

Reptile (Flagship) Species Action Plan



“Reptiles and amphibians are sometimes thought of as primitive, dull and dimwitted. In fact, of course, they can be lethally fast, spectacularly beautiful, surprisingly affectionate and very sophisticated.”

Sir David Attenborough

1 Aims

- To reverse the decline of reptile species across the borough and strive towards supporting self-sustaining, viable and thriving populations by utilising evidence based conservation actions.
- Promote reptiles as a ‘Flagship Species’, to encourage a wealth of beneficial conservation practices that support an array of other less known and less *charismatic* species.
- To raise the awareness amongst Council Officers and the public of the importance of reptiles to encourage greater levels of council and community driven conservation and appreciation across the borough.

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2 Introduction

There are currently six species of reptile which are recognised as native in the United Kingdom. These captivating creatures are misunderstood by many, yet they are truly important parts of an ecosystem.

All reptiles are exothermic (cold blooded), thus reliant on the environmental temperatures to gain body heat and raise their internal body temperature by basking in warm sites. In the colder months, typically between mid-October and March, all of our reptiles enter a period of hibernation in which they lower their metabolic rate and become inactive.

Reptiles are typically associated with the open, dry heathlands and grasslands which provide basking opportunities, as well as plenty of cover and food. Other habitats of importance are brownfield sites and mosaic habitats of scrub and grassland. An exception is the grass snake, which has more of affinity with wetland habitats.

Throughout Greater London there are populations of common lizard (*Lacerta vivipara*) slow worm (*Anguis fragilis*) and two native snakes; the grass snake (*Natrix natrix*) and the adder (*Vipera berus*). Other native reptile species which are rare and currently only found in the south of England, including in the neighbouring county of Surrey, are the sand lizard (*Lacerta agilis*) and the Smooth Snake (*Coronella austriaca*). Interestingly, the aesculapian snake (*Zamenis longissimus*) which is arboreal and native to western Europe has been recorded to be breeding at a site in North London. Apart from the adder and the aesculapian snake, all other species mentioned above have been recorded in Kingston.

Slow worms are the UK's longest living reptile (up to 30 years in the wild with records of up to 54 years in captivity) and are the UK's only legless lizard. They are distributed across the borough. Populations can be found in areas such as the Knollmead area and the Thames Water Hogsmill sewage works. Being most active at dusk, slow worms eat mainly slow moving prey such as slugs, worms, snails as well as the occasional insect and spiders. Although they are often mistaken for snakes, their key differences include a flat forked tongue, the ability to drop their tails to escape from predators and the presence of eyelids.

Common (viviparous) lizards are distributed across the borough. They are one of the most northerly distributed reptile species in the world and in the UK can be found in most regions of the Scottish Highlands. Like slow worms, these creatures give birth to live offspring. This is a climate adaptive strategy which allows the species to reproduce in colder climates by incubating eggs within the body, as egg laying requires warmer and temperature-stable environments. Unlike slow worms, common lizards can eat faster moving invertebrates such as flies and crickets, although they will also prey upon snails and slugs. They are not as long lived as the slow worm and live between 5-6 years on average in the wild.

Grass snakes are the only egg laying snake species recorded in Britain. These aquatic loving reptiles are the UK's longest snake and can reach over 1 metre in length. Due to their size they are able to predate larger species compared to native lizards, including amphibians, fish, small mammals, and birds. Eggs are normally laid in a sheltered location

within rotting vegetation, with compost heaps being a favoured spot. Up to 40 eggs may be laid which hatch in late summer or early autumn. Only a minority of the young will reach adulthood with many falling prey to predators such as herons, birds of prey and even hedgehogs.

The grass snake (*Natrix natrix helvetica*) is currently considered to be a subspecies. This term refers to the slightly unique characteristics that the British population of grass snakes have compared to other regions. New genetic research however, suggests that grass snakes have enough genetic variation to be able to be classified as a species within their own right as the barred grass snake (*Natrix helvetica*) (Kindler *et al.* in 2017).

The red-eared slider terrapin (*Trachemys scripta elegans*) is a non-native and invasive species that has been reported in Kingston. The purchase of this semi-aquatic turtle has been illegal under the Wildlife and Countryside Act 1981 since 2016. While owners have the right to keep their pets, wild releases, as well as importation, breeding, selling and rehoming are strictly prohibited, as the ecology and behaviour of red-eared sliders can have devastating impacts on native ecosystems. Known populations in the borough should be monitored as to prevent harmful consequences on local ecosystems.

This plan encourages greater awareness of reptile species amongst the general public and council officers. As with all the flagship species selected within the Kingston Biodiversity Action Plan, their conservation will promote the safeguarding of other species which share the same habitats.

3 Current status

- a. **Legal / policy status** - All reptiles in the UK are afforded protection under schedule 5 of the Wildlife and Countryside Act 1981 (as amended), meaning that it is an offence to intentionally kill, injure, sell or trade them.
- b. **Conservation status** - All reptile species currently found in the borough are common and widespread in England with stable global populations:
 - Common lizard – the UK’s most common reptile
 - Grass Snake – the UK’s most common snake species
 - Slow worm – London’s most common reptile
- c. **Distribution**

Heatmap of Reptile Records in Kingston upon Thames

Produced by Greenspace Information for Greater London CIC, on behalf of RB Kingston upon Thames, May 2022

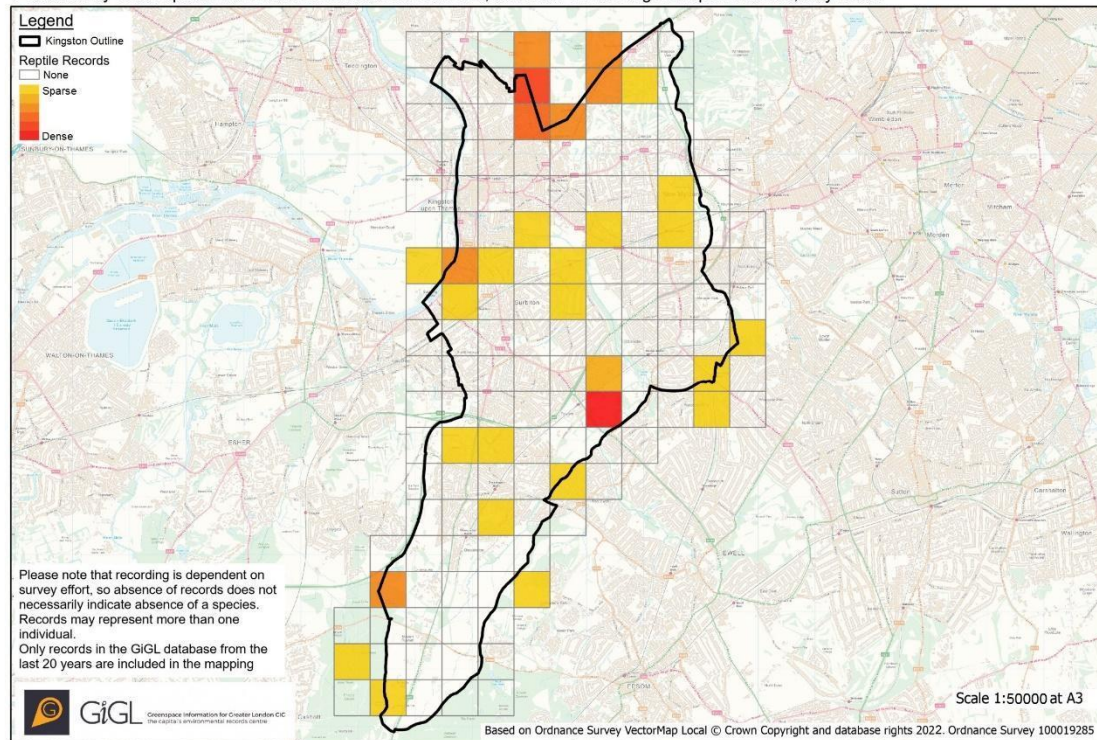


Figure 1 Heat map showing reptile distribution in RBK from the last 20 years. Note that this map is subject to data deficiencies - this plan will encourage greater recording of reptile data.

4 Key Habitats

Reptiles require a diverse range of habitats within the landscape in order to regulate their body temperature, to feed, to complete their lifecycle and also to avoid predators. In order to secure reptile populations that are self-sustaining in the long-term, it is important to maintain the following within habitats:

- Diverse vegetation structure
- Ground level sunlight (open areas)
- Connectivity between reptile occupied habitats
- Breeding / egg-laying features
- Hibernation areas
- Sufficient sources of prey
- Continuity of habitat over time
- Sunny slopes and banks (natural or man-made) are preferable but not essential

Reptiles prefer a mosaic of different levels of undergrowth and a variety of basking sites. Creating a habitat that is too uniform through mowing or unnecessary tidying for example, can reduce the suitability of habitat for reptiles. To avoid homogenous landscapes, managers could consider creating 'reptile hotspots', connected to a mosaic of dynamic successional habitats. Hedgerows are an invaluable connective feature which helps to

ensure the viability of populations over time and across the land (More species-specific information can be found in **Table 1**. Sustaining such well-connected, biodynamic and heterogeneous landscapes is likely to benefit a range of non-target species.

Table 1 Habitat preferences of the reptile species found in Kingston upon Thames.

Species	Habitats	Diet
Common lizard	Preferred habitat is damp heathland but common lizards can be found in open woodland, moorland, abandoned and derelict land, wilder gardens and allotments, downland and hedgerow. They are thought to hibernate underground in frost-free areas, or beneath large rocks and woodpiles. They are diurnal and will hide in cracks, crevices and abandoned burrows at night or during extremely hot or cold weather.	Small insects, particularly flies, grasshoppers, spiders and invertebrates e.g. centipedes, small snails and earthworms.
Grass snake	Prefer wetland habitats but can be found in woodland, grassland, gardens and hedgerow, especially those with ponds, rivers, lakes or reservoirs nearby. They may hibernate amongst log piles, tree roots, compost heaps or in the burrows of other animals.	Grass snakes hunt both in water and on land - amphibians, fish, small mammals and birds.
Slow worm	Can be found in heathland, tussocky grassland, gardens, woodland edge and hedgerow, as well as road and rail embankments, urban wasteland and wilder gardens and allotments. Slow worms exhibit mosaic basking behaviours, where they expose parts of their body to the sun while hiding the rest to avoid predators. They may also keep warm in log piles and compost heaps, and tend to hibernate in anthill mounds, decomposing leaf piles, in burrows underground or in the crevices of rotting tree stumps and roots.	Feed on invertebrates such as spiders but prefer slow-moving prey such as snails, slugs and earthworms.

5 Ecosystem Functionality and Services (Role in the Climate Emergency)

Trophic Position

Common lizards and slow worms are both secondary consumers, meaning they are carnivores which feed on herbivores. Grass snakes are tertiary consumers. Their position in the trophic cascade is

important for a number of reasons, including the regulation of primary

consumers and nutrient cycling. Without these predators, ecological stability can easily be thrown out of balance. Reptiles

therefore play an integral role in the food network.

Pest Control, Nutrient Cycling & Food Production

Pest control and soil health are important factors in protecting food sources worldwide. As secondary consumers in the UK, lizards play an important role in pest control; all reptiles contribute to soil health through nutrient cycling.

There are two types of nutrients which supply food to soils and to plants - organic and inorganic compounds. In a natural process, reptiles provide organic material to the land through their waste which not only feeds soil but is converted by fungi and microbes into inorganic nutrients for uptake by plants. This is an important biological process which helps to sustain the entire food chain from the bottom up. By cultivating diverse habitats which

support reptiles, we can reduce the need for both chemical fertilisers and pesticides

that ultimately damage the land and are often unsustainable in the long-term.

Disease Control

Tied to their pest control service, reptiles help to eliminate disease vectors thus contributing to the fight against human illness. However, integrated strategies to control disease require detailed ecological knowledge of both the vectors and the reptile predator species. Nonetheless, supporting a strong community of native reptiles will only maximise resilience, especially as climate change threatens to increase the risk of disease in the UK.

Culture

Throughout history reptiles have been a source of inspiration in art, mythology and literature and for some, a foot into the door of nature appreciation and conservation. One study found that reptile species which were most feared by the public were also regarded as the most beautiful, revealing an interesting duality in the perception of reptiles amongst humans (Janovcová *et al.*, 2019).

6 Threats to Species

Habitat Loss, Fragmentation & Urbanisation

Degraded and fragmented landscapes represent a major threat to all reptile species in the UK due to their philopatric lifestyle, or in other words, their tendency to stay within or near a particular area. Many urban reptiles are restricted to small habitat pockets or managed reserves which are often surrounded by a hostile environment. Any loss of, disturbance to or disconnection between these limited patches can result in local extinctions and population declines. For these reasons,

research into local population viability, habitat quality and population genetics can be extremely valuable for conservation (See Appendix A).

In urban areas, reptiles are also at an increased risk of disturbance and predation by pets such as cats and dogs. Cats are more likely to predate reptiles, however anecdotal instances have been recorded where adders were attacked by dog walkers accessing restricted sites, in

the attempts of the owners to ‘safeguard’ their pets. Adders are a ‘shy’ species and while their bites can be severe they are rarely fatal to humans or dogs. Increasing public awareness by developing a creative and positive narrative which engages and educates the community about adders may help to prevent the occurrence of such instances at targeted sites in the future.

Disease

Snake fungal disease (SFD) (*Ophidiomyces ophiodiicola*) is an emerging pathogen which, as the name suggests, is known to affect snake species only. The pathogen originates from North America but a distinct strain was first detected in an infected UK grass snake in 2015. (Franklinos *et al.*, 2017). Classic clinical signs of SFD include facial swelling, skin lesions and altered behaviour patterns that reduce survival. The disease can also move from the nasal cavity to the eyes, throat, and lungs, causing eye infections and pneumonia. Monitoring and research will be important going forward, as the extent to which SFD affects all of the UK’s snake species is not yet understood.

Climate Change

UK reptiles sit in the northern range of

distribution for their species. Common lizards, slow worms (and adders), who also have Scandinavian populations at higher altitudes, have adapted to these climates by producing live young rather than incubating eggs. All UK reptiles have relatives in warmer, more southerly climates, so one might assume that global warming will have positive impacts on their distribution in the ‘north’. However, this may not be the case for most species.

Dunford & Berry (2013) modelled UK reptile distribution changes under high and low emission scenarios for 2050 and 2080, and found that all species (apart from grass snakes and slow worms) are likely to experience widespread population declines, especially in high emission scenarios. Grass snakes were the only species predicted to consistently shift northwards, whereas slow worm populations were predicted to expand in the north but contract in the south (Dunford & Berry, 2012).

Droughts, fires and extreme weather are also on the increase with global warming and aside from direct impacts, climate change could indirectly affect reptile populations by contributing to declines in invertebrate prey.

7 Conservation actions (Tabulated)

Action	Timeframe	Lead	Partners	Evidence base
R01 - Identify and record key habitats within the borough, including connective features and reptile hotspots.	2023 - ongoing	RBK		N/A

R02 - Ensure / encourage all existing habitat is managed in an appropriate fashion to provide favourable conditions for reptiles.	2023 - ongoing	RBK		See R03
R03 - Identify sites (known hotspots in particular) which have the potential for habitat creation, enhancement or expansion. Encourage positive management and increase connectivity across these sites.	2023 - ongoing	RBK		Reptile Habitat Management Handbook - AARC Creating Ponds for Grass Snakes - FWH Grassland Management for Reptiles - Suffolk Wildlife Trust
R04 - Encourage habitat management that provides suitable basking, feeding, breeding and hibernation sites in a connected landscape.	2023 - ongoing	RBK		See R03
R05 - Encourage landowner / manager involvement in reptile conservation via liaison with local conservation groups, distributing management advice and information on grant schemes.	2023 - ongoing	RBK	LARG	See R03

<p>R06 - Support the monitoring / surveillance of amphibians. Develop relationships between recording bodies and organisations to facilitate information exchange. Incorporate the knowledge gained into planning and policy decisions.</p>	2023 - ongoing	LARG	RBK	<p>Survey Protocols for British Herpetofauna - NAARS</p>
<p>R07 - For key areas, prepare and implement supplementary planning guidance and local spatial strategies to ensure the long-term safeguarding / management of populations.</p>	2023 - ongoing	RBK		<p>Reptiles: Advice for Making Planning Decisions - GOV.UK</p> <p>Reptile Mitigation Guidelines – Natural England</p> <p>Reptile Guidelines for Developers – English Nature</p>
<p>R08 - Distribute information on grant schemes to land owners / managers and encourage uptake.</p>	2023- 2028	RBK		N/A
<p>R09 - Consider reintroductions of reptile species to their former range where appropriate and according to good practice. Implement long-term monitoring of the translocated populations to evaluate success.</p>	2023 - ongoing	RBK		<p>Reptile Reintroduction Guidelines – ARG</p>

R10 Translocate reptiles threatened by development where appropriate and according to good practice. This should be deemed as a last resort following the mitigation hierarchy. Full population surveys should be conducted on both donor and receptor sites and long-term monitoring of the translocated populations should be implemented to evaluate success.	2023 – ongoing	RBK		See ‘ R09 ’ IUCN Guidelines for Translocations Long-term Success of Reptile Translocation – Aspect Ecology
R11 - Provide a list of research subjects to be addressed by local institutions. Disseminate results and conservation messages.	2023-2028	RBK		See Appendix A
R12 – Encourage the reporting of invasive reptiles, such as the red-eared slider, and take appropriate measures to eradicate them locally.				Red-eared terrapin: Direct removal of adults - Conservation Evidence
Engagement & Awareness	Timeframe	Lead	Partners	Evidence base
R12 - Promote and support the surveying, management and	2023 - 2023	RBK	LARG	See ‘ R03 ’, ‘ R06 ’, ‘ R07 ’, ‘ R09 ’ & ‘ R10 ’

conservation of reptile species.				
R13 - Encourage the sharing of information collected during citizen surveys with local and national recording schemes (e.g. NARRS, GiGL).	2023 – ongoing	RBK		National Amphibian & Reptile Recording Scheme Greenspace Information for Greater London Record a Sighting - Record Pool
R14 - Utilise existing reptile-based environmental education initiatives & provide opportunities to see reptiles and their habitats in the wild.	2023 - 2023	RBK	Engage with NGO's such as ARC-Trust and Froglife	N/A
R15 - Take part in National Reptile Awareness Day.	2023 – ongoing	RBK		N/A
R16 - Engage with the public to encourage habitat and compost piles (especially within gardens and allotments).	2023-2028	RBK		Slow Worm Compost Survey - SARG Compost Heaps - Wild Patch Reptile Habitat Management Handbook - ARC Trust
R17 - Run annual online training for citizen science survey(s) and ensure data is recorded through local / national recording schemes (GiGL / NARRS /	2023-2028	RBK	LARG	London Amphibian and Reptile Group Amphibian Survey Guide Froglife.org Local Wildlife Sites - The Wildlife Trusts

Surrey Wildlife Trust). Ensure that the information gained is available to be incorporated into planning or policy decisions.				National Amphibian and Reptile Recording Scheme Amphibians & Reptiles Atlas - GiGL
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8 Planning Context - Biodiversity Net Gain

As priority species for the borough, reptiles should be protected through the planning system and, where possible, adequate habitat creation and enhancement for amphibians is encouraged. Planning conditions should be applied which enhance connectivity between relevant habitats and to effectively prevent or mitigate their deterioration. This plan advocates only for the use of relevant guidance to protect and enhance conditions for reptiles.

9 Monitoring

Metric	Process of Monitoring	Timeframe	Lead	Partners
R01, R02, R03, R04 & R05 – Number of habitat enhancement projects undertaken	Ad hoc, Annual report	2023 - ongoing	RBK	
R01, R02, R03, R04, R05, R06, R07, R09, R10, R12 – Number of monitoring programmes undertaken	Ad hoc, Annual report	2023 - ongoing	RBK	
R11 - Number of research topics addressed	Ad hoc, Key findings	2023 - 2028	RBK	KU

R13 - Database of records	Ad hoc, Annual account	2023 - ongoing	RBK	
R12 R13, R15, R16, R17 - Number of events held	Annual account	2023 - 2028	RBK	
AM09 - Record of event resources and activities, number of events held and number of attendees	Annual account	2023 -2028	RBK	LARG

10 Other relevant HAPs/ SAPs

- a. Grassland
- b. Hedgerow
- c. Pollinator Parks
- d. Rivers and Streams
- e. Standing Open Water

- f. Woodland
- g. Amphibians
- h. Badgers
- i. Hedgehogs

11 References

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12 Abbreviations

KU - Kingston University

LARG - London Amphibian and Reptile Group

RBK - Royal Borough of Kingston

SINC - Site of Importance for Nature Conservation

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14 Appendix

Appendix A Potential research topics

Research topic	Description
Policy	Evaluate the effectiveness of legislation in attaining conservation for UK amphibian species. Identify and promote mechanisms for improvement.
Population viability analyses	Determine the viability of reptile populations in the borough, especially isolated or fragmented populations.
Population genetics	Study the population genetics of reptile species isolated by new developments in the borough.

Developing conservation units	Conduct a one-off exercise to determine appropriate units for conservation status assessment and target setting.
Population structure	Do reptile species in the borough exist in a metapopulation structure or do occupied pockets of habitat represent discrete populations?
Habitat quality	Determine whether habitat quality can act as a surrogate for the presence of reptile species.