KENT NATURE PARTNERSHIP

STATE OF NATURE IN KENT 2021

An account of the changing fortunes of Kent's species and habitats, the pressures nature has faced and the conservation efforts undertaken over the last 10 years.

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ACRONYMS

25YEP - 25 Year Environment Plan

ADB - Ash Dieback

AOD - Above Ordnance Datum

AONB - Area of Outstanding Natural Beauty

AOO - Area of Occupation

ARCH - Assessing Regional Habitat Change

BAME - Black, Asian and Minority Ethnic

BAP - Biodiversity Action Plan

BatCRU - Bat Conservation and Research Unit

BBCT - Bumblebee Conservation Trust

BBS - Breeding Bird Survey

BC - Butterfly Conservation

BCT - Bat Conservation Trust

BDS - British Dragonfly Society

BHPS - British Hedgehog Preservation Society

BNG - Biodiversity Net Gain

BNG - British National Grid

BOA - Biodiversity Opportunity Areas

BPS - Basic Payment Scheme

BSBI - Botanical Society of Britain & Ireland

BTO - British Trust for Ornithology

CaBa - Catchment Based Approach

CEFAS - Centre for Environment, Fisheries and Aquaculture

CMSi - Conservation Management Sites International

CP - Countryside Partnership

CPD - Continued Professional Development

CPRE - Campaign to Protect Rural England

CR - Critically Endangered

CSF - Catchment Sensitive Farming

DDT - Dichlorodiphenyltrichloroethane

DEFRA - Department for Environment, Food and Rural Affairs

DLL - District Level Licensing

DWPA - Diffuse Water Pollution from Agriculture

EA - Environment Agency

EIA - Environmental Impact Assessment

ELMS - Environmental Land Management Scheme

EN - Endangered

FBNA - Fellow of the British Naturalists' Association

FC - Forestry Commission

FCS - Favourable Conservation Status

FOCI - Feature of Conservation Importance

GIS - Geographic Information System

GSP - Green Social Prescribing

GMA - General Management Approach

GP - General Practitioner

HAP - Habitat Action Plan

HCLG - Housing, Communities and Local Government

HIA - Health Impact Assessment

HLMO - High Level Marine Objective

HLF - Heritage Lottery Fund

HLS - Higher Level Stewardship

IDB - Internal drainage board

IEEP - Institute for European Environmental Policy

IEMA - Institute of Environmental Management and Assessment

IFCA - Inshore Fisheries and Conservation Authorities

INNS - Invasive Non-Native Species

IPCC - Intergovernmental Panel on Climate Change

IUCN - International Union for Conservation of Nature

JNCC - Joint Nature Conservation Committee

KBG - Kent Bat Group

KBRG - Kent Botanical Recording Group

KCC - Kent County Council

KCLT - Kent Conservation Landscape Tool

KEIFCA - Kent and Essex Inland Fisheries and Conservation Authority

KFC - Kent Field Club

KMBRC - Kent and Medway Biological Record Centre

KMG - Kent Mammal Group

KMoG - Kent Moth Group

KNP - Kent Nature Partnership

KOS - Kent Ornithological Society

KRAG - Kent Reptile and Amphibian Group

KWCA - Kent Wildfowling and Conservation Association

KWT - Kent Wildlife Trust

LCM - Land Cover Map

LNRS - Local Nature Recovery Strategies

LNP - Local Nature Partnership

LPA - Local Planning Authorities

LWS - Local Wildlife Site

MaB - Making a Buzz for the Coast

MCAA - Marine and Coastal Access Act

MCZ - Marine Conservation Zone

MENE - Monitor of Engagement with the Natural Environment

MHCLG - Ministry of Housing, Communities and Local Government

MMO - Marine Management Organisation

MOD - Ministry of Defence

MOJ - Ministry of Justice

MPA - Marine Protected Area

MSEP - Medway Swale Estuary Partnership

MVCP - Medway Valley Countryside Partnership

MWG - Management Working Group

NASP - National Academy for Social Prescribing

NbS - Nature-based Solutions

NBMP - National Bat Monitoring Programme

NBN - National Biodiversity Network

NCA - National Character Area

NCC - Natural Capital Committee

NCIA - Nature Capital Investment Area

NDMP - National Dormouse Monitoring Programme

NE - Natural England

NEKEMS - North East Kent European Marine Sites

NEKMPA - North East Kent Marine Protected Area

NEKSCAG - North East Kent Scientific Coastal Advisory Group

NERC act - Natural Environment and Rural Communities Act

NFM - Natural Flood Management

NHS - National Health Service

NLHF - National Lottery Heritage Fund

NNL - No Net Loss

NNR - National Nature Reserve

NRN - Nature Recovery Network

NSC - Nature's Sure Connected

NSIP - Nationally Significant Infrastructure Projects

NT - Near Threatened

NTZ - No Take Zone

NVC - National Vegetation Classification

NWVMP - National Water Vole Monitoring Programme

OCND - Old Chalk New Downs

OPM - Oak Processionary Moth

OSPAR - Oslo and Paris Convention (for the Protection of the Marine Environment of the North-East Atlantic)

PBDE - Polybrominated Diphenyl Ethers

PCBs - Polychlorinated Biphenyls

PES - Payment for Ecosystem Services

PFOS - Perfluorooctane Sulphonic Acid

PHI - Priority Habitat Inventory

PM - Particulate Matter

PROW - Public Right of Way

PTES - People's Trust for Endangered Species

RIMP - Regional Invasive Alien Species Management Plan

RPR - Rare Plant Register

RSPB - Royal Society for the Protection of Birds

RTPI - Royal Town Planning Institute

SAC - Special Areas of Conservation

SAMMS - Strategic Access Management and Monitoring Scheme

SDL - Single Data List

SEA - Strategic Environmental Assessment

SELEP - South East Local Enterprise Partnership

SENP - South East Nature Partnership

SFD - Snake Fungal Disease

SFI - Sustainable Farming Incentive

SHcAB - Shared Health and Care Analytics Board

SMT - Shoreline Management Plan

SOD - Sudden Oak Death

SPA - Special Protection Area

SRS - Spider Recording Scheme

SSSI - Site of Special Scientific Interest

S41 - Schedule 41

TDFZs - Turtle Dove Friendly Zones

UKCEH - UK Centre for Ecology and Hydrology

VAM - Views about Management

VCSE - Voluntary, Community and Social Enterprise

VU - Vulnerable

WFD - Water Framework Directive

WSF - Wild Spaces Fund

Male adder *Vipera berus* © Rick Hodges

KENT'S REPTILES

RICK HODGES, KENT REPTILE AND AMPHIBIAN GROUP

Summary

- Kent's native reptile fauna includes two snakes, the Grass Snake and Adder, and two lizards, the Viviparous Lizard and the Slow Worm. Sand lizards have been reintroduced into Kent following extinction in the late 1960s.
- Expert opinion suggests that all four native species are in decline, although all have partial protection under the Wildlife and Countryside Act. Of most concern is the Adder, which is thought to be in more urgent need of new conservation efforts than any other British reptile.
- Non-native species include the Wall Lizard, which has breeding populations at several locations in Kent. Terrapins have also been found in various water bodies, but without evidence of reproduction.
- Kent's reptiles use a range of habitats, of which chalk grassland and its associated low scrub is particularly important. While areas of chalk grassland are often wildlife reserves, reptile populations may still be threatened by unsympathetic management. Brownfield sites are important, but sometimes overlooked as reptile habitats.
- Habitat loss and fragmentation are currently the most significant drivers of change; however, the first evidence of the negative impacts of climate change – especially for Adders and possibly also Slow Worms – is beginning to emerge.
- The KRAG has an extensive database of reptile records that are shared with local and national recording bodies. Among KRAG's reptile conservation projects is a long-term monitoring programme on the North Downs to assess the impacts of climate on Adder populations.

Reptile fauna of Kent

Only six of Europe's 150+ reptile species are native to Britain (Beebee & Griffiths, 2000; Inns, 2009). Of these six species, four have a widespread distribution, and it is these four that are found naturally in Kent. They include two species of snake, the Grass Snake and Adder, and two species of lizard, the Slow Worm and Viviparous Lizard. The Grass Snake found in Britain has recently been promoted from a sub-species *(Natrix natrix helvetica)* to a full species *(Natrix helvetica)*; it has a western European distribution. Female Grass Snakes lay eggs, while Kent's three other native reptiles bear live young. The Adder and the Viviparous Lizard have the distinction of being the most northerly distributed reptiles, with populations ranging north of the Arctic Circle. Although reptile biodiversity may be low in Britain, reptile population densities may be higher than in central Europe owing to the climatic benefits of the Gulf Stream. In the 1960s, one reptile species, the Sand Lizard, is believed to have become extinct in Kent. A reintroduction programme (2004 to 2006) established a population of Sand Lizards in a dune system in East Kent where the species was last observed in 2018 and may still persist.

Status and trends

Assessing the status and trends for reptile populations is hampered by the fact that they are secretive and cryptic, and is constrained by factors that limit detectability (e.g. inclement weather). Nevertheless, expert opinion considers that all Britain's widespread reptile species are experiencing declines. The occupancy rates for the two lizard species in Kent are very similar (Table 1), while the two snake species are quite different, with Adders apparently far more restricted in range. It is estimated that 25% of monads (km squares) are considered to offer above average suitability for Adders, but the species has only been recorded from 8.6% (Table 1).

Table 1 Occupancy of the 4,365 kilometre squares of the Vice Counties East and West Kent by reptile species, including a correction for survey effort

Species	Occupied km squares	% Squares occupied	% Occupancy controlled for survey effort
Slow Worm *Anguis fragilis*	926	21.2	33.9
Viviparous Lizard *Zootoca vivipara*	1026	23.4	37.5
Grass Snake *Natrix helvetica*	873	19.9	31.9
Adder *Vipera berus*	237	5.4	8.6

Adder

In 2011, an Adder-focused conference in Chatham, attended by more than 100 reptile conservationists, issued a press release stating that, "The Adder is in more urgent need of new conservation efforts than any other reptile or amphibian species in Britain." Nationally, there is evidence of a considerable decline in Adder distribution. In the period 1980 to 2005, 15,154 monads were recorded as occupied

by the species. Between 2006 and 2011, this fell to 9,237, which amounts to a potential decline of 39% (Gleed-Owen & Langham, 2012). A national long-term surveillance project, 'Make the Adder Count', found that sites with small populations (peak counts < 10 individuals) declined by 55% over the 11-year period 2005 to 2016. By contrast, sites with large populations (site with mean peak counts > 10) on average showed a 33% increase over the same period (Gardner *et al.,* 2019). If these trends are representative of Britain as a whole, then within 15 to 20 years Adders will become restricted to just a few sites with large populations (Julian & Hodges, 2019). This already appears to be the case in Belgium and the Netherlands, and without intervention, in Britain the Adder could become a rare species flourishing in just a few areas.

In Kent, the Adder is highly localised with populations centred on areas of high quality habitat. Typically, such areas are found in or close to woodland and/or scrub, with many of Kent's Adder populations restricted to areas of chalk grassland and scrub along the North Downs. Healthy Adder populations may consist of only five or six adults per hectare. However, a combination of factors results in Adder populations responding only slowly to improvements in habitat conditions; these include low population densities, slow onset of sexual maturity (taking four or five years), and female Adders reproducing only every second or third year. Fortunately, Adders are relatively long-lived, and in favourable conditions have been recorded surviving to 30 or more years. The Adder is a priority species in the Kent Biodiversity Strategy.


Male blue spotted slow worm *Anguis fragilis*
© Rick Hodges

Grass Snake

Encounter rates with this species appear to be higher in areas close to freshwater, and ponds in particular are important habitat features. However, Grass Snakes also forage up to several kilometres from moist habitats. They occupy a wide range of different habitats and some individuals may even spend significant amounts of time in arable fields (within the crop, not just field margins). Their need to lay eggs may limit some Grass Snake populations if there is poor access to egg laying sites, such as manure heaps. Increased populations of non-native amphibian species, such as the Marsh Frog, may have increased Grass Snake populations locally.


Grass snake *Natrix natrix*
© Rick Hodges

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Common Lizard *Zootoca vivipara*
© The Wildlife Trusts

Slow Worm

Being semi-fossorial, Slow Worms prefer habitats with previously disturbed ground (e.g. gardens, old allotments, and brownfield sites) and appear to be less frequently encountered in areas that are subject to regular flooding (e.g. Romney Marsh). Population estimates at favourable sites have revealed densities of more than 2,000 Slow Worms per hectare. Although population levels within the wider countryside are generally considered to be lower, with sympathetic management, populations can become very high. At one site in East Kent, more than 130 slow worms were observed in a single survey session from a 1.5 ha area of chalk grassland where sheep grazing had been suspended for seven years.

Viviparous Lizard (or Common Lizard)

This species uses a wide variety of habitats, typically very sunny locations on chalk grassland, heathland, woodland edges and larger gardens. Brownfield sites are also frequently occupied and population estimates at such sites have revealed densities of more than 500 Viviparous Lizards per hectare. Detailed observations of Viviparous Lizard populations in Kent suggest that individuals typically reach sexual maturity within a year of birth and reproduce the following season. In suitable habitat, populations can therefore increase rapidly. As the quality of a site declines (e.g. due to decreased complexity of the sward caused by increased grazing pressure), populations can also decline rapidly. In such situations, Viviparous Lizards may appear to become 'edge species', occupying areas of rough vegetation along hedgerows, roadsides, etc.

Non-native and invasive species

In Kent, the Wall Lizard was first recorded in 1996 in Folkestone. Subsequently, the species has expanded its range to Folkestone Warren, Ospringe (near Faversham), and areas of Rochester. There are many sightings of Red-eared Terrapin from ponds and lakes in urban parks and other sites, and The Turtle Tally, a national citizen science project initiated in 2019, has received six Kent records of Red-eared Terrapins. There is no evidence that these species can reproduce in Britain, but as these turtles may live for 40 years it is likely that the same individuals may be recorded many times. At the time of writing, neither Wall Lizards nor Red-eared Terrapins are considered invasive, but they could become so quite rapidly if our climate becomes warmer.

Table 2 Habitat types in Kent showing the number of 'Key Reptile Sites' that have been designated[1] for each habitat and the number of sites in which Kent's native reptile species[2] can be found

Habitats	No. sites	Number of sites with Adder	Number of sites with Grass Snake	Number of sites with Viviparous Lizard	Number of sites with Slow Worm
Chalk grassland & scrub ± deciduous woodland	24	18	15	23	23
Deciduous woodland	12	6	11	11	11
Lowland heath and acid grassland ± deciduous woodland	8	4	7	8	8
Rough grassland, scrub and meadow	8	3	7	7	8
Allotment	1	0	1	1	1
Ancient woodland	1	0	1	1	1
Riparian	1	0	1	1	1
Sand dunes	1	0	1	1	1
Totals	56	31	44	53	54

[1] for designation methodology see KRAG 'Key site Register' https://kentarg.org/project/key-site-register/#03
[2] Excluding the Sand Lizard which is a reintroduction

Key habitats and their protection

Reptiles occupy at least eight habitat types in Kent, within which there are designated 'Key Reptile Sites' (Table 2). Anthropogenic habitats that may support significant reptile populations are mostly missing from Table 2; these include railway and roadside embankments, gardens, allotments, and brownfield sites, which are often characterised by a structurally complex vegetation sward that covers a topographically diverse ground strewn with debris (e.g. bricks, tyres, wooden posts, etc.). These areas often provide vital refuges for reptiles in our living landscape. Nearly all the designated sites include Slow Worms and Viviparous Lizards, 79% have Grass Snakes, while only 55% have Adders. Adders are particularly prevalent in chalk grassland, while Grass Snakes are more widely spread, appearing in all the defined habitat types. Chalk grassland has the greatest number of designated key sites, and although these sites tend to be wildlife reserves, they are still vulnerable to unsympathetic management. In particular, it is generally acknowledged that on chalk grassland, reptiles require a mosaic made up of open areas and at least 15% low scrub, and if there is livestock grazing then it needs to be extensive and confined to October to February, when reptiles are relatively inactive (Edgar *et al.*, 2010).

Female adder *Vipera berus* © Rick Hodges

Drivers of change

Habitat loss

Currently, the greatest threat to Kent's reptiles is direct loss of habitat through changes in land use; this includes the development of brownfield sites, which may have been derelict for many years, but often support good populations of Viviparous Lizard and Slow Worm. Pre-development work frequently includes the capture and translocation of many hundreds of individual animals to receptor sites. Work undertaken by ecological consultants has revealed that such projects can succeed in establishing new populations – at least in the short term. However, translocation projects are often poorly monitored and insufficient data is available to determine long-term population trends at receptor locations. Increasing pressure from agriculture and development will continue to impact on available habitat and lead to increased habitat fragmentation.

Habitat fragmentation

Reptiles require a range of different habitat features, including hibernation sites, areas for foraging and for basking, egg laying substrate, sheltering vegetation and refuges. Such habitat features may be scarce resources and may only be found across several 'sites' with individual animals having to move between them. The poor dispersal capabilities of reptiles result in the relatively slow colonisation of new habitat, and sites that are isolated by significant dispersal barriers (e.g. major roads, large arable fields etc.) may never be colonised or, following extirpation, never recolonised.

Land use

Reptile populations may be lost when either their presence or their habitat requirements are neglected in land management decisions. At one well-studied, but isolated, site close to Maidstone, a neglected Viviparous Lizard population disappeared due to unsympathetic management. Subsequent changes in the management regime resulted in a significant improvement to reptile habitat, but natural recolonisation was prevented by the surrounding dispersal barriers so that lizards had to be reintroduced. This demonstrates that simply reversing unsympathetic management practices may not be enough to result in natural recolonization. A common example of neglected habitat features are the winter time subterranean shelters (hibernacula) used by groups of Adders.

These hibernacula are critically important, yet their specific locations may not be known to land managers. Unsympathetic management of habitat around hibernacula can result in increased shading (e.g. tree planting in forestry plantations), or at the other extreme, excessive vegetation clearance may increase the detectability of Adders to predators during the spring 'lying out' period.

In recent years, specific advice on land management for reptiles has become more freely available (e.g. Edgar et al., 2010; Julian & Hand, 2018). It is notable that lizard and Adder populations prey upon invertebrates and small mammals that favour structurally complex vegetation swards, and that a visual appearance of 'abandonment' and 'neglect' often indicates the mid-successional scrub dominated habitat that is so important for viable reptile populations. For the future, the ELMS may present an opportunity to create structurally diverse habitat mosaics within the agricultural landscape.

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This is something that Countryside Stewardship and other agri-environment schemes rarely achieved, except as an unintended consequence of options designed to enhance habitats for other species groups.

Climate change

Now that British summers are becoming hotter and drier, and winters wetter and warmer, the first evidence of a serious threat to reptiles is beginning to emerge. For reptiles, both changes potentially lead to loss of body condition. Greater desiccation in drier summers may limit food supply and, in order to conserve water, will enforce periods of inactivity. During winter, warmer temperatures (>8°C) may be high enough for reptile bodies to remain physiologically active and thereby consume bodily reserves without the opportunity of replenishment by feeding. The potential impacts of climate change on British reptiles have been assessed by climate envelope modelling. In a low emissions scenario (+2C by 2080), those Kent species with a distribution extending into southern Europe, for example the Slow Worm and Grass Snake, at least in theory stand to gain as conditions will become more favourable. For those species with only a more northerly distribution (or restricted to higher altitude in the south) such as the Adder and Viviparous Lizard, the expectation is of a largely negative impact. Figure 1 shows the contrast between a species with a southerly distribution (Slow Worm) and one with a northerly distribution (Adder). The negative Adder scenario has some credibility, as at the southern edge of the Adder's range (e.g. Germany) the species is considered to be associated with wet heaths, and in otherwise dry areas can only exist where there is some standing water. Furthermore, on-going long-term Adder monitoring on the North Downs has detected population declines in habitats more prone to desiccation. In particular, dry habitats, the construction of ponds or the facilitation of easy access to cattle drinking troughs may be of significant benefit to Adders. The predictions of the model for the Slow Worm (Figure 1) seem less convincing, since long-term monitoring on the North Downs suggests that drier springs and/or summers are unfavourable for Slow Worms, since they rely on mollusc prey that are particularly vulnerable to desiccation. In contrast, the recent hotter, drier conditions on the North Downs appear to have been favourable for Viviparous Lizards, the opposite of model expectation for a northerly species.

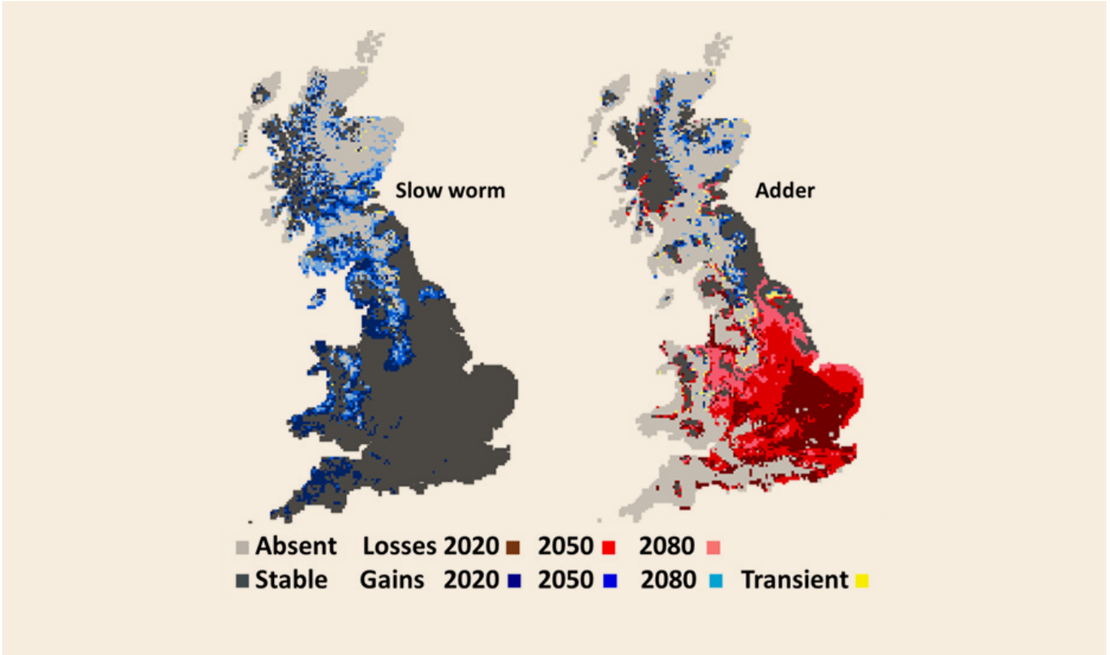

Figure 1: Climate envelope model predictions of changes in British reptile distributions under a low emissions scenario (+2°C by 2080). The Slow Worm (left) has a stable or expanding distribution, while the Adder (right) shows mostly distribution losses. Source: Reproduced from Dunford & Berry, 2012 with kind permission of ARC Trust

Human pressure / disturbance / persecution

Significant attempts have been made in recent years to raise awareness of reptiles amongst conservation practitioners and the general public; however, pressure on reptile habitats will only continue to increase. Fortunately, some human activities can actually benefit reptiles, for example the rising interest in composting provides opportunities for Slow Worm and Grass Snake. Engendering public sympathy for reptiles, and Adders in particular, is important. Warning signs are often expressed in terms that encourage dislike and fear, e.g. 'Beware Adders!', however, they could be reimagined in terms that encourage respect and appreciation, e.g. 'Adders need peace and quiet too! Please stay on the path and keep your dog on a lead.' (Julian & Hodges, 2019).

Disease

In the last few years, SFD has been detected in Britain, especially in Grass Snakes in the east of England. The disease manifests itself on the ventral scales as small (1-5mm diameter), thickened, brown lesions with an irregular surface. Although SFD can prove fatal, its significance for snake populations is still not understood, but increasing stress from climate change may result in greater prevalence.

Recording, monitoring and research

KRAG holds a database of faunal records (currently 34,999 validated records) that are used as the basis for ecological appraisal of development activities, to plan and manage conservation projects, and to designate Key Reptile Sites (Table 1) (Hodges et al., 2013). The database receives records from diverse sources and there are data sharing agreements with many ecological consultants, Kent and Medway Biological Recording Centre, and Record Pool. KRAG undertakes database search requests for those organisations and individuals needing access to this important information. A search request form is available on the KRAG website.

Since 2008, KRAG has undertaken an intensive, long-term Adder monitoring project in a chalk grassland reserve on the North Downs to observe factors (especially climatic ones) that may lead to reptile declines (Hodges & Seabrook, 2018). In areas more prone to desiccation, Adder populations have been in steep decline, whereas in a less exposed area the population has remained stable. A full analysis and interpretation of the long-term data is expected within the next two or three years. In the meantime, the data has been analysed to show other important aspects of Adder biology, including the thermal relations of Adders using artificial refuges (Hodges & Seabrook, 2016) and emigration and seasonal migration (Hodges & Seabrook, 2019).


Neonate adder *Vipera berus*
© Rick Hodges


Male adder *Vipera berus* 'mate guarding' a female
© Rick Hodges

Conclusion

The current status of Kent's reptiles relates directly to past and present human activity. Intensive agriculture and development have resulted in habitat loss and fragmentation. Of particular conservation concern is the Adder both nationally and in Kent. The first evidence of the impacts of climate change on this species is beginning to emerge as a result of particularly desiccating spring and summer weather. Greater awareness of both reptile distribution and habitat requirements provide a solid foundation for future conservation efforts.

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