as containing managed burns, a well-managed fire-break infrastructure also makes unplanned summer burns easier to control.

Before setting any fire, however, it is important to first map the areas likely to be used by adders. These can form the basis of the burn management plan whereby exclusion zones, including important habitat features such as: hibernacula, favoured basking or birthing areas, or areas of connectivity, can be identified to minimise the risk to the adders. We recommend that a fire-break system is designed to protect these high-risk areas, which should only be managed with hand tools.

5.6.2. Managing a controlled burn

The impact of burning can be reduced by planning cool, winter or ‘quick burns,’ leaving important areas for the adders untouched (particularly potential hibernacula); longer rotations between burns, and burning smaller areas. Winter burns, which just remove the top layer of gorse rather than penetrating deeply below ground, are probably better than accidental (deep) summer burning, as long as the area has been surveyed for adder hibernation spots first. Other factors should also be considered, for example a downhill burn into the prevailing breeze will create a far hotter, deeper fire than an uphill fire with a following wind (but which is far likelier to get out of control).

5.6.3. Fire-breaks on smaller sites

On small sites, small, semi-permanent fire-breaks created on a rotational basis can also reduce the spread of fire. These are created by cutting or mowing 2m wide strips, in an east to west orientation. If the site is not too steep, these could be shaped in a sinusoidal ‘wave’ pattern. This maximises the diversity of microhabitats created at the interface between cut and uncut vegetation, thereby increasing its habitat value for the adders, other reptiles and invertebrates.

6. Creating micro-habitat features

6.1. Creating a mosaic of habitats

Adder habitat can be improved by creating a range of microhabitats, which will suit the adders’ differing physiological and ecological needs, as well as supporting other species.

Adders require external warmth to raise their body temperatures, either by basking openly in direct sunlight, or by seeking warm sites under cover (in vegetation or under objects lying on the ground). On warm days adders may bask in partial cover, amidst vegetation, or may even avoid basking altogether and remain in the shade.

On breezy days, adders shelter from the wind, tucked away in calm 'pockets'. These can be provided by topography and vegetation structure; trees, scrub, woodland edges and hedgerows can all provide important windbreaks.

Most predatory birds, particularly raptors, corvids and game birds; and larger mammals such as badger, fox, mustelids, and even wild boar, prey on reptiles, including adders, given the opportunity. Maintaining vegetation cover next to basking sites provides additional security which can allow adders to quickly escape from predators.

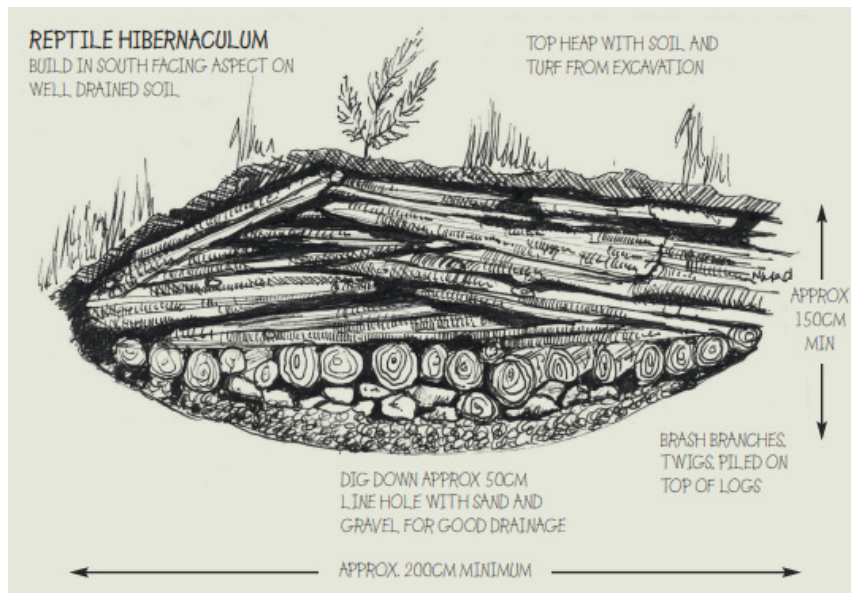


Adder basking partially exposed, among bracken (Nigel Hand)

The combination of basking sites and shelter can be created by cutting out patches, or 'keyholes', in vegetation, whilst maintaining the protective scrub surround. This opens up areas and allows sunlight to penetrate to ground level. Another successful technique is to 'scallop' along the south facing edges of a large scrub or bramble patch, to increase the number of sheltered basking spots.

6.2. Hibernacula

Artificial hibernacula can be created. Site selection is essential for the success of this, and the hibernaculum should preferably be situated on a south-facing site with well-drained soil.



(Image copyright Nigel Hand)

reptiles to enter and exit the finished hibernaculum.

For the underground chamber, excavate a hole from around 2.0-4.0m in diameter, and 0.5m deep, and line it with sand and gravel to improve drainage. Then loosely back fill the void with stones, rocks and logs, and pile branches and brash over the top, creating nooks and crannies where the adders can hibernate. Finally, place soil and turfs from the excavation over the top of the pile to form an insulating layer and to

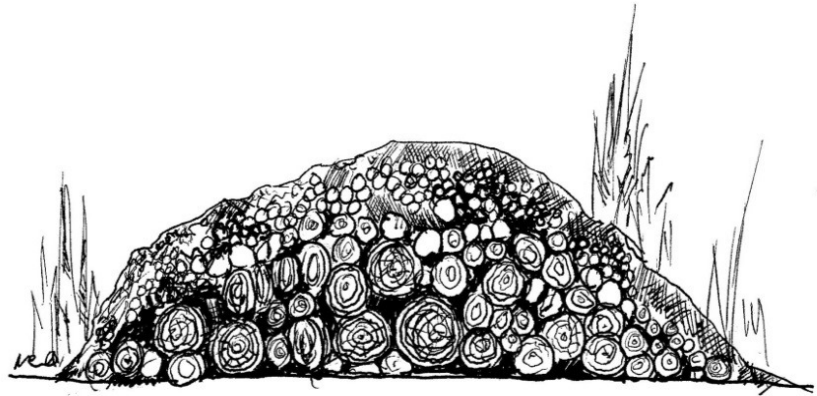
protect it from frost. Ensure small gaps are left for

It is essential to avoid any risk of flooding, and for this reason, underground elements should be avoided on peatland and other wet sites.

6.3. Brash piles

Brash piles can provide an important refuge, particularly on sites with little vegetative cover, as well as increasing the habitat structure of the site. We have evidence that brash piles are also used by prey species, such as voles, lizards and amphibians. To create a brash pile, select a free-draining, south-facing location and pile logs and branches on the ground to create a heap. This is ideally from 2.0 to 8.0m long by 1.0 to 1.5m high.

Adders also need access to humid environments to help them cope with extremely hot, dry weather, and a structurally diverse habitat with more complex or dense vegetation, such as: scrub, grass tussocks or beds of mosses and lichens, can provide cooler and more humid retreats.



An artificial brash pile created from arisings from woodland management work.

7. Managing conflicting constraints

7.1. Managing protected sites for multiple species or taxa

There are always constraints to managing habitats, even on protected sites. For example, on SSSIs, site management objectives are usually linked to conserving the special features of interest and maintaining 'favourable condition'. In these cases the site manager may have the challenge of ensuring that adders are protected, whilst balancing multiple stakeholder requirements, and conserving other important or vulnerable species or features. The challenge is often greater on smaller sites, and those with multiple scarce species, and this can lead to conflicts. Fortunately, many species benefit from management regimes that suit adders, so in most cases managing for adders will improve the biodiversity of the site more generally.

7.2. Managing public and recreational user requirements

7.2.1. Accommodating public concerns about site management

Public perception of change, even for legitimate management practices such as felling trees, or closing footpaths, is not always favourable. It is important to include a period of consultation and outreach, if you are planning major habitat works, and accept that sometimes habitat management may have to compromise to accommodate public sensitivities. Where habitat works are essential, for example to remove encroaching scrub or tree cover, it is sometimes better to clear small sections at a time. This provides an opportunity for the site to recover, and to offer an explanation of why the works are taking place.

7.2.2. Managing visitors and recreational users of a site

Public access to adder sites can create considerable pressure on the animals and their habitats. Disturbance can have a negative impact on adders, depending on how close pathways are to prime habitat, and whether there are alternative places for the adders to go. However, some activities will undoubtedly have a greater impact, particularly those involving off-road mountain bikes and other

vehicles. Dog walkers may also be an issue, as dogs running loose can cause serious disturbance. Whilst most dog-owners are responsible and keep their animals under control if asked, a minority can be hostile towards adders due to the perceived risk of harm to their pets, and this needs to be considered carefully when creating interpretive signage.

Conversely public engagement with the natural environment can be the key to the success of wildlife conservation programmes. Where the community has been encouraged to take a pride in their local wildlife, and champion species such as adders, populations may thrive. There are a number of examples of this overseas, and closer to home, even within Greater London.

One means of mitigating public impact is by careful routing of recreational users (e.g. walkers, horse riders and mountain bikers) away from sensitive habitat features. The careful siting of access infrastructure (tracks, paths, boardwalks, car parks, picnic areas, fencing etc.) can concentrate users within selected 'honey pot' areas, while minimising impacts on more sensitive habitats. A carefully placed pile of brash, gorse, bramble or bracken, or creation of banks and windrows can screen and protect a popular adder basking spot, even within a few metres of a heavily used path. Sensitive areas such as hibernacula, favoured basking spots or birthing sites could be fenced off. This practice has been implemented in the Wyre Forest with a degree of success.

Interpretive materials or dog control measures should be supported by positive publicity. One example of this is the *Take the Lead* campaign run by the Sheffield Moors Partnership (Eastern Moors Partnership, 2018). This reinforces the law as set out in the Countryside Rights of Way Act 2000, with positive messaging around how dog owners can help to protect livestock and wildlife, whilst keeping their pets safe.

8. References

- ARG UK (2017). ARG UK Advice Note 8: Organising Guided Walks and Training Courses.
- Baker, J. (2015). Adders, photography and disturbance. *White Admiral* 91, 16-19.
- Edgar, P., Foster, J. & Baker, J. (2010). *Reptile Habitat Management Handbook*. Amphibian and Reptile Conservation, Bournemouth.
- Eastern Moors Partnership (2018). *Take the Lead in the Peak District*, www.visit-eastern-moors.org.uk/plan-your-visit/take-the-lead-in-the-peak-district.html (updated April 2018)

9. Acknowledgements and citation

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