Bat (Flagship) Species Action Plan

Dark air-life looping
Yet missing the pure loop ...
A twitch, a twitter, an elastic shudder in flight
And serrated wings against the sky,
Like a glove, a black glove thrown up at the light,
And falling back.

The Bat - D. H. Lawrence

1 Aims

- To reverse the decline of bat 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.
- Promote bats 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 bats to encourage greater levels of council & community driven conservation and appreciation across the borough.

Acknowledgements

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2 Introduction

Across the globe there are approximately 1,400 species of bats. This incredible group of mammals, also known as *Chiroptera,* express a wide range of body shapes from flying foxes which can weigh up to 1.5kg, to bumblebee bats weighing only 2 grams (the world's smallest mammal). Generally, they are a highly adapted group and the only mammal species to have evolved powered flight. In the UK 18 bat species are annually recorded which represents almost 25% of all our mammal species, however only 17 are currently known to be breeding.

All British bats are insectivores, and common pipistrelles (*Pipistrellus pipistrellus*) for example, can predate as many as 3,000 invertebrates in one night. Each species occupies a slightly different ecological niche to reduce the amount of inter-species competition, with some species such as the Daubenton's bat (*Myotis daubentonii*) flying low along rivers and species such as the noctule (*Nyctalus noctula*) flying high typically above a tree canopy. Bats are a highly mobile group and recent studies demonstrate that Nathusius' pipistrelles (*Pipistrellus nathusii*) for example, have the ability to migrate from Europe including countries as far as Latvia despite weighing up to only 10g. This therefore requires that significant spatial landscapes are considered when trying to conserve the species.

It is highly likely that bats have suffered considerable declines since the pre-industrial age, due to significant levels of habitat loss, degradation and fragmentation. In more recent years, The Bat Conservation Trust has investigated general bat trends, in which there is sufficient data for 11 of the 17 breeding species (BCT, 2021), none of which were considered to have declined significantly since the baseline year of monitoring (1999 for most species). While data from the National Bat Monitoring Programme indicates that populations of the bat species they monitor are stable or recovering, it should be remembered that these trends reflect relatively recent changes and should not be interpreted as the appropriate population baseline for the species.

Across London 11 species of bat have been recorded, all of which have been recorded within the Borough of Kingston or in neighbouring boroughs. Bats are important indicators of the quality of our environment, as their complex ecological requirements leave them highly sensitive to environmental changes. They are relatively well surveyed throughout the borough however recent surveys have indicated that some bat species are becoming increasingly scarce/ absent in some areas. It is therefore pivotal that conservation actions and measures are adopted to avoid the local extinction of these important species.

Highly light-sensitive species include the Daubenton's bat which has been recorded along the Hogsmill and in darker areas along the Thames including Seething Wells. Following a trapping exercise conducted by volunteers from the London Bat group, a whiskered bat was recorded in Jubilee Wood in the late summer of 2017, a rare species in London.

Bats also generate a significant interest and curiosity amongst the general population. In recent years there has been growing attendance to bat walks which are run throughout the summer months in greenspaces across the borough. These have been known to attract over a hundred people, demonstrating the affinity people have for bats if given the opportunity.

3 Current status

a. Legal / policy status

- All bat species are afforded protection under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended by the Countryside and Rights of Way Act, 2000), Schedule 2 of the Conservation of Habitats and Species Regulations 2010, and annex IV of the EC Directive on the conservation of natural and semi-natural habitats and of wild fauna and flora (the 'Habitats Directive').
- Greater and lesser horseshoe bats, Bechstein's bat and barbastelles are given special protection under Annex II, making it a requirement to designate roosts and foraging sites as Special Areas for Conservation (SACs).
- Bats have been adopted as Species of Principal Importance in England under Section 41 of the NERC Act (2006).
- The UK is a signatory to the Agreement on the Conservation of Bats in Europe (EUROBATS). While this is not strictly a legal instrument, as a signatory the UK is obliged to abide by such agreements.
- The Wild Mammals (Protection) Act, 1996, protects bats from cruel ill treatment.

b. Conservation status - There are 18 species of bat in Britain. **Table 1** outlines sites where bat species have been recorded in Kingston Upon Thames. Several are UK Priority Species under the UK Biodiversity Action Plan.

c. Distribution

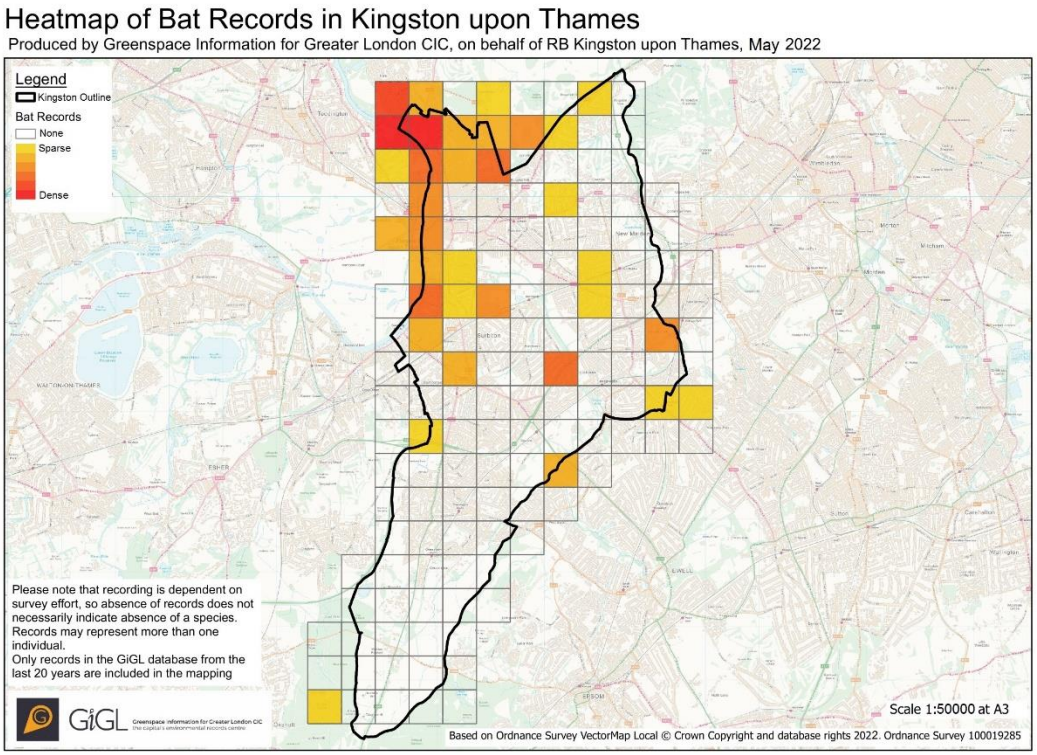

Figure 1 Heat map showing bat distribution in RBK. Note that this map is subject to data deficiencies - this plan will encourage greater recording of bat data.

Table 1 Records of bat populations within RBK (Fure, 2018).

Name	Status	Recorded and Important Sites
Noctule *Nyctalus noctula*	UK priority species. Native, uncommon nationally and locally	Records from ten localities within the borough, including: Kingston Riverside at Canbury Gardens, Seething Wells, Kingston University Kingston Hill Campus, The Woods Surbiton, Sixty-Acre wood in Chessington
Common pipistrelle *Pipistrellus pipistrellus*	UK priority species (Wales). Native, common and widespread nationally and locally	Small colonies present throughout the borough, often found bordering 'good' habitat e.g., Richmond Park. Seething Wells is the only known hibernation site
Soprano pipistrelle *Pipistrellus pygmaeus*	UK priority species. Native, common and widespread nationally and locally.	Regular roost sites in the Surbiton area and central Kingston. Tree roosting sites: Fishponds, Lower Marsh Lane, Surbiton and Jubilee Wood. Feeding sites: Hogsmill River, Beverley Brook, Bonesgate Stream and Tolworth Brook. Winter roosting: Seething Wells.
Brown long-eared bat *Plecotus auritus*	UK priority species. Native, considered common in wooded areas but uncommon in the borough.	Strongholds at five sites in or adjacent to the borough: Ditton Fields, Home Park, Richmond Park and Wimbledon Common. Singles or small colonies are likely to exist in trees or larger properties at Kingston Hill and Castle Hill.
Leisler's lat *Nyctalis leisleri*	Native, nationally rare, local in the borough.	Recorded in good numbers along the Thames and Seething Wells, less so along the Hogsmill Valley, including Kingston Cemetery and Knights Park. Favoured feeding sites include Mayflower Park and Joseph Hood Memorial Playing Fields.
Nathusius's pipistrelle *Pipistrellus nathusii*	Migratory species, rare nationally, local to the borough riverside.	Thames Riverside, Seething Wells filter beds and the riverside, Canbury Gardens, mating roosts are still located under the railway bridge in the town centre.
Serotine *Eptesicus serotinus*	Native, nationally local, scarce in the borough.	Recorded at twelve localities in the borough, most of which are associated with the River Thames or the HSW. There are no known roosting sites in the borough.
Daubenton's bat *Myotis daubentonii*	Native, nationally uncommon, declining in London .	Regularly recorded at four wetland sites in the borough. Hogsmill River and Seething Wells are important feeding sites for this species. Under the bridges of small rivers make important commuting routes for the Daubenton's bat.
Whiskered bat *Myotis spp.*	Native, nationally rare, locally rare.	There is a single record of the whiskered bat from Kempton Park.
Brandt's bat *Myotis brandti*	Native, nationally rare, locally rare.	Recordings of a single Brandt's bat made along the river of the Seething Wells Filter Beds.
Natterer's bat *Myotis nattereri*	Native, uncommon nationally, rare in the borough.	Recorded at fishponds Surbiton, Hogsmill River, Surbiton Sewage Works and the west bank at Barge Walk.

4 Associated Habitats

As each species occupies a unique ecological niche, a mixture of key features in the landscape is required. The most important sites are those which provide roosting opportunities, foraging opportunities and commuting routes between areas of ecological significance, including habitats which support or attract an abundant source of insect prey (Wickramasinghe *et al.,* 2004). The following **Table 2** outlines the habitats of importance for each species currently found in Kingston.

Table 2 The relative importance of habitats to bat species (Entwhistle *et al.,* 2001).

	Woodland edge	Riparian vegetation	Broad-leaved woodland	Treeline	Parkland	Mixed woodland	Hedgerows	River/canal	Woodland ride	Lake/reservoir	Pond	Wet woodland	Woodland clearing	Pasture	Suburban	Single trees	White lighting	Meadow	Coniferous woodland	Ditches	Urban	Arable
Pipistrelles 45 & 55 kHz	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦
Serotine	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	
Daubenton's	✦	✦	✦	✦		✦	✦	✦	✦	✦	✦	✦	✦		✦	✦			✦	✦		
Natterer's	✦	✦	✦	✦	✦	✦	✦	✦	✦		✦	✦		✦		✦		✦				
Bechstein's	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦		✦		✦				✦			✦
Leisler's			✦		✦	✦		✦		✦	✦		✦	✦			✦	✦	✦		✦	
Noctule	✦	✦			✦			✦		✦	✦		✦	✦	✦		✦	✦			✦	
Brown long-eared	✦	✦	✦	✦	✦	✦	✦		✦				✦			✦			✦			
Whiskered	✦	✦	✦		✦	✦		✦		✦	✦		✦						✦			
Barbastelle	✦	✦	✦			✦		✦	✦	✦	✦		✦									
Nathusius' pipistrelle	✦	✦	✦	✦	✦			✦	✦						✦							
Brandt's	✦	✦	✦			✦	✦						✦						✦			

Creating, enhancing and connecting the relevant and existing habitats in the borough will promote an environment suitable for the recovery of bat populations. Such management practices are likely to benefit an array of wildlife outside of the target species and provide a resilient habitat network. However, precautions should be taken to ensure that changes in the management of sites does not undermine the existing conservation priorities of other species.

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

4.1 Bioindicators

As urbanisation continues to expand into previously undisturbed areas, monitoring population change and habitat degradation is becoming increasingly important. Bats have great potential as bioindicators, as they are sensitive to a range of stressors which affect a wide array of taxa and respond to such stressors in predictable ways. Due to their high position on the trophic cascade, bat populations can also be used to identify the level and scale at which environmental degradation is occurring.

For example, insectivorous bats in the UK are sensitive to the bioaccumulation of pesticides and other pollutants, as well as

changes in abundance of prey species in occupied habitats. Furthermore, as the productivity of insect communities is dependent upon the plant populations in which they live and feed, changes in bat populations can also reflect the status and quality of vegetation. Bat species with restricted ranges may even allow the course of pollution or disturbance to be tracked with great accuracy (Caro & O'Doherty, 1999).

Overall, changes in bat populations and activity can be directly linked to climate-related stressors, water quality, and changes in land use including agricultural intensification, pollution and habitat fragmentation. Their level of sensitivity means they can show a graded response to such stressors over long time-periods, allowing for the detection of a disturbance while also providing a window of opportunity to address the cause. Additionally, due to their slow reproductive rates, bats are less subject to noise that confounds data typical of fast reproducing taxa at lower trophic levels (Jones *et al.,* 2009).

To utilise their potential as bioindicators, populations must be monitored accurately and consistently, and this data should ideally be comparable on a global scale. Such work is carried out through the National Bat Monitoring Programme.

4.2 Pest Control

All bat species in the UK are insectivorous, and can suppress the populations of a range of arthropods considered to be pests in both urban and agricultural landscapes. For example, mosquitoes, moths, beetles and flying termites (Aguiar *et al.,* 2021). Flying termites are not indigenous to the UK (Eggleton, 2010), though global warming is expected to increase the incidence of their presence in temperate regions (Dhang, 2017). Strongholds with dense populations of bats in the borough may therefore present a nature-based solution to preventing invasions of flying termites and other invasive pests. Thus, increasing our resilience to the impacts of climate change. Furthermore, the pest management service provided by bats is considered important for maintaining the ecological integrity of forest ecosystems (Vanitharani, 2014).

4.3 Nutrient Dispersal

Some species travel considerable distances when foraging which consequently spreads nutrients across the landscape through droppings. Noctule bats, for example, have been found to travel up to 26km from their roosts (Entwhistle *et al.,* 2001).

6 Threats to habitat

5.1 Loss of or Disturbance to Important Sites

All bat species in the UK are sensitive to environmental anthropogenic alteration. Therefore, the disturbances to, destruction of or damage to roosting, commuting and feeding sites could result in the deterioration of any community (Russo & Ancillotto, 2015). These sites may take the form of other priority habitats in the borough such as woodlands, grasslands, rivers and streams, standing open water, wildways and hedgerows. A good example of disturbance in urban areas is the installation of artificial lighting at the edge of or within these important habitats.

5.2 Conservation Priorities

The responses of bats to disturbance, changes in land use and urbanisation is highly species-specific, and could favour one species while causing the decline of another. For example, some species exploit the abundance of insects attracted by artificial light, though this apparent benefit is significantly undermined by some negative consequences (see 5.4 Artificial Light at Night). In contrast, the Daubenton's bat is sensitive to light pollution from encroaching development (Fure, 2018).

5.3 Social Attitudes

Pressures on bat species are likely to be exacerbated by social attitudes towards maintenance and management, a lack of awareness surrounding bats and ignorance of the legislation protecting them (Aguiar *et al.,* 2021). Other key threats include a decline in insect availability through the build-up of insecticides and pesticides in the food-chain (Entwhistle *et al.,* 2001).

5.4 Artificial Light at Night

Artificial light at night (ALAN) is a relatively novel threat that can impact the entire trophic cascade, especially nocturnal species such as bats and nocturnal insects. First of all, ALAN affects the abundance of prey through associated insect mortality, and the distribution of prey as insects gather round light sources at the streetlight scale (Perkin *et al.,* 2014). Secondly, by illuminating the scene, ALAN may increase the predation of bats by owls and other raptors. This causes the bats to increase their flight speed (Polak *et al.,* 2011) though the impact varies depending on the species. For example, slow flying species such as the brown long-eared and Natterer's bats have been shown to avoid lit areas (Zeale

et al., 2018), while fast flying species such as the pipistrelles may benefit by foraging insects that gather around streetlights (Clémentine Azam *et al.,* 2015).

In any case, ALAN has been shown to negatively impact the relative abundance of bats on the landscape scale, by reducing the functional connectivity of habitats (Pauwels et al., 2019). Barré *et al.* (2021) showed that bat activity was 1.7 times lower for bridges crossing riverine ecosystems, and that bats kept larger distances and flew faster close to illuminated bridges, suggesting that lighting strongly reduced habitat availability and connectivity. More research is needed to quantify the ecological consequences of artificial light as this field remains largely understudied.

5.5 Climate Change

Climate change may significantly influence the survival and distribution of bats in the future, as hotter, drier summers and warmer, wetter winters are likely to affect prey and habitat availability. For example, Nathusius' pipistrelle has already been shown to have expanded its range into the UK from European populations in response to recent climate change, with a potential two-fold increase in suitable habitat for the species by 2050 (Lundy, Montgomery & Russ, 2010). Additionally, warmer winters are likely to interfere with hibernation cycles and the occurrence of extreme weather events which results in the felling of trees may further disturb bats.

5.6 Knowledge Gaps

Further limitations to conservation arise from gaps in data due to a lack of standardised, structured surveys (Stahlschmidt & Brühl, 2012; Fure, 2018) and a lack of knowledge regarding the

ecological spans of prey species. The current available conservation guidelines for bats focuses mainly on feeding and

roosting areas. However, this approach assumes that foraging habitats fulfil the functional needs of bat species and does not take into account the ecological needs of their prey (Arrizabalaga-Escudero *et al.,* 2015).

Prey species often require habitats outside of the foraging grounds where predator and prey coincide to complete their life cycles. Therefore, ontogenetic life stages must be identified to prevent the loss of favourable habitats and ensure long-term food availability. The contemporary use of molecular tools in dietary analyses has generated important progress in the species-level identification of prey (Clare, 2014).

7 Conservation actions (Tabulated)

Basic management principles:

- Avoid loss of suitable habitat
- Avoid fragmentation and isolation of habitats, including dark skies
- Protect current roosts, potential roosts and suitable habitat in the area
- Minimise the use of pesticide (herbicides and insecticides)
- Reduce artificial lighting near key habitats

Action	Timeframe	Lead	Partners	Evidence base
KB01 - Promote best tree work practice with links to appropriate websites.	2023 - 2028	RBK		Bats & Trees - Bat Conservation Trust
KB02 – Run a bat-focused arborist/ecology course for arborists and ecologists.	2023 - 2028	RBK	Glendale ATS, Development Management Officers	N/A
KB03 – Maximise the roosting opportunities for prospecting bats by encouraging land managers and property owners to follow good practice guidelines.	2023 - ongoing	RBK		Habitat Management for Bats - A Guide for Land Managers - JNCC

KB04 – Create or promote new roost and hibernaculum opportunities on identified sites.	2023 - 2028	RBK		Bat Roost Creation Opportunities in Greater London - Bat Conservation Trust
KB05 – Maintain annual borough participation in NBMP at least 3 sites	2023 - 2028	RBK	BCT	Surveys - National Bat Monitoring Programme
KB06 – Ensure management plans include actions to protect known bat roosts and enhance habitat, particularly for brown long-eared bat and Natterer's bat.	2023 - 2028	RBK		See **KB01, KB03** & **KB10**
KB07 - Distribute appropriate information to major roofing contractors & pest control companies and encourage uptake.	2023 - 2028	RBK		Advice for Planning Decisions - GOV.uk
KB08 – Discourage the use of modern roofing membranes that are the cause of bat-entanglement, especially in buildings that have had known bat presence or high potential. This includes buildings that are near woodland and water, or are of a certain age or historic in nature.	2023 - ongoing	RBK		Bats and Breathable Roofing Membranes - Arbtech Roofing Membranes - Bat Conservation Trust

KB09 – Identify core sites for habitat creation and enhancement.	2023 - ongoing	RBK		Landscape and Urban Design for Bats - Bat Conservation Trust Ponds for Bats - Freshwater Habitats Trust Trees & Woodland for Bats - Forestry Commision Hedge for Bats - Hedgelink
KB10 – Request the reduction in night-time lighting through the following measures. Conduct standardised surveys of bat activity before and after lighting alterations.	2023 - ongoing	RBK		Bats and Artificial Lighting in the UK - Bat Conservation Trust

1. Give support to any measure which seeks to limit night-time lighting by the imposition of curfews after 1am.

2. There should be no NEW lighting near ecologically sensitive areas, ponds, lakes, rivers, and areas of high conservation value. New schemes elsewhere should provide refuges/dark corridors that animals can use.

General recommendation to:
Limit the duration of light
Reduce 'light trespass' into areas not intended to be lit (including the sky)
Change the intensity of lighting
Change the spectral composition of the lighting.

3. Floodlighting schemes should be encouraged to:
Reduce the height of lighting columns
Not to use reflective surfaces under lights
Use narrow spectrum and avoid white/UV light to minimise the range of species affected
Lights should not be on automated switching but should be extinguished after the last user.

4. Car park lights should be switched off as early as possible or on motion sensors.

5. Trees and vegetation should be retained as they act as light shields.

6. Historic buildings should not be lit: this includes uplighters on churches and chapels as well as heritage structures.

7. Events with lighting or fireworks should not be held near water or during the period May to August.

Engagement & Awareness	Timeframe	Lead	Partners	Evidence base
KB11 - Run an annual training course in the use of bat detectors and/or running bat walks.	2023 - 2028	RBK		Bat Walk Resources - Bat Conservation Trust
KB12 - Seek funding for the purchase of bat detectors and promote their availability for the public to borrow to encourage interest in bats and recording.	2023 - ongoing	RBK		N/A
KB13 - Encourage citizen science surveys.			BCT	Getting Started with Bat Surveys - NBMP

8 Planning Context - Biodiversity Net Gain

As priority species for the borough, bats should be protected through the planning system and, where possible, habitat creation and enhancement for bats is encouraged. Planning conditions should be applied which incorporate the implementation of bat roosting and foraging habitat, and prevent or mitigate their deterioration. Detailed species-specific actions can be found in Habitat Management for Bats – a guide for land managers, land owners and their advisors.

9 Monitoring

Metric	Process of Monitoring	Timeframe	Lead	Partners
KB01 - Register of sites where trees are managed according to best practice for bat conservation	Annual account	2023 - 2028		
KB02 & **KB11** - Number of events and number of attendees	Annual account	2023 - 2028	RBK	
KB03, KB04, KB06 & **KB09** - Number of habitat creation or enhancement projects undertaken	Ad hoc, Annual report	2023 - ongoing	RBK	
KB05, KB13 - Number of surveys conducted	Annual report	2023 - 2028	RBK	
KB07 - Register of contractors and companies that information has been distributed to	Annual account	2023 - 2028	RBK	
KB08 - Register of known roosting sites in buildings and their roof membrane status (e.g. modern or breathable membrane)	Ad hoc, Annual report	2023 - 2028	RBK	

KB08 - Number of pledges to switch to bat-friendly membranes or install only bat-friendly membranes in the future	Annual account	2023 - 2028	RBK	
KB10 - Record of locations where lighting has been reduced or altered for bats	Ad hoc, Annual account	2023 - ongoing	RBK	
KB10 - Number of surveys conducted & report of results	Annual report	2023 - ongoing	RBK	
KB12 - Register of people, groups or organisations that bat detectors are lent to	Ad hoc, Annual account	2023 - ongoing	RBK	

10 Other relevant HAPs/ SAPs

a. BioBeds
b. Community Orchard
c. Grassland
d. Hedgerow
e. Pollinator Parks
f. Rivers and Streams
g. Standing Open Water
h. Woodland

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12 Abbreviations

BCT: Bat Conservation Trust
LBG: London Bat Group
NBMP: National Bat Monitoring Programme
SNCO: Statutory Nature Conservation Organisation
SWLEN: South West London Environment Network

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