



2. Reptiles of Great Britain

Native reptiles of Great Britain		
Sand lizard	<i>Lacerta agilis</i>	England and Wales
Viviparous/common lizard	<i>Zootoca (Lacerta) vivipara</i>	England, Scotland, Wales
Slow-worm	<i>Anguis fragilis</i>	England, Scotland, Wales
Smooth snake	<i>Coronella austriaca</i>	England only
Grass snake	<i>Natrix natrix</i>	England, Wales, rare in Scotland
Adder	<i>Vipera berus</i>	England, Scotland, Wales

The six terrestrial reptile species native to Great Britain are listed in the table above. Although the leatherback turtle *Dermochelys coriacea* includes coastal waters as foraging grounds, justifying its native status, its ecology is so fundamentally different to that of the terrestrial species that it is not considered within this handbook. However, references relating to the leatherback are given in section 14. *Sources of Information and Advice*.

The current section summarises the distribution and conservation status of British reptiles as well as the basic characteristics of their life history relevant to habitat management. More detailed accounts of identification, ecology and status can be found in other texts e.g. Beebee and Griffiths (2000) and Inns (2009).

Note that this is a general summary, and there is local variation in, for instance, the timing of activity, clutch size and prey type.

2.1. Sand lizard *Lacerta agilis*



Male sand lizard in breeding coloration (Fred Holmes)

Distribution The sand lizard has always had a scattered distribution and limited range in England and Wales but this has been severely reduced even further by human activities. Native populations have been lost from the whole of Wales, where they formerly occurred on dunes along the north and west coasts, and from the English counties of Berkshire, Cheshire, Cornwall, Devon, Kent, East and West Sussex, Wiltshire and much of Hampshire. Original, non-reintroduced populations now remain only in Dorset, Hampshire, Surrey and on the coastal dunes of Merseyside. Reasons for this decline centre almost entirely on habitat destruction and the associated fragmentation and degradation of the small surviving areas. However, 65 re-introductions have taken place over the past thirty years in 13 vice-counties and the sand lizard has now been successfully re-established in Wales, Cornwall, Devon, Kent, West Sussex and the New Forest area of Hampshire.

Habitats Sand lizards are confined to two habitats in Britain; lowland heathland supports well over 95% of the national population, the remainder is found on sand dune.

Habitat requirements Within the sites where it is found, the distribution of the sand lizard is further restricted, often to relatively small areas, by its specific habitat requirements. This species is on the edge of its European range in Britain and requires warm, sheltered sites, with a varied topography, and especially south-facing slopes. Although sand lizards, especially dispersing juveniles, may be found at low densities across many parts of a heathland site, breeding adults are more or less confined to the later successional stages of sandy, dry heath (i.e. the mature and degenerate phases of heather growth). Areas with a luxuriant ground layer of bryophytes and lichens seem to be particularly favoured. Sand lizards also venture into adjacent areas of wet heath and valley mire, especially in

very hot weather. Sandy substrates are not only warmer than the gravels and clays underlying many heathland habitats but they are essential for egg laying purposes. On coastal sand dunes, this species favours frontal dune ridges, preferring areas of dense marram grass combined with abundant exposed sand and a south or southwest facing aspect. Fixed dunes further inland are avoided if they are heavily grazed, although high densities of sand lizards may be present where frontal dunes grade into heathland.

Diet The sand lizard preys on a variety of invertebrates, especially spiders, grasshoppers, crickets, bugs, flies and insect larvae.

Activity Sand lizards are wholly diurnal and daily activity is weather dependent. In the spring, these lizards spend most of the day basking, mating and foraging, whereas in hot summer weather they may be encountered only early in the day and late in the afternoon. Sand lizards hibernate for longer than other native reptiles. Adults, especially the females, often disappear into their hibernation burrows in late August or early September, regardless of the weather, although hatchlings can be active into October or even November. In the spring, male sand lizards may emerge in early March but the females often do not appear until several weeks later.

Movements Male sand lizards have fairly limited home ranges of only a few hundred square metres, which can overlap considerably. The ranges of females are often even smaller. If habitat conditions are especially suitable, adults may be remarkably sedentary and rarely cross unsuitable habitat. Individual lizards can be regularly seen in the same spot on repeated occasions, and often in successive years. Sand lizards show no territorial behaviour but a dominance hierarchy develops among the males each spring when they compete for females.

Reproduction The female digs a nest in which she lays 6-14 eggs in unshaded, bare, semi-compacted sand. One, or sometimes two, clutches of eggs are laid per year, usually from late May to June, but as late as July or August when second clutches are produced. In a typical year, hatchlings begin emerging in August.

Conservation status The sand lizard is a rare species confined to a limited number of sites. Its conservation status is unfavourable, given the massive reduction in population size, range and viability. Uncontrolled fires threaten all heathland populations.



Sand lizards require semi-compacted sand in which to deposit eggs (Paul Edgar)

2.2. Viviparous or common lizard *Zootoca (Lacerta) vivipara*



Male viviparous lizard (Fred Holmes)

Distribution The viviparous lizard is widely, though very patchily, distributed across the whole of England, Scotland and Wales.

Habitats Viviparous lizards occupy a wide range of habitats, including wet and dry heathland, moorland, mountain scree slopes, most types of grassland (especially chalk grassland and rough grassland with bramble scrub), woodland glades and rides, coastal dunes and cliffs, vegetated shingle (and, in some areas, salt marsh), hedgerows, allotments, old quarries, sea walls and road, railway and canal embankments. However, this species is now absent from large areas of the countryside. Intensively farmed land, dense woodland, heavily grazed or mown habitats and many urban areas are unsuitable. This is because they are structurally deficient or lacking invertebrate prey.

Habitat requirements Not all areas within occupied sites support viviparous lizards; the species avoids structurally uniform vegetation, whether it is rank

and completely closed or short and completely open. Typically, the viviparous lizard differs from the other widespread lizard species, the slow-worm, in preferring sites with a greater variation in the height of vegetation cover. Both humid and dry microhabitats are selected by viviparous lizards but the highest densities tend to be found in damp or wet areas, especially where abundant grass tussocks are present to provide food, shelter, basking and hibernation sites. However, as long as the vegetation is located in a sunny area, is structurally diverse and provides adequate cover, viviparous lizards can attain extraordinary population densities.

Diet Like the sand lizard, the viviparous lizard preys on invertebrates but, because of its wider habitat preferences, consumes a greater range of soft-bodied prey than the sand lizard.

Activity Viviparous lizards are diurnal and, since they can operate at lower temperatures and warm up faster than sand lizards, they spend less time basking. They can be active from February through to November in southern Britain but for shorter periods (March to October) further north, in Northern Ireland and on the Isle of Man.



Viviparous lizard basking on log (Fred Holmes)

Movements Movements of viviparous lizards are usually limited to a few tens of metres. Individual lizards often share the same basking areas and hiding places. Most dispersal is through the movements of juveniles, which can rapidly colonise new habitat, should it become available adjacent to a site already occupied.

Reproduction In the British Isles this species gives birth to its young in transparent egg membranes from which the baby lizards rapidly break out. This strategy gives live-bearing reptiles a distinct advantage over egg-laying species at northern latitudes, in that females can regulate the

temperature of developing embryos by seeking microhabitat accordingly. Typically 4-10 young are born in July, but birth can occur from late June to early September. The female requires sheltered, humid microhabitat in which to give birth.

Conservation status Large declines have occurred in recent decades, mainly as a direct result of habitat loss. On surviving sites lizard status may be affected by reduction of structural diversity, the use of chemicals and predation by invasive introduced species (e.g. pheasants and domestic cats). The overall effect is that viviparous lizards are now more patchily distributed, and tend to occur at lower population densities.

2.3. Slow-worm *Anguis fragilis*



Male slow-worm (Fred Holmes)

Distribution The slow-worm is widely distributed in England, Scotland and Wales. However, populations tend to be smaller and more patchily distributed in the north, and the species is most abundant in southern England.

Habitats Slow-worms inhabit a wide range of habitats, including heathland, lower altitude moorland, most types of grassland (especially chalk grassland and rough grassland with bramble scrub), woodland glades and rides, hedgerows, disused quarries and other brownfield sites, and road, railway and canal embankments. As long as sufficient warmth, cover and food is available, they can be found in urban areas, for example in gardens and allotments, where they often inhabit compost heaps/bins.

Slow-worms have a broader range of habitats than the other lizards, tolerating a less diverse vegetation structure and often being found on impermeable as well as free-draining soils.

Habitat requirements In all habitats, slow-worms require dense vegetation, especially grasses coupled with sunny areas to allow thermoregulation and, preferably, loose soil into which to burrow. Very wet and very dry habitats are usually avoided.

Diet Soft-bodied invertebrates, especially slugs and worms, are the favoured prey.

Activity Slow-worms are primarily fossorial (living mostly underground, or underneath objects lying on the ground, or within vegetation litter and tussocks). Although the occasional slow-worm may be seen basking in the open (especially in early spring), most activity takes place out of sight of human observers. Slow-worms are mainly diurnal but have been observed foraging after dark on warm evenings.

Hibernation occurs usually from late October to early March and takes place in burrows, loose soil and dense vegetation. Slow-worms sometimes hibernate communally, and up to several hundred animals have been found overwintering together inside large tussocks of purple moor-grass *Molinia caerulea*.

Movements Slow-worms do not move long distances. Home ranges are probably only several hundred square metres, and the same individual may be found repeatedly in the same location. Although communal hibernation demands some annual movement, such movements are small compared with seasonal migrations of snakes.

Reproduction This species retains its eggs internally, giving birth to young within a thin egg membrane that is almost immediately ruptured. Six to twelve young are produced between mid-August and mid-September.

Conservation Status The slow-worm is the commonest reptile in the British Isles, although, like all species, it has suffered declines in recent decades due to loss of suitable habitat.

2.4. Smooth snake *Coronella austriaca*

Distribution In the British Isles, the smooth snake is found only in southern England. By the second half of the twentieth century, it had become extinct in Berkshire, Devon, East and West Sussex and Wiltshire, surviving only in Dorset, Hampshire and Surrey. More recently it has been reintroduced to Devon.

Habitats The smooth snake is confined to a single habitat, lowland heathland. It fares well on the warm, sandy heaths preferred by the sand lizard, but some

important populations occur on heathland underlain by gravels and clays.



Smooth snake (Fred Holmes)

Habitat requirements Like sand lizards, smooth snakes tend to favour mature to degenerate dry heath, though especially where the heather is structurally diverse and grades into humid and wet heath areas. The dense ground cover often associated with optimal smooth snake habitat, particularly deep beds of bryophytes and lichens, provides the cool, moist conditions that this species seems to require during hot weather. The smooth snake also uses areas of humid and wet heath and valley mires. Large tussocks of purple moor-grass are a particularly important feature, because they harbour prey species and provide cover for this secretive reptile.

Diet The diet of smooth snakes consists predominantly of other reptiles, but also includes small mammals, particularly young from nests. The viviparous lizard and slow-worm are probably the most important reptile prey, although sand lizards make up a large proportion of their diet where the species co-exist.

Activity The smooth snake is extremely secretive. It has a lower preferred body temperature than other British snakes and rarely basks in the open. Thermoregulation tends to take place in dense cover, with only a small part of the snake's body exposed at any one time, or under objects warmed by the sun. Although largely diurnal, smooth snakes are known to be active during very warm nights in the summer. The main period of activity lasts from late March through to late October.

Movements Smooth snakes exhibit limited powers of dispersal. Daily movements are usually less than 20 m and only rarely exceed 100 m. Unlike grass snakes and adders, smooth snakes do not appear to undertake longer distance seasonal movements.

Reproduction Mating occurs in spring but has hardly ever been observed in the wild. The smooth snake gives birth to live young (typically 4-15) and this seems to take place in very dense, humid cover such as under moss and lichen layers or within large grass tussocks.

Conservation status The smooth snake is a rare species, with a limited range. Its cryptic behaviour makes population estimates difficult, but loss and fragmentation of its heathland habitat have reduced numbers. Uncontrolled fires in remaining habitat pose a particular threat to this species.

2.5. Grass snake *Natrix natrix*



Grass snake (Fred Holmes)

Distribution The grass snake is a lowland species, found widely across England and Wales, though distribution is very patchy in northern areas. Historical records exist for southern Scotland and recent sightings have been made, but current status there is largely unknown.

Habitats This species is often associated with wetlands, but can also be found in many other habitats such as heathland, many types of grassland (including some quite dry areas of chalk grassland), open woodlands, some coastal habitats, farmland, gardens (especially large gardens with ponds), allotments, brownfield sites including disused quarries and along road, railway and canal corridors.

Habitat requirements The grass snake requires some cover and a degree of structural diversity but, as it is more mobile than the other reptiles, it is often not reliant on a single site providing the necessary habitat for hibernation, feeding and egg-laying. Sunny areas are usually preferred, but during hot weather it is not uncommon to encounter grass snakes in woodland and other shaded habitats. Warm, humid, decomposing organic material is required for egg-laying.

Diet Grass snakes feed primarily on amphibians, but fish, small mammals and fledgling birds are also taken.

Activity Grass snakes hibernate from October to March. After their spring emergence they usually disperse rapidly. They are active foragers and may be seen in and around water bodies during the summer. However, they are also wary and quick to flee, so they can easily be overlooked on a site. Grass snakes are largely diurnal although they are known to be active at night during warm periods, especially in and around ponds. Though mostly found at ground level, grass snakes are occasionally seen in the lower branches of trees and scrub.

Movements The grass snake is the most mobile of our reptiles. Individuals disperse from hibernation sites relatively rapidly and may move over several kilometres during the course of the active season. Sometimes concentrations of snakes allow identification of specific population centres. This is most common for egg-laying sites, which tend to be communal and traditional, meaning that many females habitually use the same precise location year after year. However, snakes may migrate through relatively poor quality habitat to reach favoured egg-laying, foraging or hibernation areas.



Grass snake hatching. The grass snake is the only British snake that lays eggs (Paul Edgar)

Reproduction During the breeding season (April to June), several male grass snakes may simultaneously court a single female, in exceptional cases in large numbers, forming a 'mating ball'. This species is the only British snake that lays eggs, typically 15-40 per female. These are deposited in decomposing organic material, such as heaps of vegetation, manure or woodchips in June or July. Females may congregate at egg-laying sites. The young hatch out from late August to September.

Conservation status Lack of systematic monitoring and high mobility make it difficult to determine the conservation status of this species. It is still relatively abundant in some parts of Britain but there have been severe declines in other areas, notably where egg-laying and foraging sites have disappeared.

2.6. Adder *Vipera berus*

Distribution The adder has a widespread, albeit very patchy, distribution throughout England, Scotland and Wales. It is rare in the English Midlands, much of northwest England, central Wales and parts of Scotland, but more abundant in areas such as the North Yorkshire Moors, East Anglia, the southern heathlands and chalk downlands, the coasts of west and south Wales and southwest England and the southern Highlands of Scotland.



Adder (Fred Holmes)

Habitats The adder prefers lighter chalk or sandy soils, and is almost never found in habitats based solely on heavy clays. Favoured habitats include heathland, moorland (usually at fairly low altitudes), grassland with a dense sward and low scrub, including acid and chalk grasslands, clearings, rides and edges in deciduous or coniferous woodland (including plantations and native pine forest in Scotland), coastal dune systems and cliffs, field edges, disused quarries, some brownfield sites such as disused allotments, sea walls, and road, railway and canal embankments. The adder tends not to be found in intensive agriculture, high, rugged mountainous terrain or urban areas.

Habitat requirements In all suitable habitats, dry, open, sunny areas with adjacent dense ground cover are essential. Hibernation sites tend to be on south-facing slopes; tree root systems, crevices in banks, and voids in piled materials are often used. Wetter areas around ponds, lakes, bogs or mires are

also used (especially in the summer) providing there are dry banks or grass tussocks for basking.

Diet Adders eat mainly small mammals, especially voles. Lizards, nestling birds and frogs are also eaten.

Activity The first adders to emerge from hibernation may do so very early in the spring during mild spells in January (in southern England) or February-March (elsewhere). Emergence is followed by basking, which can last for several weeks, often very close to the hibernation site. This period of lying out is followed by sloughing, after which the males become much more active, competing for females and eventually mating.

Adders remain active through to late October or early November in the south, 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 hot weather.

Movements Distinct seasonal movements have been recorded for adders, which often use separate spring breeding and summer foraging areas, sometimes as much as two kilometres apart. After mating activity, adders disperse and may migrate to a wetter habitat for the summer. At sites, where foraging and overwintering requirements are close together, adders may not move so far in the course of a year. Adders return to traditional hibernation sites in late summer, and often this is where the females give birth. Maintaining vegetation cover between different areas used by adders reduces the risk of predation during seasonal movements.

Reproduction Mating is preceded by ritualised combat ('dancing') between males. Dominant males may mate with several females. Female adders retain their eggs within the body and give birth to 3-18 live young during August and September.

Conservation status In common with the other widespread reptile species, the adder has suffered extensive declines in recent decades. However, as this species is more restricted in its habitat preferences, it has been less resistant to human-induced habitat changes. As a result, declines have been more severe than for other widespread reptiles, with many local extinctions occurring outside its core range. Adders are still sometimes deliberately killed by people, even though this is illegal. They also seem prone to disturbance by people and dogs, though this probably needs to be intense and sustained to have a population level impact.