Amphibian (Flagship) Species Action Plan

"If we can discover meaning in the triling of a frog, perhaps we may understand why it is for us, not merely noise, but a song of poetry and emotion".

Adrian Forsyth

1 Aims

- To protect amphibian species across the borough, and strive towards supporting self-sustaining, viable and thriving populations, utilising evidence based conservation actions with the integration of population monitoring.
- To raise the awareness amongst Council Officers and the public of the importance of amphibians to encourage greater levels of council & community driven conservation and appreciation across the borough.
- Promote amphibians as a 'Flagship Species', to encourage a wealth of beneficial conservation practices that support an array of other less known and less charismatic species.

Acknowledgements

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2 Introduction to Species

There are currently seven species of amphibians recognised as native to the United Kingdom. Each share certain characteristics, but all have differing niches and functions in the environment. All amphibians have a backbone, are cold-blooded, require a moist environment, respire through their skin, are carnivorous as adults and display courtship rituals. Most are keen baskers and can often be found in a sunny spot at the edge of a pond. However, they are typically much more active at night to do most of their hunting. The following species mentioned are those that are currently present in the borough of Kingston upon Thames.

Palmate newt (*Lissotriton helveticus*) – The smallest of the UK's newts. The palmate newt is named after the black webbing that develops on the males' hind feet during the breeding season. Breeding males also possess a dark and filamentous tip on their tails and a smooth ridged dorsal crest. Newly hatched newts (efts) possess a 'frill' of external gills, and are distinguishable from tadpoles as they grow their front legs first and leave the water in the summer once they have lost their gills. While similar to the lifecycle of the smooth newt, palmate newts can tolerate drier conditions and so can be found further away from a water source.

This species has a very patchy distribution across the UK, showing a marked preference for shallow, soft-water pools on acidic soils which explains why the species is common on heathland in the south and west of England, and in moorland bogs in the north. However, while quite common in Scotland, Wales and England, palmate newts are largely absent from much of central England. In Kingston, the palmate newt has been recorded at sites such as Kingston University.

Great crested newt (*Triturus cristatus*) – Unlike palmate and smooth newts, great crested newts have a warty appearance and are identified by a distinctive pattern of black spots on their orange underbellies, which are as unique as fingerprints and allow individuals to be tracked by scientists. In the breeding season, the males develop their iconic great crests, which are partially reabsorbed after the mating season ends. Indeed, their names are derived from the Greek Triton (son of Poseidon) and the Latin cristātus meaning tufted, crested or plumed. Like all newts from April to May, the males perform a mating dance and waft pheromones towards females by waving their impressive tails. The females can lay around 200-300 eggs (though this is not always the case for individuals with chromosomal abnormalities), which are meticulously and individually wrapped into carefully chosen pond leaves. If the newts successfully reach adulthood, they will develop an ability to secrete toxic chemicals in their skin to protect themselves from predators.

This species is distributed widely across lowland England and Wales. However, their distribution is patchy and great crested newts have disappeared from many sites across Europe, meaning UK populations are internationally important. Great crested newts have been recorded in the borough at sites such as Jubilee Meadows, Hogsmill Sewage Treatment Works and Winey Hill.

Smooth newt (*Lissotriton vulgaris)* – Also known as the common newt, the smooth newt is widely distributed throughout the UK and is a firm favourite of the garden pond. Smooth newts look very similar to palmate newts as they are both brown in colour with yellow/orange underbellies and rarely exceed 10cm in length. The smooth newt is however, easily distinguished by the dark spots on its throat which palmate newts do not have. Like all newts in the UK, male smooth newts perform a courtship display and then deposit a packet of sperm onto a substrate which the female will take up for fertilisation, unlike frogs and toads who fertilise their eggs externally. A week later, the female newt lays around 300 fertilised eggs which are carefully wrapped into a variety of aquatic plants, including fallen leaves in the pond and plant roots.

The smooth newt has been recorded at sites in Kingston upon Thames such as Knollmead Allotments, Edith Gardens Allotments, Alric Avenue Allotments and Kingston University, though their distribution is likely to extend across the borough.

Common frog (*Rana temporaria*) – As the name suggests, the common frog is found throughout Britain though its numbers are in decline, likely due to disease and the disappearance of breeding sites. Males possess a single vocal sac under the chin, which is used for their famous nightly choruses in the breeding season. When females approach, males use the nuptial pads on the front feet to clasp onto the female's back and will fertilise her eggs as they are deposited below. Frogs tend to lay their spawn in rafts near the water's edge, often in a sunny and warm area, which can contain as many as 2,000 eggs.

Sites where the common frogs have been recorded in the borough include Beverley Park Allotments, Berrylands Nature Reserve, Manor Park, Fishponds Park, Kingston University, Alric Avenue Allotments and the Hogsmill Valley.

Common toad (*Bufo bufo*) – Common toads are widespread across Britain and are famous for their en-mass migrations to breeding ponds. When a large group of toads are seen to cross a road in a particular hotspot, it can be officially designated as a ‘toad crossing’ with signs erected to warn motorists of their presence in the breeding season. Unsurprisingly, this poses a major threat to migrating amphibians, as it is estimated that twenty tonnes of common toads are killed on the UK’s roads each year**.** To report or register a toad crossing, please visit Froglife. Unlike the common frog, common toads have warty skin and tend to walk or crawl rather than hop. During the day they conserve their energy by living in shallow burrows and are most active during the night. Toad tadpoles produce toxins that protect them from predators, allowing them to survive in deep ponds containing fish which frogs and newts may avoid. The common toad has been recorded at sites such as Kingston University, Fishponds Park and Beverley Park Allotments.

3 Current status

a. **Legal / policy status –** All wild, native amphibians and amphibian spawn are protected under UK law:

- **Great crested newt, natterjack toad & pool frog** – Protected in the UK under the Wildlife and Countryside Act 1981, making it illegal to kill, injure, capture, disturb or sell them, or to damage or destroy their habitats. They are also listed

as a European Protected Species under Annex IV of the European Habitats Directive.

- **Smooth newt, palmate newt, common frog & common toad** – Protected in England from sale and trade under the Wildlife and Countryside Act 1981.
- **Wild amphibian spawn** – Protected from sale/trade.
- **Captive amphibians** - Protected under the Animal Welfare Act 2006.

b. Conservation status - Further information on the national and global status of amphibians native to the UK is available here. As natterjack toads and pool frogs are absent in the borough, they will not be referred to in the remainder of this document.

- **Great crested newt & natterjack toad** – Endangered in the UK, listed as Priority Species under the UK Post-2010 Biodiversity Framework.
- **Common toad** – Threatened/declining in the UK, listed as a Priority Species under the UK Post-2010 Biodiversity Framework.
- **Pool frog** – Critically Endangered in England, this rare species went extinct in Britain in the mid-1990s and was reintroduced to Norfolk (2005). Listed as a Priority Species under the UK Post-2010 Biodiversity Framework.
- **Smooth newt** – Population stable.
- **Palmate newt** - Population stable.
- **Common frog** - Population stable.

c. Distribution

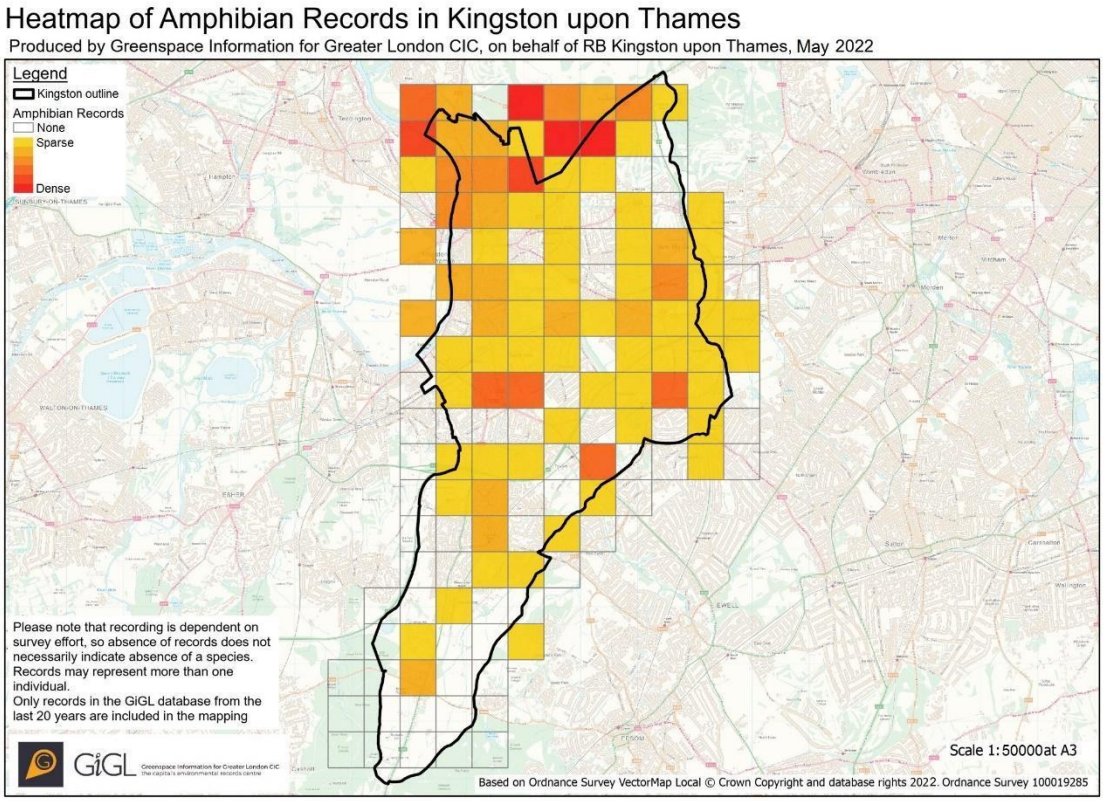

Figure 1 Heat map showing the distribution of amphibian species in RBK over the last 20 years. Note that this map is subject to data deficiencies - this plan therefore encourages the greater recording of amphibian data.

4 Key Habitats

Amphibian species found in the borough will generally utilise a wide range of damp and densely vegetated habitats, including grassland, heathland and moorland, farmland, wetlands (including slow flowing rivers and streams), woodland, and hedgerow.

Outside of the breeding season amphibians spend most of their time on land, so protecting connectivity and terrestrial habitat is just as important as conserving water sources. During the summer and autumn months, hedgerows and boggy grasslands make ideal hunting grounds, though they also utilise drier meadows that are connected to woodlands so long as the soil isn't severely parched. In the winter, safe and hidden spaces such as compost heaps and burrows (hibernacula) are needed for the colder months to be endured. Additionally, all amphibians are carnivorous and rely on the presence of habitats which sustain an abundance of invertebrate life.

Great crested newts are very particular in their requirements, and may travel over 1km to find the right breeding pond (Baker *et al.,* 2011). Therefore, their presence in an area can be a great indicator of the health of a water source. The annual migration to breeding ponds is not unique to great crested newts, as most amphibians require good quality, undisturbed habitats and may travel to find them. For example, the common frog may hibernate up to 2 km away from breeding ponds and the common toads may roam up to 5 km (Baker *et al,* 2011), although critical habitat is typically within 250m-500m of selected breeding ponds.

For the aforementioned reasons, it is extremely important to maintain a mosaic of well-connected, high quality and invertebrate-rich habitats, and a metapopulation of ponds to travel between if conditions in some become unfavourable. This will benefit amphibians and other species, including plants, by increasing resilience in the landscape. Small freshwater bodies are prone to great potential fluctuations, the threat of which is increasing with population growth and climate change. If the usual breeding ponds become tainted, disturbed or lost, then having access to other water sources across the landscape is tremendously advantageous for survival.

Great crested newt	Favours large and clean ponds with lots of vegetation and no fish. They breed in ponds in the spring and spend most of the remaining year on land, feeding in woodland, hedgerows, marshes and tussoky grassland. They hibernate underground among tree roots and in old walls.	Worms, slugs, snails, insects and insect larvae on land – other newt young, tadpoles and molluscs in water
Palmate newt	Favour shallow, soft-water pools on acidic soils like heathland, moorland and uplands. Fish-free waterbodies are preferred for breeding during the spring and their remaining time is spent feeding in woodland, hedgerows, marshland and tussoky grassland. They hibernate underground among tree roots and in old walls.	Aquatic and terrestrial invertebrates, frog spawn, crustaceans and occasionally tadpoles
Smooth newt	Prefer standing water with plenty of vegetation, such as lake margins, ponds and ditches in which to breed during the summer. They spend the rest of the year in grassland and woodland, hibernate under rocks, compost heaps or buried in mud and will sometimes overwinter in ponds.	Insects, slugs and worms on land - frogspawn, snails and small crustaceans in the water
Common frog	Found in almost any habitat where suitable breeding habitats are nearby. Common frogs breed in shallow waters such as ponds, puddles, lakes and canals during the spring and spend much of the rest of the year feeding in woodlands, hedgerows or tussoky grasslands. Garden ponds are extremely important for common frogs and many populations in suburban areas depend on them. They hibernate in pond mud, in piles of rotting leaves, logs or stones, but may emerge in milder weather to forage.	Worms, slugs, snails, insects and smaller amphibians in adult stages - juveniles feed on algae
Common toad	Tend to breed in larger, deeper water bodies than common frogs during the spring, including fish ponds, farm ponds, reservoirs or village ponds. They spend much of the rest of their time on land away from water feeding in woodlands, gardens, hedgerows, tussoky grasslands. Common toads like to excavate shallow burrows where they return to after foraging prey and hibernate in the winter, often under log/leaf piles, stones or even old flower pots.	Slugs, snails, worms, insects, larvae and spiders. Larger individuals may eat small vertebrates such as young harvest mice, slow worms, grass snakes or toads.

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

5.1 Predator and Prey

Amphibians are both predators of invertebrate insects and in some cases small mammals, and prey to other animals such as otters, badgers, birds, reptiles and even hedgehogs. Due to their trophic position, amphibians contribute significantly to particular energy pathways and provide readily available, seasonally abundant nutrition to support the aquatic and terrestrial food web (Regester, Whiles & Lips, 2008).

5.2 Pest & Disease Control

Amphibians contribute to pest and disease control through predation of and competition with insects and invertebrates. To the gardener this is beneficial through the reduction of pests such as slugs, snails and aphids. However, there may be a wider benefit to this service as climate change is predicted to increase the risk of mosquito and tick borne diseases in the UK, potentially leading to an outbreak of conditions normally experienced in tropical climates. Amphibians may reduce this threat, however, studies to investigate the rate of predation on mosquitos and mosquito larvae are limited.

Ramsdale & Snow (1995) listed tadpoles as predators of mosquito larvae and stated that all feeding stages of amphibians are likely to be important predators. Even if their impact is marginal, it is important that predators be maintained in mosquito habitats and care must be taken so as to not reduce their numbers. This can be achieved by enhancing habitats (such as fish-free ponds) for their survival.

5.3 Nutrient Cycling

As the etymology of the name suggests, amphibians live both in water and on land. The rate of transfer of nutrients within and between these two habitats depends on factors such as breeding effort (number of eggs produced) and the rate of survival into adulthood.

Tadpoles are known to act as primary consumers, detritivores and even cannibals. They also affect nitrogen cycling by serving as sinks of organic nitrogen. However, amphibians are voracious eaters at all life stages and can occur in incredible high densities in some ecosystems. Therefore, their presence is likely to have significant effects on ecosystem functions, such as primary productivity and community structure (Hocking & Babbitt, 2014). It is also likely that the movement of amphibians between terrestrial and aquatic habitats helps to maintain a balance of nutrient cycling in the landscape, although this service is understudied and overall effects are difficult to predict.

Main processes related to nutrient cycling in amphibians include:

- Soil burrowing
- Aquatic bioturbation
- Consumption
- Waste excretion

5.4 Bioindicators

Due to their susceptibility to environmental pollutants and preference for good quality habitats, amphibians have great potential as bioindicators in both aquatic and terrestrial environments (Venturino *et al.,*

2003). Amphibians make excellent indicators of the integrity of ecosystems, whereas population declines may serve as an early indicator of the impending loss of ecosystem services and functionality.

5.5 Cultural

As an abundant and diverse class of animals, amphibians have garnered rich symbolism throughout history. They play prominent roles in culture and society today through pathways such as mythology, literature and art, which contribute to the quality of human life through recreation, spirituality, and aesthetics (Hocking & Babbitt, 2014). Associations with amphibians have not always been positive, as toads and frogs were depicted as evil creatures in medieval Europe and were associated with witchcraft, diseases and skin ailments. In Shakespeare's play *As You Like It*, the jewel that was supposedly found inside the head of a toad would indicate the presence of venom or poison, protecting the wearer from foul play.

6 Threats

6.1 Infectious Disease

Ranavirus and chytrid fungus are the main causes for concern in terms of amphibian disease in the UK. These can cause severe physical symptoms, amphibian mortality on large scales and appear to be major factors in the dramatic decline of amphibians across the globe. Their occurrence is exacerbated by climate change and the introduction of non-native species such as fish, and in particular the unregulated movement of amphibians, amphibian spawn and aquatic plants by the public between private ponds and public ponds and vice versa. To learn more or report a sighting, please visit Garden Wildlife Health. This plan highly discourages the unregulated movement of amphibian species, as to prevent the spread of disease.

6.2 Habitat Loss & Fragmentation

Historically, amphibians have been threatened by the drainage of wetland areas for agriculture. Today, the intensification of agriculture, the development of dense road networks and increased runoff from hard surfacing contribute to pollution, isolation and habitat degradation. Without mitigation, these can and have led to the drastic decline or even extinction of local populations. Loss of breeding habitat is a particularly significant factor, with an increasing number of ponds being filled for development.

6.3 Pollution

Amphibians breathe and drink through their skin as adults and their gills as juveniles. They are therefore extremely susceptible to environmental pollutants that may be present in the atmosphere, water or soil. Their semi-permeable skin absorbs bacteria, chemicals and other toxins just as easily as water and for this reason, toxins are able to invade critical organs and cause mortalities or deformities. These substances can include (but are not limited to) pesticides, herbicides, insecticides, heavy metals, road salts and even microplastics. Therefore, if a healthy population of amphibians are present at a site it is an

indication of a quality environment which should be protected.

6.4 Roads

Amphibians tend to hibernate or are less active over winter. In spring, on the first warm and damp evening of the year, they migrate from the terrestrial landscape back to their breeding ponds. This is the riskiest time for most amphibians, especially common toads who migrate in large groups with busy roads often blocking their paths. In fact, it is estimated that up to 80% of males are killed on roads in the UK every year. This includes instances where individuals fall into roadside gully pots and become entrapped in drains. Furthermore, road salts are often deposited in winter (just prior to the breeding season in spring).

Salts that enter the aquatic system or lie in the migratory path of amphibians have been shown to cause morbidity and mortality, including to young overwintering newts and amphibians hibernating in the ground between roads and ponds (Duff *et al.,* 2011).

6.5 Climate Change

Droughts, warmer and wetter winters and an increase in extreme weather events have become more common with climate change, leading to the premature drying of waterbodies, disturbance, poor breeding success and reduced survival rates. Global warming will also increase temperatures in both terrestrial and aquatic habitats, which is exacerbated in London by the urban heat island effect and has been shown to increase amphibian mortality.

6.6 Knowledge

While amphibians' contribution to ecosystem services is evident, much research remains to be done. Most amphibian studies are limited to a few species or habitats and it is likely that their full value is yet to be discovered. Students in the fields of medicine, zoology, ecology etc. will find promising research careers when studying this large and highly diverse class of invertebrates. The information gained can then help inform and prioritise conservation efforts.

6.7 Hybridisation

In some cases, distinct but closely related species are able to interbreed to produce infertile offspring. For example, the pool frog with the invasive marsh frog. Additionally, invasive populations that are able to breed with native populations produce hybrids that are not afforded the same legal protection as native species. As non-native and invasive species are becoming more common, preventing introductions and controlling introduced populations should be a management priority (Todesco *et al.,* 2016).

7 Conservation actions (Tabulated)

To facilitate amphibian conservation in the borough, this plan aims to align its actions with relevant Habitat Action Plans, such as Standing Open Water and Pollinator Parks.

Action	Timeframe	Lead	Partners	Evidence base
AM01 - Identify and record key amphibian habitats within the borough including connective features. In line with '**AM09**'	2023 - ongoing			N/A
AM02 - Ensure / encourage that all existing habitat is managed in an appropriate fashion to provide favourable conditions for amphibians	2023 - ongoing			See '**AM03**'
AM03 - Identify sites which have potential for habitat creation, enhancement or expansion. Encourage positive management and increased connectivity of pond networks across these sites	2023 - ongoing	RBK		Habitat Management for Amphibians – Summary Amphibian Habitat Management Handbook – ARC Trust Gems in the Dunes – Back From the Brink
AM04 - Encourage land owner / manager involvement in active conservation via liaison with conservation groups, distribution of management	2023 - ongoing	RBK		See '**AM03**' How to Build a Hibernaculum

advice and				

information on grant schemes				
AM05 - 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	2023 - ongoing	LARG	RBK	Amphibian Survey Guide - Froglife.org Pond Surveillance Network – Freshwater Habitats London Amphibian & Reptile Group Record a Sighting - Record Pool Survey Protocols for British Herpetofauna - NAARS
AM06 - For key areas, prepare and implement supplementary planning guidance and local spatial strategies to ensure the long-term safeguarding / management of populations	2023 - ongoing	RBK		Planning & Development – ARC Trust Amphibian Habitat Management Handbook – ARC Trust
AM07 - Provide a list of research subjects to be addressed by local institutions	2023-2028	RBK		(see **Appendix A**)

AM08 - Translocate amphibian species impacted by development where appropriate and according to good practice (including testing to prevent the spread of disease). Implement long-term monitoring of the translocated populations to evaluate success	2023 - ongoing	RBK		IUCN Guidelines for Amphibian Reintroduction & Translocation Translocate amphibians - Conservation Evidence
Engagement & Awareness	**Timeframe**	**Lead**	**Partners**	**Evidence base**
AM09 - Run annual online training for citizen science survey(s) and ensure data is recorded through local / national recording schemes (GiGL / NARRS / Surrey Wildlife Trust). Ensure that the information gained is available to be incorporated into planning or policy decisions	2023-2028	RBK	LARG	London Amphibian & Reptile Group Amphibian Survey Guide Froglife.org Local Wildlife Sites - The Wildlife Trusts National Amphibian and Reptile Recording Scheme Amphibians & Reptiles Atlas - GiGL
AM10 - Implement / encourage positive interpretation material and displays about amphibian conservation in public greenspaces,	2023 - ongoing	RBK		N/A

schools, allotments and similar				
AM11 - Ensure the highways team are aware of the impacts of road salting on Amphibians. Thus ensuring this is only conducted when completely necessary for public safety reasons	2023- 2028			Road Mitigation Measures - Froglife Report on Solutions to Road Salts - Carey Institute
AM12 - Raise awareness of the Frog Life Toad Crossing Register to ensure any identified crossings are recorded	2023- 2028			Register a Toad Crossing Froglife.org
AM13 - Raise awareness among the general public of the disease risks involved with introducing / translocating amphibians and discourage the unauthorised movement of amphibians	2023-2028			See '**AM08**'

8 Planning Context - Biodiversity Net Gain

As priority species for the borough, amphibians should be protected through the planning system and, where possible, habitat creation and enhancement for amphibians is encouraged. Planning conditions should be applied which enhance connectivity between the relevant terrestrial and aquatic habitats and prevent or mitigate their deterioration.

9 Monitoring

Metric	Process of Monitoring	Timeframe	Lead	Partners
AM01, AM02, AM03, AM04 & AM06 – Number of habitat enhancement projects supported / undertaken	Ad hoc, Annual report	2023 - ongoing	RBK	
AM05, AM06, AM08, AM09 - Number of monitoring programmes supported / undertaken	Ad hoc, Annual report	2023 - ongoing	RBK	
WV06 – Record of supplementary planning guidance	Annual update	2023 - ongoing	RBK	
AM07 - Number of research topics addressed	Ad hoc, Key findings	2023 - 2028	RBK	
AM10 - Number of interpretation boards in public greenspaces	Ad hoc, 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	
AM11 - % of road salt reduction per area	Annual account	2023- 2028	RBK	

AM12 - Number of amphibian crossings registered in the borough	Annual account	2023- 2028	RBK	
AM13 - Number of campaigns addressing amphibian disease	Annual account	2023-2028	RBK	

10 Other relevant HAPs/ SAPs / Strategies

a. Grassland
b. Hedgerow
c. Pollinator Parks
d. Rivers and Streams
e. Standing Open Water
f. WildWays
g. Woodland
h. Badger
i. Hedgehog
j. Reptiles

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12 Abbreviations

ESU: Evolutionarily Significant Unit
GiGL: Greenspace Information for Greater London
NARRS: Nation Amphibian and Reptile Recording Schemes
NPPF: National Planning Policy Framework

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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.
Developing conservation units	Conduct a one-off exercise to determine appropriate units for conservation status assessment and target setting.
Population viability analyses	Determine the viability of amphibian populations in the borough, especially isolated or fragmented populations.
Population genetics	Increase understanding of population genetics and their significance in different contexts e.g. populations on brownfield sites, those isolated by new development etc.
Population structure	Determine whether breeding ponds represent discrete populations.
Population size	Determine whether breeding aggregations can act as an accurate measure of population size.