Today I saw a demoiselle…

Dragonflies and damselflies of London

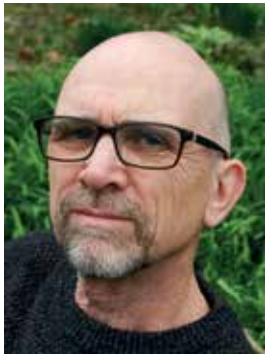
London Wildlife Trust

In England, it was once believed dragonflies - 'Devil's darning needles' - would sew closed the mouths of naughty children while they slept.

An alternative name for Japan is Akitsushmi which means dragonfly island.

Contents

Foreword



London is a great place to watch and record dragonflies. Half of the 45 resident British species occur regularly in the Capital and a further 11 species may occasionally be seen. This rich dragonfly fauna is partly due to the location of London in one of the warmest parts of Britain and all dragonflies love the heat. There are also still a lot of places for dragonflies to live in London, despite the urban sprawl. Ponds, lakes, ditches, streams and rivers are essential for dragonflies because their larvae live below the water. Fortunately, thanks to organisations like the Environment Agency, London Wildlife Trust, London borough councils, the City of London Corporation, Wildfowl & Wetlands Trust, Thames 21 and also Londoners who have created ponds in their back gardens, many of London's wetlands and open spaces are in good condition and support healthy populations of dragonflies. Of course more work can be done to further enhance and increase the number of these sites, which are important for wildlife and also the health and well-being of Londoners, but things seem to be going in the right direction at the moment.

This book will help you find dragonflies in London and also help you to identify them. Take it with you when you visit the dragonfly hotpots listed inside and see which species you can find. Make sure you go on a warm sunny day, between mid-May and mid-October, and you should be rewarded by the sight of large, colourful dragonflies swooping across the water or more delicate, but no less colourful, damselflies fluttering amongst the plants at the edge of the water. Now is a great time to be watching dragonflies because they are on the move. The warming climate and general improvements in the quality of wetlands means that we are seeing more dragonflies and more kinds of them in London. You never know which species may turn up at your local patch. Just be sure to let London Wildlife Trust know what you find.

Steve Brooks, Natural History Museum

The dragonflies of London; an introduction

London, we are increasingly aware, is a green city with a relative wealth of natural and 'semi-natural' places: woodlands, meadows, rivers, marshes, as well as parks, reservoirs and gardens. In fact, over 47% of Greater London's area is 'green and blue' space, and we share our city with over 15,000 species of animals, plants and fungi. The vast majority of the animals in London are insects, but of these only a few groups are readily visible to most people, because of their size, behaviour and ability to occupy a range of habitats within the capital: bees, butterflies, some flies, and, of course, dragonflies.

Dragonflies, or 'rock-&-roll insects', as Nick Baker has called them, have long attracted attention. As far back as 1766, Moses Harris, a naturalist and artist born in Holborn, published *The Aurelian or natural history of English insects*, featuring images and brief descriptions of moths and butterflies as well as dragonflies he found on his travels around London. In 1780 he followed this up with the first scientific descriptions of several dragonflies, including banded demoiselle, and was the first English artist to make illustrations of them accurate enough to be identified to species.

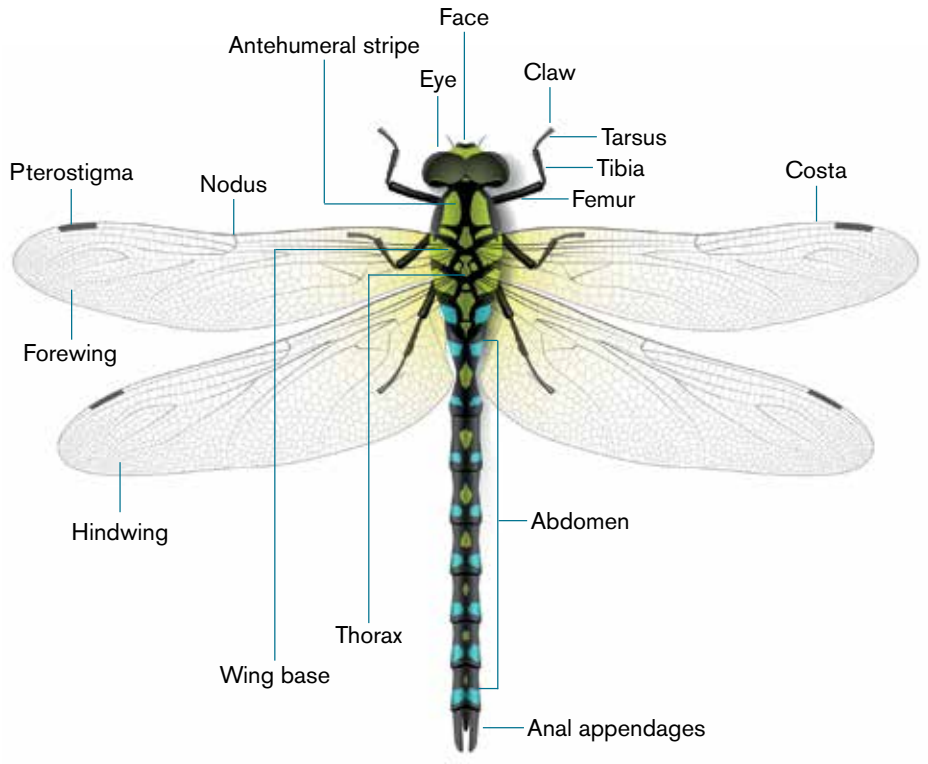
Dragonflies appear to be doing well in the capital. Against the backdrop of declines in insect diversity and abundance across much of the country, this group of active and often impressive insects appears to be responding positively to the improvements to water quality and breeding habitat, as well as, somewhat ironically, our warming climate change, which makes them important indicators of environmental change.

Our understanding of dragonflies and damselflies has increased to the extent that a plethora of guides and atlases is now available, with atlases covering most of the capital's surrounding counties. Most, however, are aimed at the specialist. A more generalist introduction, with pictures of all the dragonflies found in London, has not hitherto been published. This new guide aims to fill that gap, and offers an introduction into their fascinating world.

Petra Sovic Davies, London Wildlife Trust

The world of dragonflies and damselflies

Anatomy of a dragonfly



Dragonfly illustration © Alhovik/Dreamstime

Sizes of dragonflies (total body length in millimetres)

Demoiselles

45 - 49

Damselflies

S 26 - 34 **M** 30 - 36 **L** 35 - 48

Dragonflies

S 29 - 44 **M** 40 - 64 **L** 66 - 84

Dragonflies and damselflies (often referred to collectively as dragonflies) are captivating insects that originally emerged on Earth long before the dinosaurs made their mark; early fossils date back to some 300 million years ago. In this sense they are a relatively primitive group of insects, but their successful adaptation to their habitats has led them to evolve into a remarkable number of species albeit of a superficially similar body plan and lifecycle. Over 5,200 species are found across all continents of the world bar Antarctica.

They belong to the order Odonata which means 'toothed jaws', not an obvious feature unless one looks at the serrated mandibles of the adults or the rather more fearsome 'fanged' lower lip of the larvae. Odonata predominantly inhabit wetland habitats of tropical and temperate zones; over 120 species occur in Europe and over 40 are known to breed in Britain[1] and a changing climate suggests that this number may increase in the future.

dragonfly close-up © Brian Valentine

damselfly close-up © Brian Valentine

It is relatively easy to distinguish Odonata from other insects by their very large eyes, tiny antennae, two pairs of large elongated membranous 'see-through' wings and a very long slender body. In addition, their bright, often metallic colours and strong flight make them some of the most striking insects of our wetlands and waterways. Most dragonflies are large insects; a few are Britain's largest. And apart from some bees, moths and hoverflies, they are also possibly the most skilled fliers. Their two pairs of stiff wings, controlled by strong muscles in the thorax, can be moved completely independently, which allows them to perform aerobatics, fly forwards, backwards, sideways, turn 'on a sixpence', and/or hover in the air. Some dragonflies can fly fast (up to 36 kph) and they can also cover considerable distances and can often be found well away from the water, hunting over meadows, along woodland edges, and into parks and gardens.

[1] although two species have become extinct here since 1945

Importantly – and a key to their success – is that the Odonatan lifecycle has an aquatic stage, and a much shorter, if more visible, aerial phase. Unless we choose to look for them as well-camouflaged larvae under water, we mostly see them as adults in the final stages of their lives during the summer months.

The Odonata consist of dragonflies (scientifically the Anisoptera; 'unequal wing'- there is noticeable difference in the shape of their front and back pair of wings) and damselflies (the Zygoptera; 'even wing')[2]. There are significant differences between dragonflies and damselflies, even though they are often collectively referred to as dragonflies.

Dragonflies are stouter, larger, and hold their wings flatly outstretched at right angles to their body when at rest. Their large compound eyes dominate the head, often meeting at the top for an almost all-round 360° view. They have a very direct and powerful flight.

Damselflies are smaller and more delicate insects, with very thin bodies. Their front and back wings are equal in size and shape and kept closed back over their body when resting, much like a butterfly. Large eyes on stubby stalks are located on the side of their head. Damselflies generally have a gentler, more fluttery flight and often stay closer to the water and in surrounding vegetation. They can be seen in very large numbers when breeding, often flying joined in tandem close to the water's surface.

The Odonata are carnivorous and are very efficient predators as both larvae and adults. Adult dragonflies possess exceptional agility and speed which, together with their vision, allows them to intercept insects, such as flies, bees and moths, in flight. Damselflies may be weaker fliers but are still capable of catching small flying insects in their bristled legs.

Odonata require heat to warm up their muscles in order to fly. They are often seen basking in a sunny spot in the early morning and take shelter amongst vegetation during the night. Some species, such as common darter and broad-bodied chaser, have a favourite basking spot. During rain and in windy conditions Odonata often shelter amongst vegetation, particularly in tall grass and scrub. The best time to see them is on warm clear sunny days without wind. Whilst male dragonflies tend to congregate around water edges, females spend time away from water, hunting across meadows, patches of scrub and along tall trees. Linear features like paths and hedges can create heat 'hotspots' and sheltered spots for dragonflies to bask and hunt.

[2] A third, primitive, group, Anisozygoptera, is now classed within the dragonflies

From water to the air

Dragonflies start their life as an egg, which is laid either into the water or into leaves or stalk of a plant near the water edge dependent on the species. An adult female can lay hundreds of eggs, which normally hatch within two to five weeks, but in some species, such as emerald damselflies and darter dragonflies, the eggs remain dormant over winter and develop the following spring.

dragonfly larva © Steven Falk

Following hatching, Odonata spend the majority of their lives as a fully aquatic larva. For most species this stage lasts one to two years but can take as little as two to three months for emerald damselflies and darter dragonflies or as long as five years for golden-ringed dragonfly. The larvae have gills for breathing underwater and are ambush predators, using their extendable lower lip (labium) to snatch passing prey which include insect larvae, tadpoles and even small fish. Over time as the nymph grows and develops, it moults and replaces its exoskeleton many times; in some species larvae will grow up to 20 times their original size.

Fully developed larvae move towards the water's surface in late spring and summer as the temperature rises, and climb out of the water using emergent aquatic vegetation. The adult breaks through the weak line in the exoskeleton on the back and uses its body fluids to extend the wings and the abdomen, which can be up to twice the length of nymph. The newly emerged adult - a teneral - must wait for its body and wings to harden before it can take flight. The casings of the larval exoskeletons left behind - exuvia - can often be found attached to vegetation near ponds and rivers.

hairy dragonfly emerging © Full Moon Images

hairy dragonfly fully emerged © Full Moon Images

Immature adults can be recognised by their paler colouration and shiny wings. They spend about a week feeding away from the water and develop the typical adult colouration. During this time they are vulnerable to predation. They return to the water when they have reached sexual maturity. Males of some species display territorial behaviour, such as patrolling sections of bankside and chasing off or even fighting other males, while waiting for a mate. This behaviour is atypical of most winged insects and makes them entertaining to watch.

All species adopt 'the wheel' position during mating, where the male clasps the female by the back of the head (in dragonflies) or the 'neck' (in damselflies). Mating can last seconds in species such as chasers and often happens during flight, or hours in species such as blue-tailed damselfly. Egg laying can occur shortly after mating or be delayed for many days for some hawker species. The majority of Odonata guard the females as they deposit fertilised eggs, while in some species the female egg-lays alone.

common darters mating © Full Moon Images

large red damselflies mating © Mark Barrett Photography

Dragonfly habitats in London

Given Odonata are strongly associated with waterways and wetlands, it may not be immediately obvious the plethora of opportunities the city affords for dragonflies and damselflies. However, about 45% of Greater London is vegetated, and 2% is 'blue' (open or flowing water). Of the latter this consists of over 600km of rivers and streams, 80km of canals and over 1,000 hectares of marshes, lakes, large ponds and reservoirs. These figures do not take account of many small ditches, and the countless small ponds in London's private gardens. Not all of this is suitable; the tidal Thames, for example, is too salty and fast-flowing to allow Odonata to breed along it downstream of Teddington, and many reservoirs have too little emergent vegetation to offer them breeding opportunities. Nevertheless, there is much in London that allows a good diversity of damselflies and dragonflies to flourish here.

Despite their need for water some dragonfly species are very adaptable and can occupy a wide range of habitats. This is particularly true for many species found in London. Common darter, for example, prefers still or slow-flowing waters, so can be found in ponds in parks

emperor dragonfly in flight © Full Moon Images

beautiful demoiselle in flight © David Fielding

and private gardens, as well as along rivers with slow flow, canals and reservoirs. Banded demoiselle has been found along most of London's rivers and canals.

However, some species show a preference for specific freshwater or wetland habitats. This can be governed by the aquatic stage of their lifecycle, for example, a preference for flowing or standing water, to live amongst water plants near the water surface or living amongst debris at the bottom of the water. As adults, some species prefer rivers or ponds that are completely unshaded, whereas others prefer some trees near the water's edge. Southern hawker prefers vegetated waters, with at least with some trees nearby. Different species have evolved strategies that allows them to utilise specific landscape features. For example, hedgerows and similar linear features are used for more efficient orientation and hunting. Particularly during mating, adults seek waterbodies with features that will allow them to display their mating behaviour, such as patrolling and displaying on perches, but also provide conditions needed for egg-laying and development of the aquatic larvae.

One important habitat characteristic that affects species distribution is whether the water is still or flowing. The beautiful demoiselle occurs in faster-flowing streams which have a gravelly, stony bed, higher oxygen levels, and more uniform temperatures during the year than standing water. However, animals that live there have to adapt to strong flows. This species is sensitive to changes in environmental conditions, such as oxygen availability, temperature, or presence of pollutants. For example, recent work on the River Wandle has restored flows, exposing gravels and improving oxygen levels in the water. These habitat enhancements have contributed to an expansion of beautiful demoiselle's distribution along the river.

Still waters, such as ponds, lakes, reservoirs and canals, generally have more silts and leaf litter on the bottom, more pronounced seasonal temperature fluctuations and typically lower oxygen levels. Larvae living in ponds often feature colouration that allows them to hide in silt or amongst vegetation. Still water habitats often accommodate a greater diversity of dragonfly

species. Downy emerald dragonfly is particularly selective and therefore restricted to woodland ponds with a substantial layer of leaf litter, while blue-tailed and common blue damselflies are more adaptable and can be found along slow-flowing rivers, as well as reservoirs.

There are many still water bodies in London, from large reservoirs, such as those in the Lee Valley and Colne Valley, to ponds in public parks and small ponds in private gardens. Canals with controlled water levels provide similar habitat, especially where the margins are colonised by emergent vegetation or lack of disturbance allows floating-leaved plants to establish. Even small sites are important as they act as stepping stones and links allowing species to disperse through the urban landscape and colonise new sites.


water-lily © Chris Brooks


marsh-marigold

Many other factors impact the distribution of species; emergent and floating vegetation is particularly important for dragonflies and damselflies. Floating-leaved plants can include water-lily, water-plantain and broad-leaved pondweed. Sedges and rushes, bogbean, water forget-me-not, arrowhead, marsh-marigold and many other plants can be rooted in the sediment under the water, with their stems, leaves or flowers emerging above the surface. Together with vegetated banks, they provide vantage and perching points for adults, as well as hunting grounds and shelter for aquatic larvae. Some, such as red-eyed damselfly, choose to rest on floating leaves. Others require plants for egg-laying, either inserting them inside the plants or in the shallow sheltered water around them. On the other hand, exposed rocks and bare banks are preferred basking spots for black-tailed skimmer or broad-bodied chaser, both of which are commonly found on newly created or restored sites, where vegetation hasn't yet fully matured.

Climate change

Dragonflies are temperature sensitive throughout their life cycle, and their migrations and the expansion or contraction of their ranges can be used to monitor climate change. For some species changes in weather patterns provide an opportunity to expand their distribution. Small red-eyed damselfly has expanded its European range dramatically since 1999 when it was first recorded in Essex. Now it can be found as far as Devon and North Yorkshire, with regular sightings across London. Species like scarce chaser were previously rare and localised, but their distribution has quickly expanded with the helping hand of river restoration efforts and a warmer climate. In contrast, species better adapted to cooler temperatures may see their ranges within Britain contract with a warming climate.

After first being recorded in Suffolk in 2007, over 400 individuals of willow emerald damselfly were recorded across East Anglia in 2009. Since then it has rapidly colonised south-east England and now found across London in places such as Thamesmead, Stoke Newington and Hanwell. Prefering canals and ponds; waterbodies with lots of marginal vegetation and willow branches overhanging the water, where it lays its eggs under the bark, willow emerald damselflies are likely to become more frequently seen in London.

Another which is quickly expanding its distribution is Norfolk hawker. The British population was initially restricted to Norfolk, although it is widely distributed across southern Europe. Recently it has been extending its range across Cambridgeshire and Hertfordshire towards Kent, and it is likely to become a more regular sight on London's wetlands, as long as water-soldier (a floating plant) is present, which this dragonfly appears to need.


Norflok hawker © Iain Leach


water-soldier © Brian Eversham

Where to spot dragonflies; some of London's choice locations

These are just some of the species you can find at these particular sites:

- **Beam Parklands:** banded demoiselle, black-tailed skimmer and emperor dragonfly.
- **Bedfont Lakes Country Park:** common blue damselfly and hairy dragonfly.
- **Bedfords Park:** azure and small red-eyed damselflies, ruddy darter, broad-bodied chaser, scarce emerald and emperor dragonfly.
- **Bentley Priory:** azure and red-eyed damselflies, hawker dragonflies.
- **Brent Lodge Park:** common blue damselfly, broad-bodied chaser and emperor dragonfly.
- **Bushy Park (Heron Pond):** common blue damselfly and migrant hawker.
- **Cray Valley (inc. Foots Cray Meadows, Thames Road Wetlands):** banded demoiselle, blue-tailed damselfly, brown hawker, common darter, and hairy dragonfly.

Victoria Park East Lake © Joshua David Peters

Walthamstow Wetlands © James Cracknell

- **Crossness and Erith Marshes:** common blue and azure damselflies, common darter, black-tailed skimmer, migrant hawker and emperor dragonfly.
- **Greenwich Peninsula Ecology Park:** small red-eyed and blue-tailed damselflies, common darter, brown hawker and black-tailed skimmer.
- **Firs Farm Wetlands:** common and ruddy darters, migrant and southern hawkers.
- **Frays Valley (Frays Farm Meadows, Harefield Place, and Denham Lock Wood):** common blue and blue tailed damselflies, emperor dragonfly, southern and brown hawker.
- **Hampstead Heath**: common blue and red-eyed damselflies, brown and migrant hawkers and black-tailed skimmer.
- **Hornchurch Country Park:** banded demoiselle and emperor dragonfly.
- **Ickenham Marsh**: emerald, common blue and blue-tailed damselflies, and brown hawker.
- **Kensington Gardens and Hyde Park:** small red-eyed and blue-tailed damselflies, black-tailed skimmer, red-veined and common darters, and emperor dragonfly.
- **Keston Common:** black-tailed skimmer, brown hawker, common and ruddy darter, red-eyed, blue-tailed, large red and common blue damselflies.
- **London Wetland Centre (£):** banded demoiselle, azure, blue-tailed, red-eyed damselflies, hairy and lesser emperor dragonflies, four-spotted chaser and Norfolk hawker.
- **Moat Mount Open Space (Leg of Mutton Pond):** blue-tailed damselfly, ruddy darter.
- **Morden Hall Park:** banded and beautiful demoiselle, large red and azure damselflies.
- **Natural History Museum (pond):** large red damselfly, common darter and broad-bodied chaser.
- **Rainham Marshes (£):** willow and scarce emerald and small red-eyed damselflies, brown, migrant and southern migrant hawkers, ruddy darter, hairy and emperor dragonflies.
- **Richmond Park (Pen Ponds):** red-eyed, common-blue and blue tailed damselflies, black tailed skimmer, brown and migrant hawker.
- **South Norwood Country Park:** ruddy darter and large red damselfly.
- **Sutcliffe Park and Cator Park:** : banded demoiselle, blue-tailed and small red-eyed damselflies, common darter, and emperor dragonfly.
- **Thamesmead:** willow emerald damselfly, migrant hawker and emperor dragonfly.
- **Victoria Park and Mile End Park:** red-eyed and large red damselflies, common darter and black-tailed skimmer.
- **Walpole Park:** common blue damselfly, emperor dragonfly, and brown hawker.
- **Walthamstow Wetlands/River Lee:** banded demoiselle, common blue and blue-tailed damselflies, migrant and brown hawkers, and emperor dragonfly.
- **Wanstead Park:** red-eyed and common blue damselflies, broad-bodied chaser and emperor dragonfly.
- **Welsh Harp (Brent Reservoir):** common blue and blue-tailed damselflies.
- **Wimbledon & Putney Commons (Bluegate Pond):** broad-bodied chaser, black darter, azure and emerald damselflies.
- **Woodberry Wetlands:** red-eyed and common blue damselflies, emperor dragonfly, black-tailed skimmer and red-veined darter.

Frays Valley

Bedfords South Lake © Tony Gunton

N

Moat Mount Open Space

Firs Farm Wetlands

Bentley Priory

Walthamstow Wetlands/River Lee

Bedfords Park

Welsh Harp
(Brent Reservoir)

Woodberry Wetlands

Frays Valley LNR

Wanstead Park

Hampstead Heath

Ingrebourne Marshes &
Hornchurch Country Park

Ickenham Marsh

Victoria Park/Mile End Park

Beam Parklands

Brent Lodge Park

Kensington Gardens & Hyde Park

Crossness & Erith Marshes

Walpole Park

Thamesmead

Natural History Museum

Greenwich Peninsula Ecology Park

Rainham Marshes
(£)

London Wetland Centre
(£)

Sutcliffe Park/Cator Park

Richmond Park

Thames Road Wetlands

Bedfont Lakes Country Park

Wimbledon & Putney Commons

Foots Cray Meadows

Bushy Park

South Norwood Country Park

Morden Hall Country Park

Keston Common

Bluegate Pond at Wimbledon Common © Peter Haldane

Keston Common © Steven Lofting

(£) Membership or entry fee required for access.

Action to conserve London's dragonflies

Towards cleaner waters

As their lifecycles include both aquatic and aerial stages, dragonflies can be useful indicators of the health of an aquatic environment, and absence of some widely common dragonflies can indicate an underlying problem. Even though some species complete their aquatic stage in a very short time, larger species need up to several years. This can make them sensitive to pollutants in the water, and changes in prey quality and availability. Being near the top of the food web, their larvae will only thrive in clean and stable environments that support a diversity of smaller insects and invertebrates as a prey.

Nevertheless, there has rarely been targeted conservation work specifically on dragonflies in London. The drive over the past 40-50 years has been largely on improving the quality of our rivers, streams, lakes and ponds, which has indirectly benefited Odonata as well as a host of other insects, fish, amphibians and other aquatic plants and animals. The levels of pollution by the 1950s were so high that most rivers and waterways were biologically dead. Reservoirs were 'cleaned' with chlorine, and many rural ponds were filled in due to changes in agriculture. Urban rivers had been culverted and in the inner city, often diverted into underground sewers.

Efforts to reduce the impacts of pollution in the 1960-80s have been followed up since the 1990s by breaking smaller rivers 'out of their concrete' through reconnecting old meanders, softening their banks and putting in new planting. The value of garden ponds for wildlife is now recognised, and most reservoirs and canals are now managed with wildlife in mind. These enhancements can also help London become more resilient to a changing climate. This work continues, supported by Government policy and legislation, and the public's desire to see more naturalistic waterways close to where they live. Still, there is much more we can do.

How you can help dragonflies

Waterway enhancements

Most of London's rivers and waterways were heavily modified as the city grew, with many cut off from their floodplains, flows constrained in straight, engineered channels, made invisible by culverting in concrete, and polluted by industry. Fortunately, the ecological importance of these waterways is now widely recognised, and work to restore them back to thriving natural habitats is well underway. Between 2009 and 2020, over 27 km of London's waterways were improved and restored, through a combination of large regeneration schemes and small projects focused on local rivers and delivered by volunteers. This work is partly being driven by legislation to improve the water quality and ecological status of our waterbodies.

habitat enhancement at Brent Lodge Park

Alongside the Environment Agency and many local authorities, London Wildlife Trust and other organisations have been leading on this restoration work in London for many years. Recent projects by the Trust have included work to improve river flow and vegetation along the Crane Valley in west London, work to restore habitats along the River Brent in Ealing, opening Woodberry Wetlands (in partnership with Thames Water) in Manor House, and enhancements to the River Wandle near Morden.

Opportunities to participate in river and wetland restoration projects can be sought by contacting a borough's local biodiversity partnership, a catchment partnership, London Wildlife Trust, Thames 21 or other Rivers Trusts.


garden pond © Lou Smith


Natural History Museum pond

Build a pond

Ponds can support a great diversity of freshwater wildlife and can be a great addition to a park or garden. A pond 1-2 metres deep with shallow, gradually shelving sides is ideal for dragonflies, and there is good guidance available about how to make one watertight and durable. Shallower water requires less energy to warm up so is preferred habitat for dragonfly larvae, which live in and around the marginal vegetation. A location that receives a lot of sunlight and is sheltered from the wind is ideal.

It is important to have a variety of submerged and floating native plants such as water-milfoil or water lilies, which will provide refuge for dragonfly larvae and places to perch for the adults. Emergent vegetation such as water-soldier or yellow flag iris allow larvae to climb out of the water before they develop into an adults. Exposed pond edges are preferred by species such as black-tailed skimmer and broad-bodied chaser and provide basking areas for all dragonfly species. Vertical sticks stuck around the pond provide perches for territorial species such as four-spotted chaser, and logs laid near a pond's margin allows species such as southern hawker to lay their eggs. Areas of open water are perfect for species such as common darter.

Use rainwater to fill a pond, either waiting for it to fill naturally, or use a water butt to collect rainwater before the pond is created. Tap water is harmful to aquatic animals. Fish and birds will predate Odonata larvae and therefore in order to create a good habitat for dragonflies and other invertebrates, do not stock wildlife ponds with fish.

Surveys, records and mapping

Early sweeps to digital means

We don't know the first dragonfly or damselfly reported in London, but Odonata have been well recorded since the 18th century, for example through the drawings of Moses Harris. By the end of the 19th century local natural history societies, many urban-based, were organising trips to catch dragonflies and publish their findings in their journals and report them in their meetings. The London Natural History Society (LNHS), originally founded in 1858, began publishing records in various formats until in 1922 it launched *The London Naturalist* as an annual publication and still in press today. This has featured papers on Odonata, for example, in 1937 an emperor is recorded flying at Mitcham Common on June 27th, and a 1970-77 survey of London's rivers revealed southern damselfly being 'regularly found' along the River Crane near Hounslow Heath.

For most of the 19th and 20th centuries accurate identification of most adult species could only be obtained by catching them (with sweep nets), or prolonged observation, often with binoculars. However, digital photography and smartphone apps have been the game changers in the past decade, by making identification easier and much more accessible to an interested public.

Unless a planned objective approach is adopted, records of dragonflies reflect the recorders as much as their subject; and recorders will have their favourite places in which to spot them. This is why much of the Odonata data in London is focused on relatively few sites which generally have disproportionately high numbers and species diversity compared with other sites where recorders have not surveyed for various reasons. In addition, rarities excite and focus recorders' attention, whilst very common species are often taken for granted. For this reason tracking 'new' species in London is probably quite accurate, whereas changes to widespread species is likely to be less well mapped. With new identification tools available, and more people interested in Odonata these discrepancies might change.


Odonata survey at Camley Street Natural Park © Marta Raña Calvo

Odonata surveying © Nathalie Chevalier-Hean

exuvium © Nathalie Chevalier-Hean

large red damselfly © Abi March

At a London level most – but not all – data is collated and held by Greenspace Information for Greater London (GiGL, gigl.org.uk), the environmental records centre for the capital. Similar models apply across most British counties. At a national level data is collected by a range of organisations, including British Dragonfly Society (BDS) and British Trust for Ornithology, and this is stored at the UK Biological Records Centre feeding into the National Biodiversity Network Atlas which is publicly accessible. Two national Odonata atlases have been published (1996, 2014, and BDS plan to publish a *State of Dragonflies* 2020), and atlases for some neighbouring counties to London have also been published.

Look, see and send

Understanding of the distribution of Odonata can help to provide insight into the quality of waterways and public green spaces, impact of habitat restoration work, and effects of changing climate on freshwater species and habitats. Experts and experienced dragonfly spotters provide a lot of critical data but do not provide the whole picture. Sightings submitted via different monitoring schemes by volunteers and the public are another way of building this picture.

Even though dragonflies are one of the best recorded groups of insects, and as adults are easy to see, a level of expertise is necessary to identify them accurately. There are considerable similarities between some species, as well as variations within species, not least between male and female, and their speed and behaviour can make those important identifying features difficult to see. As larvae, which require more effort to find, let alone survey, these differences are often more difficult to determine. All this adds complexity to recording, and accurate assessments of each species' distribution and abundance requires a certain level of expertise for most Odonata.

Nevertheless, digital apps such as iRecord (irecord.org.uk) can be used to help verify what has been photographed, and encourage records to be sent to the 'county recorder' which for London is the LNHS. Other ways to submit Odonata records are through *Dragonfly Detectives*, the Trust's online survey portal hosted by GiGL, or directly to the British Dragonfly Society.

What the data indicates

The maps on pages 14-36 describing individual species are based on our best knowledge using the data available at the time of publication. Most of the species distribution information is drawn from the records held by GiGL. This was complemented by results of surveys delivered by the Trust's staff and volunteers, as well submissions online via *Dragonfly Detectives*. We also collected information directly from site owners and added available web-based data. There are some unexpected gaps on the distribution maps; they do not necessarily indicate a species absence, but could be the result of no available data.

red-eyed damselfly © Iain Leach

What am I looking for?

Demoiselles

Demoiselles, the largest damselflies in Britain, are easy to spot due to their size, striking iridescent appearance and slow fluttery flight. The group consists of two species: beautiful, and banded demoiselle. Males of both species have metallic blue/green bodies and characteristic dark-tinted wings, which they use to attract mates and ward off competing males. They hold small territories around favoured egg-laying sites and approach females with a fluttering wing display and indicate a prospective breeding site by lunging at the water.

Demoiselles are usually restricted to flowing water but can be found in lush vegetation further away, particularly the females who only go to waterbodies to mate and lay eggs.

Damselflies

Damselflies are delicate thin-bodied insects with colouration that ranges from blues, and reds, to intense greens. They are the smallest of the Odonata, and inhabit a diverse variety of freshwater habitats.

Dragonflies – hawkers

These are some of the largest dragonflies found in London. Broadly split into emperors and mosaics (with intricate colourful patterns on their long abdomens), they are strong fliers and can often be heard by the papery rustle of their wings. Hawkers are typically found around still water habitats and slow flowing rivers and canals.

Dragonflies – chasers, skimmers and darters

These are small to medium-sized dragonflies having shorter and squatter bodies than other dragonflies, but much more robust and thicker than those of damselflies. Chasers, skimmers and darters have a rapid zig-zag darting flight pattern and tend to fly close to the water's surface. They are also often spotted perching on bankside vegetation or basking on bare ground on the edge of a waterbody.

Dragonflies – emeralds

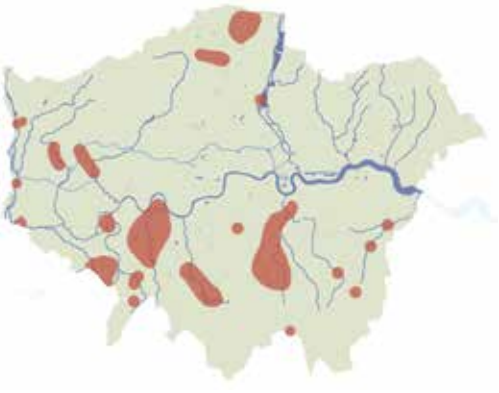
Emeralds are medium-sized dragonflies with a metallic green sheen and bright green eyes. They are typically found near standing or slow moving waters, often in sheltered woodland ponds.

Beautiful demoiselle

Calopteryx virgo

A large vibrant damselfly, males are easy to recognise by the dark pigment and iridescent blue veins on the wings, which catch the eye as they flit above fast-flowing water bodies. Their body is metallic green with a blue hue, whilst females are metallic green with copper brown wings and a white 'false wing spot' towards the tip. Both sexes can be confused with banded demoiselle.

Females can lay up to 300 eggs into emergent and floating vegetation, like water-crowfoot, almost immediately after mating. The larvae prefer faster-flowing and clean water bodies, burying themselves in loose gravel and sand on the bottom over winter.



beautiful demoiselle male © Iain Leach
beautiful demoiselle female © Chris Brooks

HABITATS
Typically found on fast-flowing clean rivers and streams with gravel beds.

DISTRIBUTION IN LONDON
Restricted to a handful of rivers in London where it can be locally common. Appears to be increasing its range. Well established along the River Wandle and can be seen on the River Crane and Turkey Brook.

FLIGHT PERIOD
May to September, most active in June and July.

Some dragonfly species can tolerate a wide range of conditions. Others, like beautiful demoiselle and hairy dragonfly, only inhabit streams with good water quality.

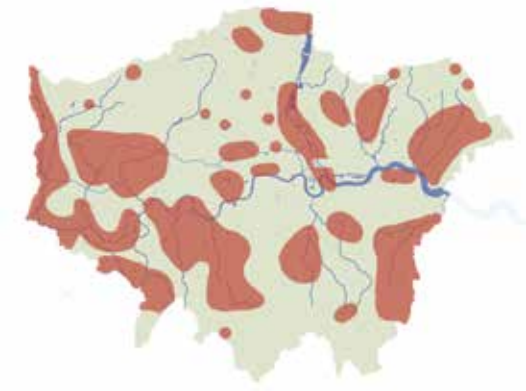
Banded demoiselle

Calopteryx splendens

Males have a metallic blue-green body and a distinctive dark band across the central part of each wing. Their wings flash as they flutter above the water's surface or display to females in the bankside vegetation. Females have a metallic green body and translucent pale green wings, with a white 'false wing spot' at the tip. Both sexes can be confused with beautiful demoiselle.

Males without territories often try to intercept females. Females can fully submerge when laying eggs in aquatic vegetation, sometimes staying under for 45 minutes at a time. This is achieved by trapping a thin layer of air between the wings and the sides of their bodies.

During occasional high flows, the larvae burrow into the mud or silt at the bottom of the river to avoid being washed away.



HABITATS
Slow-flowing rivers and streams, often in lush vegetation on the banks and adjacent to the watercourse.

DISTRIBUTION IN LONDON
Widespread and locally common. Can be seen along most of the rivers.

FLIGHT PERIOD
April to September, most active in June and July.

banded demoiselle male © Iain Leach
banded demoiselle female © Chris Brooks

Emerald damselfly

Lestes sponsa

This large damselfly has a light green metallic body and blue eyes, with wings that are held open at a 45° angle when at rest. Males develop a waxy blue colouring on the thorax towards the tip and base of the abdomen as they mature. They can often be seen flittering in a semi-vertical flight pattern in scrubby edges of ponds and canals.

It has a short one-year life cycle, as eggs hatch in April and larvae mature quickly over just 65–80 days. Emerald damselfly larvae have been observed consuming prey at twice the rate of other damselfly species, which could contribute to their faster development. They are not ambush hunters like many other dragonfly larvae, but actively hunt their prey. This means they are regularly leaving the cover of vegetation and therefore more likely to be predated on by fish and other larger animals.

Emerald damselflies are in flight later in the season, with emergence starting in late June and lasting until September.

The pterostigma or wing-spot on the leading edge of each wing helps to reduce vibrations and stabilise the dragonfly in flight.

HABITATS
Prefers sites with still water such as ponds or ditches, with banks and margins covered in reeds, grasses or scrubby patches.

DISTRIBUTION IN LONDON
Widespread but localised and uncommon. Can be found at sites such as Bushy Park, Bluegate Pond on Wimbledon & Putney Commons, and Rainham Marshes.

FLIGHT PERIOD
July to October, most active in July and August.

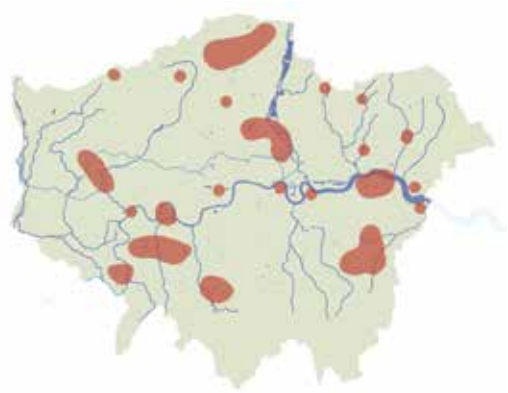
emerald damselfly male © Iain Leach
emerald damselfly female © Chris Brooks

Willow emerald damselfly

Chalcolestes viridis

This large metallic light green damselfly with brown eyes has a tan-coloured pterostigma on the outer wing. Like other emerald damselflies its wings are held open at a 45° angle when at rest. Easily confused with emerald damselfly, it has pale rather than black pterostigma and lacks the blue waxy pruinescence found in mature male emerald damselflies.

This species can be spotted in willow or alder branches at the height of a metre or more, rather than in low vegetation on the banks. A characteristic double row of raised scars (galls) on small branches is a good indicator of eggs laid just under the bark, where they overwinter. The larvae hatch with the coming of spring, falling into the water below.



willow emerald damselfly male © Margaret Holland
willow emerald damselfly female © Don Wilks

willow emerald gall scars © Marc Heath

HABITATS

Standing or slow flowing-waters with overhanging trees such as willow and alder, or stinging nettles.

DISTRIBUTION IN LONDON

Restricted but locally common. The range is spreading following recent colonisation. Can be found at specific sites, such as the Thamesmead canals, Bushy Park, Richmond Park, Mitcham Common, and the New River in Stoke Newington.

FLIGHT PERIOD

July to October, most active in August and September.

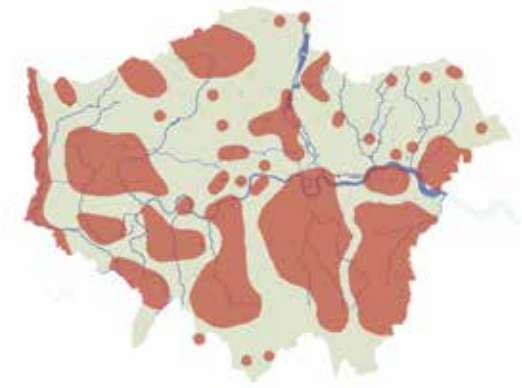
Each of a dragonflies' compound eye is composed of nearly 28,000 individual units similar to small lenses called ommatidia. More than 80% of their brain is devoted to analysing visual information.

Azure damselfly

Coenagrion puella

A medium-sized damselfly, the males sporting a vibrant blue and black body which can be easily confused with the common blue damselfly; a small black U-shape on the abdomen's 2nd segment differentiates. They can be seen hovering around the vegetation on the fringes of smaller ponds. Females are mainly black but with two strikingly different colour variations, one primarily green, and the other blue looking very similar to that of the males. They can be found foraging in tall grass and scrub away from the waterbody or amongst the males on the water's edge.

Azure damselflies lay eggs in tandem, with the male holding onto the female in an upright pose. Studies have shown that this upright position may help it spot predators like fish, frogs and toads.



In China, dragonflies represent harmony, good luck, and prosperity.

azure damselfly male © Chris Brooks
azure damselfly female © Steven Falk

HABITATS
Can be found at a wide range of habitats but prefers smaller waterbodies such as wet ditches and small ponds, including those in gardens.

DISTRIBUTION IN LONDON
One of the most common damselfly species; widespread and generally found in large numbers. Most still waterbodies, such as Welsh Harp (Brent Reservoir), White Ash Pond in Richmond Park, and Sutcliffe Park.

FLIGHT PERIOD
April to September, most active in May, June and July.

Welsh Harp (Brent Reservoir)

Common blue damselfly

Enallagma cyathigerum

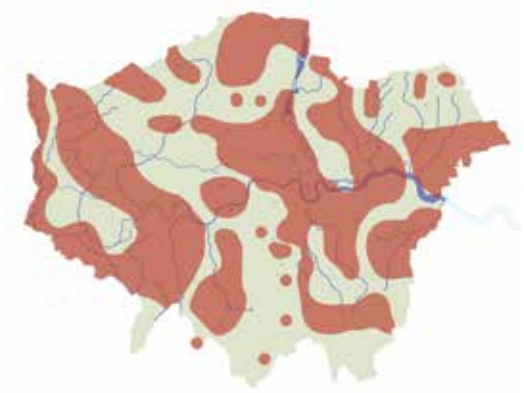
A medium-sized damselfly, male common blues feature a vibrant blue and black body, making them easy to confuse with azure damselfly; a mushroom-shaped spot on the abdomen's 2nd segment differentiates. They can often be seen flying over open water or flittering over bankside vegetation on larger ponds and lakes. Females have a black and pale green body, and forage in tall grass or scrub away from the water. Though not a territorial species, multiple mating pairs can be seen competing for space on the stems of bankside vegetation.

The common blue can tolerate habitats with excessive amounts of nutrients (which damage water quality), often becoming the predominant damselfly on such eutrophic lakes and ponds.

HABITATS
Large ponds and lakes, often in the nearby vegetation.

DISTRIBUTION IN LONDON
One of the most widespread species, and typically found in large numbers. Found on the edges of larger waterbodies such as Burgess Park, Woodberry Wetlands, the mid-Colne Valley gravel pits, and Foots Cray Meadows.

FLIGHT PERIOD
April to October, most active in June, July and August.



common blue damselfly male © Chris Brooks
common blue damselfly female © Chris Brooks

In Swedish folklore the devil uses dragonflies to weigh people's souls.

Red-eyed damselfly

Erythromma najas

A large damselfly with a mainly black body, a blue tip to the abdomen and distinctive red eyes. Males can often be found resting on floating vegetation, such as water-lily and broad-leaved pondweed, which are females' preferred egg-laying locations.

Females are mainly black and green. Both sexes can be confused with small red-eyed damselfly, however, the red-eyed is larger and the males are often lacking the pronounced stripes on top of the thorax seen in the small red-eyed damselfly.

Females lay their eggs underwater and can stay submerged for up to 30 minutes, breathing with a thin film of air trapped around the wings and body.

HABITATS
Often found at ponds and lakes, on floating leaves and vegetation overhanging open water.

DISTRIBUTION IN LONDON
Has become widespread and often found in large numbers. On sites such as the mid-Colne Valley gravel pits, Crane Park, Hampstead Heath, and Keston Ponds.

FLIGHT PERIOD
April to September, most active between June and August.


Crane Park Island


♂


♀

red-eyed damselfly male © Chris Brooks
red-eyed damselfly female © Chris Brooks

Small red-eyed damselfly
Erythromma viridulum

A small and slight damselfly, males sport a black body with blue tip to the abdomen and red eyes. Males can often be seen flying low over water or resting on floating leaves where they can be confused with red-eyed damselflies. Females are mainly black with a green patch on the end of the body.

This species may be benefiting from the warming climate. Until recently, it was confined to a more southerly parts of Europe, but it is now spreading further north due to increasing temperatures. A pair were first confirmed breeding in Essex in 1999, and since then its range has been steadily expanding north and westwards.

small red-eyed damselfly male © Pete Rose
small red-eyed damselfly female © Don Wilks

The name Odonata comes from ancient Greek word for 'tooth', which refers to their serrated (toothed) jaws (mandibles).

HABITATS
Ponds and lakes, on floating leaves and vegetation in the open water.

DISTRIBUTION IN LONDON
Widespread and generally found in large numbers and increasing in range. Found at such sites as London Wetland Centre, Woodberry Wetlands, Danson Park, Kensington Gardens, and Wimbledon & Putney Commons.

FLIGHT PERIOD
June to September, most active in August.

Blue-tailed damselfly

Ischnura elegans

This is one of smaller species of damselfly in Britain, the male sporting a mainly black thorax and abdomen, and a distinctive blue segment on the tip of the body. Females have several colour variations which can make identification tricky. Some people believe this is a way of dealing with over-crowding, as colour variations that appear more frequently in large populations stop females being damaged by large numbers of enthusiastic males.

blue-tailed damselfly male © Penny Frith
blue-tailed damselfly female © Penny Frith

HABITATS

Found at a wide range of habitats, including rivers, lakes, ponds and canals, typically in marginal vegetation.

DISTRIBUTION IN LONDON

Widespread, but typically only found in small numbers. Present at sites such as Foots Cray Meadows, Elmbridge Meadows near Surbiton, Welsh Harp (Brent Reservoir), Denham Lock Wood, and Ingrebourne Marshes.

FLIGHT PERIOD

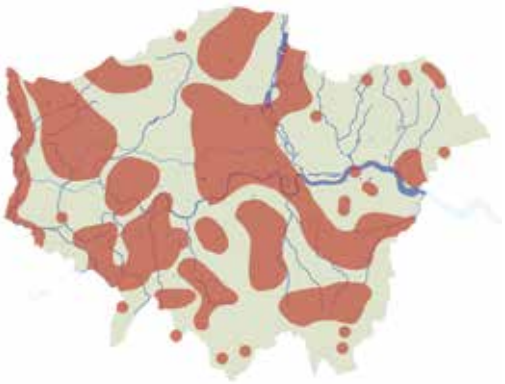
April to September

Large red damselfly

Pyrrhosoma nymphula

The males of this medium-sized damselfly are predominantly red with black markings across the body and distinctive black legs. Females have several colour variations, often with yellow patches on the thorax.

This is one of the first damselflies to be seen in the spring, sometimes emerging as early as March. Adult emergence occurs over a relatively short period, often over just three weeks. Males emerge earlier than females, and are aggressive, quickly driving off competitors, flying surprisingly fast for a damselfly. They can be found flying amongst vegetation on the fringes of lakes, ponds and rivers.



large red damselfly male © Penny Frith
large red damselfly female © Chris Brooks

HABITATS

Found at most wetland habitats with still water, such as ponds, lakes and canals with abundance of aquatic plants. Larvae live amongst debris at the bottom of the waterbody.

DISTRIBUTION IN LONDON

Widespread, but often found in low numbers. Found at sites such as Peckham Rye Park, Bushy Park, Cray Valley, Ickenham Marshes, and Richmond Park. Also common around garden ponds.

BEST TIME TO SEE

April to September, emergence can be as early as late March, most active between May and July

Adult damselflies live for a few weeks, while adult dragonflies usually live up to four months.

Southern hawker
Aeshnae cyanea

This large mosaic hawker can be easily recognised by bright green shoulder stripes on the upper side of the thorax, with a typical green and black patterning on the body. Males are very inquisitive, often coming to inspect observers that enter their territory. They are also well known for flying through open windows and into people's houses. A few males often time-share several ponds between them.

The female of this species likes to lay eggs in a rotten wood on the margins of waterbodies. Southern hawkers are often found around garden ponds, even though adults quickly disperse after emergence, only to return to breed several weeks later.

Wanstead Park © Christian Moss

southern hawker male © Chris Brooks
southern hawker female © Chris Brooks

HABITATS
Mostly found by still waters, often in woodlands, with abundant aquatic vegetation. Can be seen away from the water, along woodland rides, parks, gardens and even roadsides. Commonly breeds in garden ponds.

DISTRIBUTION IN LONDON
Widespread and one of the most commonly encountered species, typically found as individuals patrolling a territory. Found at sites like the ponds at Barnes Common, Crossness Marshes, and Wanstead Park.

FLIGHT PERIOD
May to October, most active between July and September. If weather is mild, can be seen until November.

Some dragonflies are some of Britain's largest insects with wingspan of up to 120 mm.

Migrant hawker

Aeshna mixta

This slight mosaic hawker is predominately blue and black with short stripes on top of the thorax and a yellow triangular patch on the base of its abdomen. Migrant hawker can be easily mistaken for southern hawker but have far less green colouration on their thorax and abdomen and lack the iconic large shoulder stripes of their larger cousins.

Adults can often be observed flying quite far from waterbodies, hawking along woodland rides and glades in the pursuit of insect prey. Despite being somewhat territorial, males are not very aggressive and often fly in small groups looking for females.

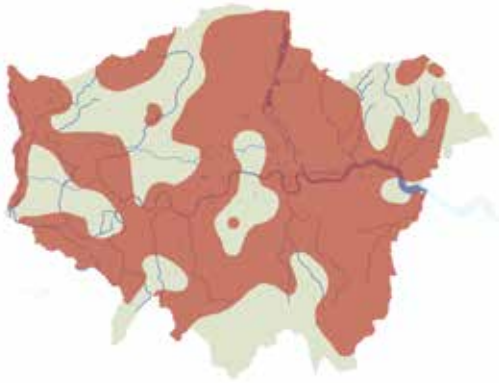
As its name suggests the British breeding population of this dragonfly is bolstered by annual migrants from mainland Europe.

Thamesmead

HABITATS
Well-vegetated lakes, ponds, canals, gravel pits and reservoirs.

DISTRIBUTION IN LONDON
Widespread, often found as individuals patrolling territory or in small numbers, at sites such as Bluegate Pond on Wimbledon Common, Thamesmead canals, Bushy Park, and Frays Farm Meadows.

FLIGHT PERIOD
July to November, most active between August and October.



Hawker dragonflies can achieve speeds of 40-50kph [or 12 metres a second] when hunting, and they can cruise at 16kph.

migrant hawker male © Iain Leach
migrant hawker female © Full Moon Images

Brown hawker
Aeshna grandis

This is the only British dragonfly with large amber-coloured wings, and easily distinguished from other hawkers by its brown and yellow body, as well as brown and blue eyes.

A strong and graceful flyer, it has a distinctive flight pattern with long periods of gliding, unlike the constant wing beating seen in other dragonflies.

Females favour partially submerged decaying wood in which to lay their eggs, which are laid in parallel rows along the wood and hatch the following spring.

Brown hawker has thrived in artificial habitats such as canals and gravel pits and can be seen patrolling the margins of these sites whilst feeding on the wing.

brown hawker male © Steven Falk
brown hawker female © Iain Leach

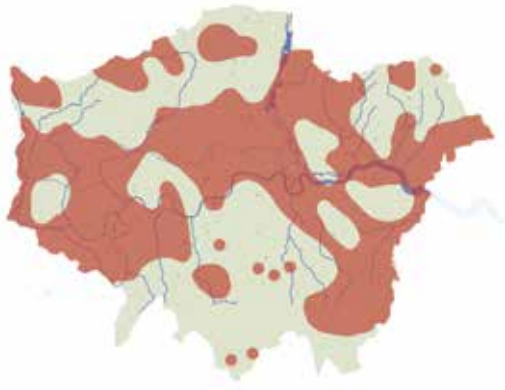

Foots Cray Meadows © Thames 21

Different species spend between 6 months and 7 years living underwater as a larva.

HABITATS
Brown hawkers can often be found over large waterbodies with lush vegetation, such as lakes, canals and slow flowing rivers, but also gravel-pits and reservoirs.

DISTRIBUTION IN LONDON
Widespread, often found as individuals patrolling territory or feeding in groups over rough fields. Found at sites such as Foots Cray Meadows, Walthamstow Wetlands and along larger rivers such as the Crane, Colne, Ingrebourne, and the Roding.

FLIGHT PERIOD
June to early October, most active in July and August.



Hairy dragonfly

Brachytron pratense

The smallest of the British hawkers, this is the earliest flying dragonfly; can often be found in early May. As the name suggests, they are characterised by an abundance of small hairs that grow across the thorax. The pterostigma on the wings are longer and thinner than in other hawkers, which is a good way of identifying them.

Hairy dragonfly appears to be recovering from a late 20th century decline. It has been recorded increasing its range across south-eastern England and has been consistently recorded at several sites in London within the last decade.

hairy dragonfly male © Full Moon Images
hairy dragonfly female © Iain Leach

HABITATS
Still or slow flowing waterbodies, such as canals, wet ditches, ponds and lakes. Requires clean water and abundant vegetation.

DISTRIBUTION IN LONDON
Locally scarce and restricted mainly to the west and south-west London where it is found in small numbers, such as Lee Valley, London Wetland Centre, Bedfont Lakes, Rainham Marshes, and Erith Marshes.

FLIGHT PERIOD
April to July, most active in May and June but can emerge in late March.

Fossil records of ancestors of today's dragonflies are over 300 million years old, which makes them older than dinosaurs and mammals. They were probably the biggest insects ever to have lived, some with a wingspan of up to 60 cm

Emperor dragonfly
Anax imperator

The largest dragonfly found in Britain, with a robust body and large wings. Male emperors have a distinctive apple green thorax and bright blue abdomen with a wide black line running along the dorsal side. Females are mainly apple green with a brown pattern on the abdomen.

Very strong flyers, males patrol their territory in wide, high circles, often engaging in aggressive and noisy aerial clashes.

Larvae normally take two years to complete their development, although in warm years can complete development in one year.

emperor dragonfly devouring a migrant hawker
© Christian Moss

emperor dragonfly male © Liz Barrett
emperor dragonfly female © Full Moon Images

When hunting, dragonflies catch prey with their feet, tear off the wings with their mandibles and often eat it in flight.

HABITATS
Ponds, lakes, canals and slow flowing rivers with abundant vegetation.

DISTRIBUTION IN LONDON
Widespread and often seen as individuals patrolling a territory. Found at sites such as Cator Park in Kidbrooke, the Hogsmill River near Surbiton, the New River in Stoke Newington, and the Regent's Canal in King's Cross.

FLIGHT PERIOD
May to early September, most active between June and August.

Broad-bodied chaser

Libellula depressa

A common medium-sized dragonfly with a distinctive broad and flat body, that is mainly pale electric blue in males and yellowish-brown in females. Both have a row of yellow spots along sides of the abdomen and the inner corners of the wings are dark brown. Males are territorial and often observed perched on bankside vegetation of still waters and erratically darting out to chase off other males. Powerful flyers, broad-bodied chasers are quick to colonise newly created sites.

Females lay their eggs on the wing by flicking their abdomens into the water and releasing the eggs, which have an adhesive jelly coating that expands in water and sticks to submerged vegetation. Males often guard females during the egg-laying and frequently try to mate again with a different female immediately after.

HABITATS
Small waterbodies such as ponds, small lakes and wet ditches.

DISTRIBUTION IN LONDON
Widespread across London but found in small numbers. Found at sites such as Crossness and Erith Marshes, South Norwood Country Park, Wanstead Park, and Ruislip Common.

FLIGHT PERIOD
April to August, most active between May and July.

broad-bodied chaser male © Full Moon Images
broad-bodied chaser female © Penny Frith

Dragonflies are very efficient hunters: they have an ability intercept their prey by judging speed and trajectory of its flight.


Crossness © Jane Clarke

Four-spotted chaser
Libellula quadrimaculata

Named after the distinctive dark spots on the middle (node) and the tip of its wings, this medium-sized dragonfly has a tapered brown body with rows of yellow dots along the sides. Mature males are highly territorial and often return to the same perch from where they can chase off rivals or intercept females for breeding. On summer evenings they can be seen congregating in swarms to feed on insects that are flying over long grass in meadows and fields.

Vast swarms of up to 2.5 billion individuals have been recorded migrating across Belgium and the Netherlands, although this behaviour is rarely seen in Britain.

hairy dragonfly male © Full Moon Images
hairy dragonfly female © Chris Brooks

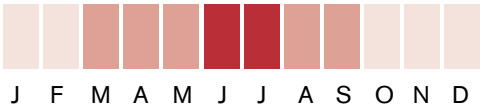
Birds such as wagtails, moorhen and hobby, as well as spiders, frogs, some large dragonflies will eat adult dragonflies and damselflies.

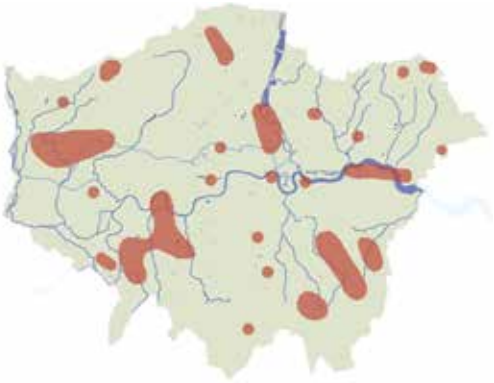
hobby with dragonfly © Full Moon Images

HABITATS
Can be found on still waters, such as ponds, ditches, canals and heathland pools, as well as slow flowing streams.

DISTRIBUTION IN LONDON
Widespread, but found in small numbers. Often associated with heathland habitats. Found on sites such as Keston Common, Walthamstow Marshes, and Gutteridge Wood.

FLIGHT PERIOD
May to September, most active in June and July.





Black-tailed skimmer

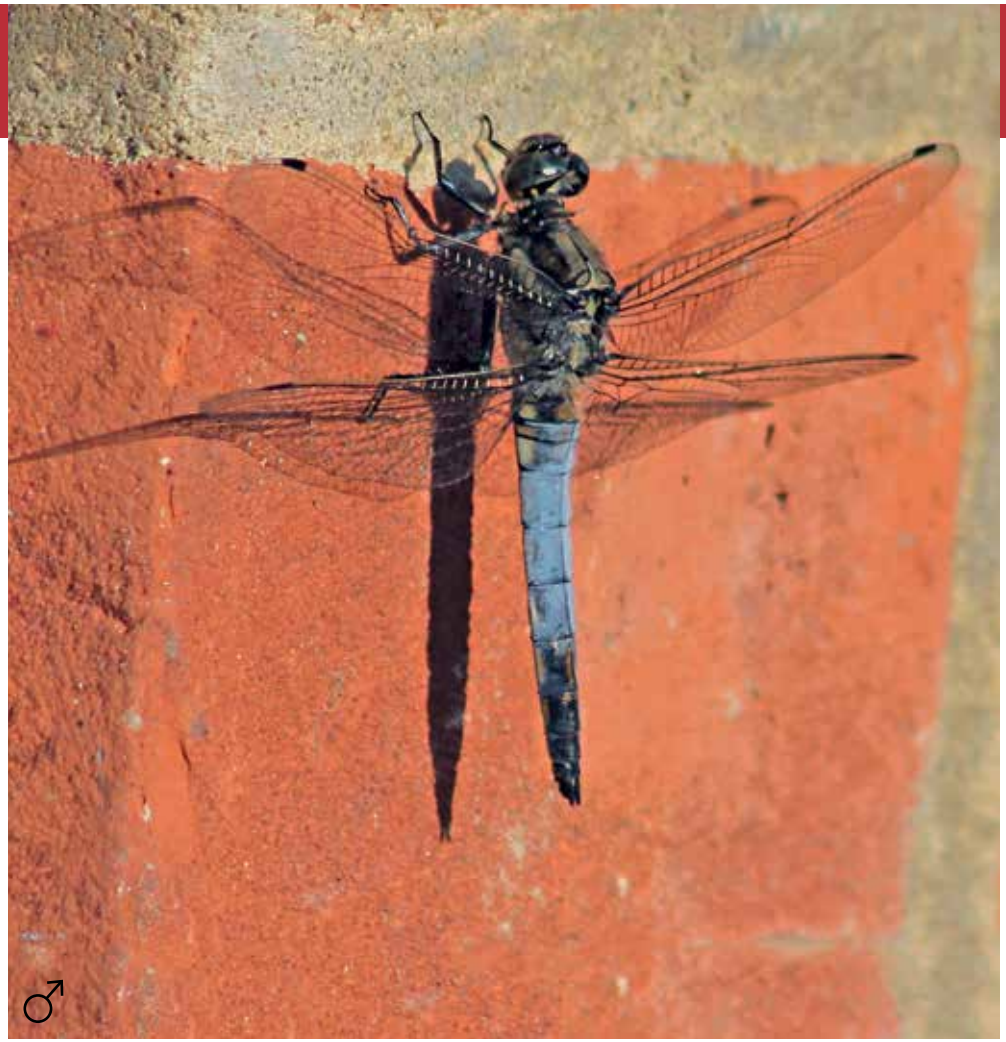
Orthetrum cancellatum

A medium-sized dragonfly, the male of which has a powdery blue abdomen with a black tip, while females are mainly yellow with two black stripes running down the length of the abdomen.

Territorial males can often be seen perching on exposed surfaces such as bare pond margins or footpaths adjacent to the waterbody. This preference for bare soil means that the species thrives in new waterbodies, however, they are less likely to be found at sites with abundant vegetation.

The range of black-tailed skimmer has significantly increased northwards and as a result is colonising new sites, such as flooded gravel pits, across Britain.

black-tailed skimmer male © Chris Farthing
black-tailed skimmer female © Chris Brooks

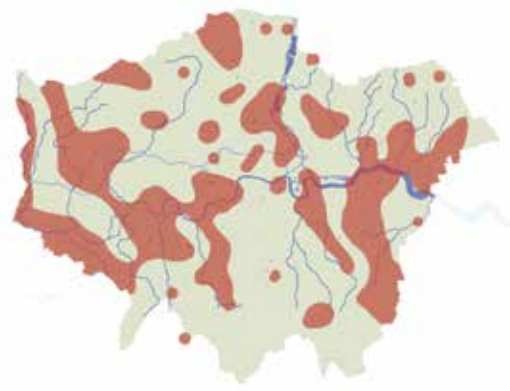


The globe skimmer (or globe wanderer) flies 18,000 kilometres across oceans, earning the title of the world's longest insect migration.

HABITATS
Still or slow flowing waterbodies, such as lakes, ponds and slow-flowing rivers. Can often be seen resting on bare banks.

DISTRIBUTION IN LONDON
Widespread and often found in small groups. Known on sites such as Beddington Park, Greenwich Park, Lesnes Abbey Wood, Wanstead Park, Woodberry Wetlands, and St James's Park.

FLIGHT PERIOD
May to August, most active in June and July.



Common darter
Sympetrum striolatum

A small orange-red dragonfly, the male sporting a characteristic yellow line down the black legs. Females are duller, with yellow and dark brown dominating. Eggs are laid in tandem with male still holding the female, leading her to suitable egg-laying areas before 'swinging' her to the surface of the water.

Common darter tolerates a wide range of conditions, which makes it one of the most widespread dragonfly species in London. It can often be observed around garden and ornamental ponds, perching on sunny spots such as fences and furniture often returning to the same spot.

HABITATS
Wide range of habitats including rivers, ponds, lakes, canals and often breeds in garden ponds.

DISTRIBUTION IN LONDON
Widespread and common, can be found in large numbers. One of the most widespread species in London.

FLIGHT PERIOD
May to October, can remain until November if conditions are mild.

common darter male © Isabel Lincoln
common darter female © Penny Metal

Ruddy darter
Sympetrum sanguineum

A small dragonfly, the males of which are vivid red. When not darting back-and-forth looking for food or a mate, they can be seen basking on garden furniture, fences and paths. Easily mistaken for common darter; however, its colouration is a more intense crimson red, with entirely black legs and a slightly constricted abdomen in the middle. Females are dull yellow and black, much like other darters.

To regulate their temperature during the heat of the day, darter dragonflies adopt the 'obelisk pose', by raising the tail end of their abdomen into the air pointing towards the sun. This reduces the surface area being directly heated by sunlight, preventing them from overheating.

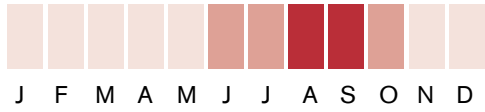
Dragonflies can work each of their four wings separately, using muscles in their chunky thorax. This allows them to fly in any direction, including sideways, backwards, hover like a helicopter and even mate and eat their prey in mid-air.

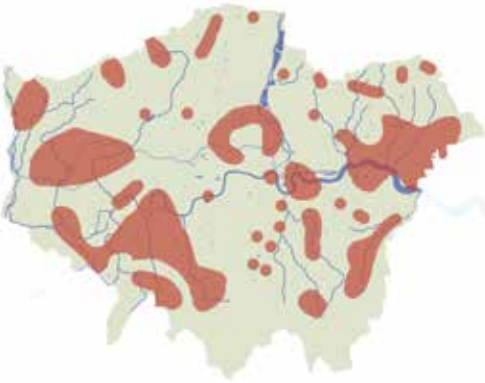
ruddy darter male © Iain Leach
ruddy darter female © Steven Falk

HABITATS
Well-vegetated ponds, small lakes and slow flowing rivers. Often on woodland ponds.

DISTRIBUTION IN LONDON
Widespread across London, can be found in large numbers. Found at sites such as Keston Common, London Wetland Centre, Cator Park in Kidbrooke, the River Brent in Hanwell, Woodberry Wetlands, Farm Bog on Wimbledon Common, and Rainham Marshes.

FLIGHT PERIOD
June to October, most active in July to September





Black darter
Sympetrum danae

Britain's smallest dragonfly, and, as the name suggests, males are almost entirely black (bar the wings). The bodies of females are yellow and black, which can make them hard to distinguish amongst more frequent female common and ruddy darters. This species frequents small acidic pools of old gravel excavations or boggy fields.

Their compact body and black colouration could be an adaptation to a colder climate, enabling them to survive in northern latitudes such as northern Europe, Russia and Canada. The black skin pigment allows them to absorb more energy from the sun, while their smaller body requires less energy to warm up.

HABITATS
Acidic pools of bogs and mires.

DISTRIBUTION IN LONDON
Rare with restricted range. Found at Bluegate Pond on Wimbledon Common, and Walthamstow Marshes.

FLIGHT PERIOD
June to September, most active between July and September.

black darter male © Iain Leach
black darter female © Chris Brooks

Even though they are efficient predators, dragonflies are completely harmless to people.

Red-veined darter
Sympetrum fonscolombii

A small dragonfly, the males being bright red with a characteristic striking red venation and conspicuously red costa on the wings and blue undersides to the eyes. They are highly territorial and often hover over the water, spending more time in flight that perched on nearby vegetation.

An attractive visitor to Britain from mainland Europe, red-veined darter has two generations in a year and tends to disperse quickly from a site after emergence. In addition, individuals from an early generation tend to migrate south, sometimes to mainland Europe, while later generation often fly north to lay eggs. As a result, continued breeding on the same site is uncommon.

HABITATS
Exposed shallow ponds and lakes.

DISTRIBUTION IN LONDON
Occasional visitor, but increasingly frequently across London. Found at sites such as the Round Pond in Kensington Gardens, Barnes Common, and Woodberry Wetlands.

FLIGHT PERIOD
June to September, occasionally in May.

red-veined darter male © David Martin
red-veined darter female © Brian Eversham

Dragonflies have almost 360 degrees vision well-attuned for detecting movement, due to the number and position of nearly 28,000 lenses (ommatidia) in their compound eyes. More than 80% of their brain is devoted to analysing visual information. Their only blind spot is right behind them.

Downy emerald
Cordulia aenea

The most widespread member of the emerald dragonfly group and the only one which is regularly found in London. This medium-sized dragonfly has a dark green body with metallic bronze sheen and bright apple green eyes. The abdomen is club-shaped towards the tip and thorax has downy appearance. Downy emerald frequents sheltered woodland pools and ponds with a thick layer of leaf litter on the bottom for its larvae to hide and ambush their prey.

HABITATS
Woodland ponds and lakes surrounded by deciduous trees and with plenty of leaf litter in the bottom.

DISTRIBUTION IN LONDON
Infrequent and scattered across London. Found at sites such as Bushy Park, Hounslow Heath, London Wetland Centre, and Keston Common.

FLIGHT PERIOD
May to August.

Aquatic larvae are predated by fish, amphibians, birds such as kingfishers, but also by larger dragonfly larvae.

downy emerald male © Chris Brooks
downy emerald female © Chris Brooks

Species rarely seen in London


© David Martin

Scarce emerald damselfly is a metallic-green damselfly often found in fish-free ditches in marshes and fens. In the last decade, it was recorded on marshes along the eastern fringes of London, including Rainham Marshes, Bedfords Park, Erith and Crayford Marshes.


© Chris Brooks

White-legged damselfly is a medium-sized sky-blue damselfly with characteristic white legs that males use in courtship displays. This inhabitant of large slow-flowing rivers and canals is occasionally found on scattered locations across London, such as Bushy Park, Hampstead Heath, Denham Lock Wood, and along the River Hogsmill in Surbiton.


© Chris Brooks

One of the smallest damselflies in Britain, **small red damselfly**, is mainly found on heathlands and bogs, such as Thursley Common and Holmwood Common in Surrey. There are very few records from Greater London, mainly from the London Wetland Centre.


© Full Moon Images

Southern migrant hawker, similar in appearance to other blue hawkers, is rapidly increasing its range from Suffolk and Norfolk across lowland England and Wales. It was recently recorded on several Essex sites and in north Kent. In London, it has been recorded in Rainham Marshes, Kew Gardens and Wimbledon Common. It will probably become more frequent.


© Howard Vaughan

Lesser emperor is a smaller cousin to the emperor dragonfly. Its abdomen features less of blue markings and the thorax is mainly brown. An occasional migrant from mainland Europe, it has been spotted at several sites in London including Woodberry Wetlands, London Wetland Centre, Kensington Gardens, and Rainham Marshes.


© Agami Photo Agency

Vagrant emperor, a rare migrant to Britain from the Middle East and sub-Saharan Africa, is closely related to the more common emperor, its body mainly pale brown with pale brown eyes and yellow costa on the wings. It is yet to be recorded in London, but in recent years unprecedented influxes have been seen in Britain, and if this continues, London might become a new home for this dragonfly.


© Full Moon Images

Scarce chaser is a nationally rare, medium-sized dragonfly with a greyish blue body and eyes. Normally found on lowland rivers in some of the eastern counties of Britain including Kent, Suffolk and Sussex. Although not yet established in London, it is increasingly likely to be found here.


© Chris Brooks

Brilliant emerald, a medium-sized, metallic dark bronze-green dragonfly with apple green eyes, has long been absent in London since several records from the mid-1990s, but new sightings have been confirmed recently.

Glossary

Abdomen – long hind part of the insect body, consisting of ten segments.

Antehumeral spots – coloured spots located on 'shoulders' of the thorax just behind the eyes of certain dragonfly species. Their shape, size and colour are used to differentiate between similar species.

Costa – main structural vein of the wing, running along the front edge of the wing.

Dorsal – upper side of an insect or back of an insect.

Emergence – process whereby larval dragonflies and damselflies climb out of the water to metamorphose into an adult.

Emergent vegetation – plants that are rooted in the substrate, with their stems, flowers and/or leaves rising above the water.

Eutrophic – (of a body of water) rich in nutrients and supporting a very dense amount of vegetation, the decomposition of which can kill animal life by depriving it of oxygen.

Exuvia – exoskeletal casings that adults leave after emergence, often on plant stems.

False wing spot – pigmented area towards the tip on the leading edge of the wing. In Britain they are found on female demoiselles.

Flight period – period during a year when adult dragonflies can be observed, covering the time period between their emergence and death. This occurs during the warmer months, with some species flying from as early as April, and others as late as October.

Labium – lower 'lip' of the mouth-parts of an insect. In Odonatan larvae, it forms a mask.

Larva – part of the life cycle of the insect that occurs between the egg and adult stages.

Lateral – 'side' of the body, often used when describing the location of distinctive features.

Mask – in larvae the labium is mask-shaped, covering the rest of the mouth-parts and part of the face in some species. They snatch their prey by shooting this out.

Node – central point along the front edge of the wing, where the angle of the edge changes (often imperceptively).

Nymph – another name for larva (often used for other types of insect larva).

Perch – object on which a dragonfly alights, typically a stick, stem of emergent aquatic plant or a horizontal bar.

Pruinescence – dusty, powder-like colouration, often found on skimmer and chaser dragonflies.

Pterostigma – a pigmented cell towards the tip on the front edge of the wing.

Riparian – the boundary between land and water.

Teneral – newly emerged dragonfly or damselfly. In this form their exoskeleton is not yet hardened, so their bodies are soft and delicate, wings are milky and opaque, and the body has still to develop its distinctive colouration.

Thorax – central part of the body of an insect, between head and abdomen, consisting of three segments where the wings and legs are attached.

Venation – network of veins in an insect's wings.

Ventral – underside of the insect, most often used when describing the location of distinctive features.

♂ (as shown on the images): male.

♀ (as shown on the images): female.

References and further reading

Benton, T. and Dobson, J., 2007. *The Dragonflies of Essex*, The Nature of Essex Series 6, Essex Field Club.

Brook, J. and G., 2010. *Dragonflies of Kent,* Kent Field Club.

Brooks, S.J., 2001. Dragonflies and damselflies, *The Changing Wildlife of Great Britain and Ireland*, pp 340-54. Taylor & Francis.

Brooks, S.J., and Lewington, R., 2018. *Field guide to the dragonflies and damselflies of Great Britain and Ireland*, Bloomsbury.

Cham, S., 2012. *Field Guide to the Larvae and Exuviae of British Dragonflies*, British Dragonfly Society.

Cham, S., Nelson, B., Parr, A., Prentice, S., Smallshire, D. and Taylor, P. (Eds.), 2014. *Atlas of dragonflies in Britain and Ireland*, Field Studies Council.

d'Aguilar, J., Dommanget, J.L. and Préchac, R., 1986. *A field guide to the dragonflies of Britain, Europe and North Africa*, Collins.

Dijkstra, K.D. and Lewington, R., 2006. *Field Guide to the Dragonflies of Britain and Europe*, British Wildlife Publishing.

Follet, P., 1996. *Dragonflies of Surrey*, Surrey Wildlife Trust.

Merritt, R., Moore, N.W. and Eversham, B.C., 1996. *Atlas of the dragonflies of Britain and Ireland*, HMSO.

Reynolds, A., Gladwin, T. and Shepperson, C., 2008. *Dragonflies and Damselflies of Hertfordshire*, Hertfordshire Natural History Society.

Riley, A.M., 2020. *Dragons & Damsels. An Identification Guide to the British and Irish Odonata,* Brambleby Books.

Smallshire, D., and Swash, A., 2014. *Britain's Dragonflies: A Field Guide to the Damselflies and Dragonflies of Britain and Ireland,* Third Edition, Princeton University Press.

The Wildlife Trusts and RHS: Big or small, ponds for all. *www.wildlifetrusts.org/actions/how-build-pond*

Acknowledgements and recorders

A great many people and organisations have provided data to make this guide possible. Data collated and provided by Greenspace Information for Greater London CIC identified the following each contributing over 50 records (as at 2019): London Natural History Society, the London boroughs of Bromley, Hounslow, Islington, Redbridge and Tower Hamlets, Greater London Authority, Lee Valley Regional Park Authority, London Wildlife Trust, Orpington Field Club, Thames Water, The Environment Agency, The Royal Parks, Wildfowl & Wetlands Trust, Essex Field Club, Harrow Nature Conservation Forum, Pond Doctor (Froglife), Riverfly Partnership, Woodlands Farms Trust, and a number of individual recorders. Several organisations have assisted on detailed species and sites information: British Dragonfly Society, London Natural History Society, City of London Corporation, The Environment Agency, The Royal Parks, Wildfowl & Wetlands Trust, and Wimbledon & Putney Commons Conservators. We are especially grateful to Neil Anderson and Steve Brooks for their contributions and insight, and Graham Coster for his editorial input.

We are thankful to everyone who generously contributed their expertise, skills and time:

Nina Ager, David Alexander, Ian Alexander, Phillip Alford, Peter Alfrey, Telmo Almeida, Karolina Allu, Magnus Andersson, Neil Anderson, John Archer, Justin Atkinson, Charlie Baker, Jack Barker, Joe Beale, Peter Beckenham, Tom Bellamy, Chris Bergson, Helen Bernhardt, Lucas Bisol, Katherine Blatchford, Val Borrell, Neil Botterill, Andy Boyers, Lucia Bramble-Boyd, Stephen Branley, Gino Brignoli, Carol Brisbern, Adrian Brooker, Steve Brooks, Martin Brown, Peter Brown, Bill Budd, Euan Bull, Paul Busby, Anna Campbell, Agostina Campodonico, Ellen Carmanah Baker, Thomas Carmona, Jonathan Carpenter, Jonathan Chambers, Roseanna Chambers, Saifullah Chaudhri, Adam Cheeseman, Vitus Cheung, Nathalie Chevalier-Hean, Jane Clarke, Czech Conroy, Sylvia Cooray, Michael Cook, Theo Cooper, Dermot Corrigan, Vicky Corrigan, Catherine Courtenay, David Courtneidge, Cat Cullen, Helen Crowne, Dave J Dack, Genevieve Dalley, Will Dartnell, Claire Davies, David Desaur, Ciprian Diaconita, Alex Dickinson, Frances Dismore, Penny Dixie, Andrew Dow, Rachel Dowse, Richard Drewe, Patrick Driscoll, Hugh Evans, Penny Evans, Chris Farthing, Bethany Field, Nic Ferriday, Lorna Fewell, Anna Forizs, Amelie Fortin, Kirsten Foster, Ryan Franco, Mathew Frith, Michael Fry, Ged Gardinier, Kevin Gates, Mary Anne Geary, Andrew Gibbs, Ben Gibbs, Claire Gladdy, Eloise Glassborrow, John Grant, Ben Gray, Sarah Green, Laura Gric, Richard Grimshaw, Shirelle Hawkins, Simon Hawkins, Christopher Hedley, Sandra Hegedus, Emma Higgs, Judith Hirson, Ian Holt, Rosemary Houston, Michael Howard, Anthony Howe, Craig James, Kevin Jennings, Nathalie Jimeriez Rezo, Tim Kelly, Marcin Kempa, Ollie Kennedy, Katharine Kirkbirde, Maria Koszel, Venetia Lamb, Sinwing Law, Eleanor Lawrence, Nathan Legall, Phillipa Leslie Jones, Daniella Levene, Steven Lofting, Alastair Locke, Astrid Lyssens, Francine O Machi, Kareemah Malik, Phillipa Marks, Oliver Marnitz, Steve Matthews, Charlie Meehan, Tabea Michaels, Bill Millard, Margaret Mose, Renata Moteiro, Dianna Murphy, Chris Negus, Jessica Neil, Jack Newman, Elliot Newton, Ben Nicholson, Tim Olsen, Ella-Jay Osborne, Sarah Perry, Katie Pitt, Adrian Podmore, Sarah Pollet, Dave Porritt, Katherine Poulton, Max Pribain, Eugene Rae, Caroline Raiman, Marta Rana Calvo, Paul Raubusch, Paula Redmond, Netty Ribeaux, Chris Rose, Karen Rumsey, Natalie Sanders, Dagmar Scheobenreif, Mark Schofield, Edyta Pszonka, Emma Shaw, Ged Shipp, Sivi Sivanesan, Irene Slegt, Louise Smith, Ray Smith, Robyn Smith, Petra Sovic Davies, Robert Spencer, Pete Stilliard, Tim Straw, Duncan Stubbs, Karen Sutton, Roger Taylor, Sonja Todd, Nicholas Tranchant, Kate Tucker, Mark Wagstaff, Ros Warwick Haller, Susie Webster, Rianna White, Stephanie White, Alice Wickman, Millie Williams, Annie Wilson, Richard Woolley, Joanna Wright, Neville Wright, Kirsten Zelmer and members of the general public that participated in the Dragonfly Detectives online survey.

We apologise for any omissions to the above. Any inaccuracies that remain in the text are the responsibility of London Wildlife Trust.

Text: Petra Sovic Davies, Tom Bellamy, Mathew Frith, David Courtneidge, Alice Wickman

Photographs: London Wildlife Trust unless otherwise credited

Front cover: Banded demoiselle © Iain Leach

Design: Metalanguage Design

Printed by: Rap Spiderweb

Dean Bradley House,
52 Horseferry Road, London SW1P 2AF
T: 020 7261 0447
enquiries@wildlondon.org.uk

wildlondon.org.uk

@WildLondon

London Wildlife Trust

@wild.london

London Wildlife Trust

Protecting London's wildlife for the future

A company limited by guarantee registered in England and Wales, Number 1600379
Registered as a charity in England and Wales, Number 283895

This publication has been made possible by the support of Esmée Fairbairn Foundation and Thames Water Utilities Ltd