



Buglife Strategy 2021-2030





The winning image in the 'Aquatic Bugs' category 2020. A diamond squid, shot in Siladen, Indonesia during a blackwater dive © Galice Hoarau

Cover photo - An acorn weevil *Curculio glandium* takes flight, first place in the 'Beetles' category 2020
© Christian Brockes

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Why bugs need Buglife

Invertebrates are essential to life as we know it. Without them flowers would not seed, birds would not feed and the soil would be sterile. They form the key linkages that make ecosystems work. Bugs provide immeasurable value for humans by

- pollinating our crops
- feeding us
- recycling nutrients and building fertile soils
- cleaning water
- providing us with medicines that improve and extend millions of lives
- sustaining a planet rich in birds, flowers and fruit
- accurately indicating the health of our environment
- inspiring people with their beauty, adaptability and industry

Past and current generations have enjoyed all these benefits and it is right that we allow future generations to do so as well. We also have a stewardship duty to look after other species and prevent their extinction.

Most species on Earth are invertebrates: our planet's health depends on them, so their enduring disappearance is intensely concerning. The rate of loss of invertebrate life is much faster than that of higher profile wildlife like birds and mammals – the local extinction rate for insects is eight times more severe!

A well-publicised review recently concluded that current declines could lead to the extinction of 40% of the world's insect species over the next few decades. Studies of flying insect bioabundance in northern Europe have reported declines of 67 to 97% in recent decades. It is not only insects that are in trouble: butterflies, moths, bees, wasps, snails, dung beetles, crayfish, mussels, stoneflies, caddisflies and mayflies are all amongst the groups most at risk. A small number of unfussy, very mobile and pollutant-tolerant species are able to cope with the damage that humans are doing to our planet. These generalist species are replacing the rich diversity of species that make up the fabric of life on Earth.

Despite an international convention and twice setting global targets for halting the loss of biodiversity, by 2010 and then by 2020, the world's politicians have failed to create the circumstances for success and the targets have been missed by increasingly wide margins.

Our planet's ecological balance is breaking and there is an urgent need for an intense and global effort to halt and reverse these dreadful trends. Allowing the invertebrate decline and extinction crisis to become a catastrophe is not a rational option for anyone.

There are many causes, and they all need to be addressed, but specifically, we will not halt the crisis without urgently reversing habitat loss and degradation, preventing and adapting to climate change, cleaning-up polluted waters, and replacing pesticide dependency with sustainable farming methods.

Buglife will not stand by and watch this decline continue. Here we set out our strategy for the next decade.

Buglife's identity

Our Vision

A wildlife-rich planet where other species thrive alongside people.

Our Mission

Buglife will work to stop the extinction of invertebrate species and to achieve sustainable populations of invertebrates.

Our Strapline

Saving the small things that run the planet.

Our Character

Buglife is.....

- passionate about bugs
- the voice of the invertebrates
- a promoter of science and evidence
- outcome focussed
- a great partner
- courageous

We will continue to work in ways that are....

- unifying
- purposeful
- leading edge, breaking new ground, going where others follow
- professional
- expert
- good humoured
- enthusiastic
- influential
- and, where necessary, determined

Buglife's outcomes

To achieve our aim of sustainable populations of all invertebrates we will help to establish three things:

1. Room for invertebrates
2. Safe for invertebrates
3. Friendlier relationships with invertebrates

Room for invertebrates

We all need room to thrive but invertebrate populations have been pinioned into tiny fragments of habitat where their needs are not being met. A high proportion of our most threatened invertebrate species are only found in a small number of places. Yet agricultural intensification, and the pressure for new development, means that we are continuing to lose these irreplaceable wildlife refuges at an alarming rate.

The current suite of protected areas includes many sites that are important for invertebrates; however, equally, or more, important areas receive no protection and continue to be damaged and destroyed.

Safe for invertebrates

Making sure that the invertebrates are safe from harm will secure a rich and bountiful planet that will also be a healthy place for humans to thrive. To achieve this, we must limit harm to invertebrates from chemicals and pollutants emitted by humans, and from environmentally harmful invasive species that have been irresponsibly or carelessly introduced into their habitats.

Friendlier relationships with bugs

We need to act now to stop the decline and extinction of invertebrates. However, the scale and quality of that action is still limited by society's lack of understanding and awareness. *"We will conserve only what we love; we will love only what we understand"* said Baba Dioum in 1968. Unless we understand the problems that bugs face and appreciate that problems for invertebrates ultimately mean problems for humans, we cannot act effectively.



The runners up spot in the 'Beetles' category 2020 a stag beetle behind an oak leaf © Martijn Nugteren

How Buglife will work

This strategy sets the direction for the next decade, a period that is likely to be characterised by uncertainty and change. Brexit, recession and disease management present challenges and opportunities. However, we are confident that our mission and values are right and that we can apply those to whatever circumstances arise.

To adapt to this uncertainty, we will produce shorter-term (2-3 year) business plans in which we will set out our work priorities and detail the specific objectives, tasks and targets that we will be pursuing.

Our approach

We will continue to operate in partnerships, seeking to collaborate and co-operate with organisations who make protection of our natural world a priority. However, to succeed in our aims we will deepen our partnerships with those whose focus is nature and its conservation. We will also broaden our partnerships with manufacturing, banking and other businesses. People and the economy depend on a healthy environment and it makes sense for them to adapt their activities to save and enhance invertebrate populations.

Progress will be made by undertaking practical projects; mobilising, inspiring, enabling and persuading others to act; and raising awareness about the value of invertebrates and the challenges to their survival. It will also be necessary to shape the development of relevant legislation and policy and help to ensure that it is enforced and implemented. We will challenge organisations and practices that are failing to conserve bugs.

Our guiding themes

To achieve our outcomes, we will work with our partners through various guiding themes.

Prioritising Conservation

Our work will build on current conservation initiatives, including:

- The **'No Insectinction'** campaign – targeted at highlighting and reversing declines in insects.
- **Important Invertebrate Areas** – mapping and protecting all the most important areas for threatened invertebrates.
- **B-Lines** – establishing a nationwide set of corridors containing stepping-stones of wildflower habitat to enable species to respond to climate change and reverse biodiversity decline.
- **Urban Buzz** – engaging with communities to take local action to restore pollinator habitats to towns and cities.
- **Peatland restoration** – restoring large areas of degraded peat bog.
- **Site protection** – challenging inappropriate and damaging development.
- Our **Pollinator** and **Freshwater** strategies – which detail the principles and actions required to save and sustain these important groups of invertebrates.

In achieving outcomes in these areas of work we must incorporate substantial training and capacity building to bring on the next generation of invertebrate experts and conservationists, and to develop and retain relevant knowledge and skills. We will take opportunities to secure new bug reserves where Buglife can take a prominent role in site management. These reserves will also provide a focus for membership growth.

Our reach

Invertebrate conservation priorities have no regard for human political boundaries and Buglife's constitution does not limit our geographical reach. Where Buglife works, locally, nationally, regionally, or globally, can be set to where we determine the greatest need is, where we can make the most profound difference, and where we can engineer a model that will fund the work.

During this strategy period we will maintain our geographic breadth of work, deepening it where we think this will best achieve our aims.

- British Isles
 - main biogeographical area of interest
 - coordinate UK delivery work and engage in Westminster policy
 - maintain/develop presence, coordinate delivery work, and engage in policy at the country level
 - seek opportunities for local delivery and public engagement projects
- European Union
 - develop an officer presence to enable us to effectively continue to coordinate EU wide pollinator conservation policy work
 - contribute to other EU-wide invertebrate initiatives
 - engage with and develop invertebrate conservation efforts
 - provide expertise to relevant fora and partners
- International and UK Overseas Territories
 - seek opportunities to foster the invertebrate conservation sector
 - develop projects, local participation and leadership in invertebrate conservation
 - provide expertise to international invertebrate conservation fora

External Relations

The problem of insect declines is of great concern to the public. We will endeavour to be the premier organisation leading efforts to understand and deliver the solutions to remedy the declines.

- Buglife will have to grow in capacity to be able to deliver change and establish and manage new partnerships. We aspire to be a much bigger organisation with many more members, establishing nature reserves to support invertebrates.
- We will build fundraising opportunities around our cause, looking to develop donative relationships with funders, individuals and companies.
- We will develop our in-house fundraising and outreach capacity and skills.
- Engaging with the general public and encouraging an interest in the insects in their gardens and helping to popularise them will also be a key target area for membership recruitment and income support.
- We will appeal to the public using popular bugs, but will always remember that we were established to speak out on behalf of the unassuming and less popular bugs as well.
- Accepting and supporting approaches from people in other countries who want to be associated with delivering Buglife's aims, and even name, is an aspiration we seek to encourage.

We want to develop more meaningful partnerships across society to help to improve understanding of invertebrates and their conservation. Starting with our Member Organisations and building through

work with other organisations in the sector, experts, scientists and decision makers, as well as those dependent on, or benefited by, invertebrates - which could include partnerships with organisations active in the health (including mental health), education, social and arts sectors.

It is important that Buglife continues to achieve a high profile in the media for invertebrate conservation stories and helps to extend their impact and breadth. We will also further extend our internet and social media presence and use new communication technologies to help us be the voice for invertebrates.

Internal Relations

Delivering our strategy depends in the first place on the people who work for Buglife. We are proud that we have a highly motivated and happy staff who understand what we are here to do and what their roles are and feel that they are changing society for the better. Buglife will continue to provide an embracing supportive framework, so that our team feel confident and comfortable putting forward their ideas and suggestions. It is vital that every voice counts and is heard.

- We will ensure we provide opportunities for volunteers and employees to influence how we work, providing ears when they provide the voices.
- Through the use of improved technology we will develop a learning hub and cross-team working groups to maximise the contributions that the highly skilled individuals we have within the organisation can make to those starting out in their careers.
- Working for Buglife will have a positive impact on skills development and the mental health and wellbeing of our staff and volunteers.
- We will deliver our work with a strong focus on achieving a low environmental footprint – recognising the climate and biodiversity emergency that we are all in, and leading by example.
- We will take steps to ensure that opportunities at Buglife are accessible to the full diversity of people and we will play our part in building a conservation sector that is more strongly representative of all cultures and backgrounds.
- We will continue to develop an organisation of empowered knowledge bearers who will both upskill colleagues and contribute to our work with the wider populace to ensure our invertebrates have the opportunity to thrive.

Stopping the extinction of invertebrate species and achieving sustainable populations of invertebrates will be very hard work, but we know we can make new friends for bugs and build momentum and capacity to deliver a better future.

Buglife's Story

In 2002 Buglife – The Invertebrate Conservation Trust started its world changing mission. Before that point there was no European champion for the conservation of all invertebrates, from bees to beetles and spiders to snails – bugs as they are more colloquially called. Buglife has become the focus point for efforts to save bug species from extinction and to halt the general decline in invertebrate populations.

In the first nineteen years of our existence our initiative and partnerships have

- tackled the conservation of neglected habitats
- developed and promoted habitat management advice
- ensured that bugs and their conservation have risen up the public agenda
- developed a national template for restoring wildflower meadows and pollinator habitat connectivity to the countryside (B-Lines)
- created hundreds of pollinator habitats in urban areas, engaging 1,000s of volunteers
- helped to secure a continent-wide ban on neonicotinoid insecticides that were destroying populations of bees and other insects
- mapped Important Invertebrate Areas across the UK
- translocated endangered species to increase the number of populations
- tackled bug conservation work on four continents
- helped to save dozens of key sites for endangered bugs from destruction
- created and restored a wide range of bug habitats

Although Buglife has grown to become a charity with an annual turnover of £1.3 million and 28 staff members, the scale of change that is required to reverse the declines in invertebrates can only be achieved by influencing, persuading and encouraging the efforts of many other organisations and individuals. Our closest partnerships have been with our member organisations, we have over 30, including leading British and European invertebrate specialist societies and conservation NGOs.

We have for example:

- saved endangered snails with the Conchological Society
- established and managed a nature reserve with the RSPB
- produced species action plans and delivery projects with the Bumblebee Conservation Trust
- worked with RSPB, Bumblebee Conservation Trust, Plantlife and Butterfly Conservation to develop the Rethink Nature partnership, that has established multi-million-pound projects to save species
- worked hand-in-glove with Pollinis in saving Europe's bees from pesticides
- successfully promoted Stag beetle monitoring with the People's Trust for Endangered Species
- encouraged the British Dragonfly Society to find a MP champion for an endangered damselfly
- conserved some of the UK's rarest spiders with the British Arachnological Society
- worked with experts in the Aquatic Coleoptera Conservation Trust, Dipterists Forum, British Entomological and Natural History Society, the Amateur Entomologists' Society, and others to prioritise species for conservation action
- developed a proposal for a new national recording framework with Biological Recording in Scotland
- Saved important sites from inappropriate development in the Cairngorms with Badenoch and Strathspey Conservation Group
- and restored hundreds of hectares of flower-rich habitat in B-Lines with the Wildlife Trusts

We have worked very closely with other UK species conservation charities in the Rethink Nature group which runs large species conservation projects and initiatives, and with a wide range of wildlife NGOs in policy fora

at the EU (European Habitats Forum), UK/England (Environment Links UK, Greener UK, and Wildlife and Countryside Link), Scottish (Scottish Environment Link), Welsh (Wales Environment Link) and Northern Ireland (NI Environmental Link) levels.

Our projects and operations have invariably relied on close partnership working, for instance, our first nature reserve at Canvey Wick is managed with the Land Trust and the RSPB.

Buglife has been a dedicated and, when required, determined advocate on behalf of invertebrates. With the most significant impact to-date being the increase in public awareness of invertebrate conservation issues.

Buglife has also become a positive voice for some of the least loved invertebrates, such as wasps and spiders, and their habitats, emphasising the important ecological roles bugs undertake. We are a favoured port of call for journalists seeking authoritative knowledge and opinions on invertebrate issues and have brought bug stories to life for the public on tv, in newspapers and on social media.



The winning image in the 'Snails and Slugs' 2020 category is this classic portrait of a Garden snail.© David Lain

"Buglife is brilliant. It's the only organisation in Europe devoted to the conservation of invertebrates – from bees to beetles, worms to woodlice. Buglife's excellent work is a vital reminder that bugs are vitally important for a healthy planet and human survival - and it's highly influential too, when it comes to the steps that policy makers and politicians should be taking."

Caroline Lucas MP.

A sketch of the challenges we face

Here we set out some of the specific challenges that Buglife faces in working towards the achievement of our vision. In many cases, we are already actively participating in resolving the challenges, but there is more work to do. Other challenges will doubtlessly come to light during the 2020s, but this gives a strong flavour the outcomes we seek to achieve.

Room for invertebrates

We must protect and expand the best wildlife areas and repair connections through our damaged landscapes so that invertebrates have the room they need to flourish and create resilient populations. Restoring a vibrant land where invertebrates are abundant, where they can fulfil their important ecological roles, and where they will continue to delight and inspire future generations.

- The most important places for the conservation of rare and threatened species, Important Invertebrate Areas, must be acknowledged and given formal protection to prevent their loss, or damage. It is vitally important that these places, and the special species that call them home, are secured from harm and managed in the right way to safeguard and enhance their wildlife riches.
- While there is a drive to increase the area of woodland cover there is yet to be an adequate response to the loss and fragmentation of other habitats; indeed the planting of trees in the wrong place can destroy irreplaceable biodiversity, such as peatland or ancient grassland.

Room to move

Historical habitat destruction and degradation means that simply throwing a protective cordon around what remains will not be enough, we also have to reconnect the surviving habitats so that species can move dynamically across landscapes. This is an essential step as over the next few decades climate change will make many of those habitats unsuitable for the species for which they currently provide refuge.

- Habitat-linking corridors, consisting of restored and created steppingstones of high-quality habitat, must be integrated into new and existing schemes and policies, including B-Lines, so that species are able to again move across landscapes.

Restored freshwaters

Aquatic invertebrates deserve special attention. They play a vital role in maintaining clean water, recycling organic matter, and in providing a food source for fish, birds and mammals. The presence of aquatic invertebrates is the standard indicator of the health of freshwaters. However, aquatic invertebrates have been just as squeezed for room to live as terrestrial species.

Small waterbodies are particularly important for small animals, but their wellbeing has been largely ignored by regulators and policy makers. Freshwater habitats are under increasing pressure from the water demands of a growing population, a wide range of pollutants, poor management, climate change and invasive species.

Two-thirds of our rivers are failing ecosystems, 87% of headwater streams in South East England are degraded, and 92% of ponds are in poor condition. There have been big losses of ponds and small waterbodies in the countryside.

A combination of climate change and over-abstraction has led to chalk streams and other headwaters suffering from drying out in many places, while naturally temporary streams, such as winterbournes, are flowing for shorter periods.

- There is an urgent need to restore freshwater habitats and improve the quality of rivers, streams, ditches, springs, seepages, ponds and lakes up to the point where specialised freshwater invertebrates can thrive again.

Living soils and accommodating carbon

Soil is a neglected space for wildlife, despite being rich in species and the increasing recognition of the importance of soil health. Soil at one end of the spectrum includes peat, a threatened habitat that continues to be excavated and sold for use in gardens, while at the other end it encompasses low nutrient habitats with bare ground where many specialist invertebrate species live and nest. The latter habitats are threatened by agricultural 'improvement', development and eutrophication from atmospheric deposition.

Peat bogs straddle aquatic and terrestrial environments. Not only do they form an important habitat for many aquatic and semi-aquatic insect species, they also play a crucial role in storing carbon, which is essential for tackling climate change. Despite this, the past damage from drainage of bogs and peat extraction has not been rectified, and indeed is being allowed to continue. Government commitments and voluntary approaches have failed to halt the use of peat in gardening.

- Reducing soil eutrophication, locking up carbon, sustaining bare ground and preventing soil pollution will ensure that soil forms a thriving foundation to life on earth. Improving knowledge and identifying and resolving threats to soil life will be crucial.
- It is essential that we stop removing peat from bogs, phase out the sale of peat for gardening and horticulture, and implement a programme of restoration for degraded peatlands.

Room for marine bugs

Invertebrates are the life blood of our seas, but again they are too often overlooked and ignored, key fisheries are unsustainable, fishing techniques still rip up the rich life that lives on the sea bed, and the monitoring of impacts on marine invertebrates is often very poor.

- While there are now marine nature reserves in many places, too often they are paper parks and damaging activities are allowed to continue, this must be fixed by improved monitoring and protection.
- Shell-fisheries must be sustainable, and fish-farming must not damage wild ecosystems.

Room around us

Many insect species share our settlements with us, indeed some are increasingly uncommon outside towns, cities and villages, these areas can also be oases for invertebrates.

- Land use change and degradation are particularly acute problems for invertebrates living near humans, we should protect the rare species and give them more room through careful planning.

- Routinely incorporating green infrastructure, such as green roofs, wildflower grasslands, ponds, hedgerows and rain gardens, in development proposals will provide habitat and steppingstones for insects, allowing them to move and disperse to urban green-space and the wider landscape.

Room for brownfield life

Brownfield sites can support a huge diversity of wildlife, often providing refuges for insects that have been lost elsewhere. Brownfields can include quarries, disused railway lines, spoil heaps, military training areas, and former industrial sites that have been allowed to return to nature.

- Development pressure has already destroyed many of the most important brownfield habitats for endangered species and continues to threaten many key sites. This development must be more scientifically controlled.
- The most important remaining sites must be legally protected and managed, and high-quality habitat on brownfield land must be identified and appropriately protected from development at all stages of the spatial planning process.

Deadwood for life

Overall, it has been estimated that 13% of all species of plants and animals in the UK are directly dependent on deadwood habitats, while many more rely on the saproxylic organisms themselves, making deadwood an important focus for conservation management. Deadwood habitats are threatened by removal from woodlands for tidiness, misguided disease control or sale/use. Many woodlands have age structure gaps that mean that in a couple of hundred years there will be no remaining ancient or veteran trees, and hence a disastrous break in habitat continuity, which is compounded by the very fragmented status of ancient woodland.

- Ensuring that there is habitat continuity for the many very rare animals associated with deadwood habitats will be a long-term challenge.
- Deadwood and veteran trees should also be part of nature recovery networks, so that rare specialists can become more common.



The winning image in the 'Flies, Bees, Wasps and Dragonflies' category 2020 shows three mayflies on Crested dog's-tail, and was shot on the River Kennet near Kintbury, in the UK.

Safe for invertebrates

There are many ways in which we are directly damaging invertebrates. These are examples of some of the challenges that Buglife will address.

Safe from harmful chemicals

Recent history is peppered with cases of pesticides causing huge damage to wildlife, most recently pollinator declines caused by neonicotinoid insecticides, but also cypermethrin sheep dip, which heavily impacted freshwater systems and may have caused the national extinction of a rare caddisfly species.

Currently there are over four hundred pesticides approved for use in the EU. Since the approval process started in 1991, over a hundred products have been banned as a result of their detrimental effect on the environment or human health, despite, until very recently, being deemed safe and used extensively. This shows that the current testing procedure for approval is inadequate; demonstrated once again by the EU introducing a ban on the use of neonicotinoid insecticides in 2018.

Plant protection pesticides are not the only chemicals that harm invertebrate populations; there are also significant risks from veterinary and human medicines, including antibiotics. There is relatively little vigilance or targeted regulation to protect wildlife from medicines.

Plastic pollution is spreading throughout all ecosystems, where it is clogging the digestive systems of invertebrates and polluting their bodies, with unknown consequences for ecosystem health.

Eutrophication, the build-up of fertility in land and water as a result of nitrogen pollution from fossil fuel burning and agriculture, is hugely destructive to ecosystems and is driving very many species of invertebrates towards extinction. Species associated with bare ground, oligotrophic water bodies and other low nutrient habitats are particularly at risk.

Chemical pollution issues are particularly acute in freshwater ecosystems, and largely unstudied in the marine environment.

- Pollution issues and their impacts on invertebrates will have to be identified and highlighted, risk assessment and regulatory processes, where they exist, will have to be encouraged to effectively address the damage. Where there is intransigence, ignorance or systems failure then public campaigns are the only way to secure action to reduce pollution.

Safe from climate change

Climate change is widely recognised as one of the major threats to biodiversity. Most recent predictions are that our climate will become warmer, patterns of rainfall will change, and the number and frequency of extreme weather events will increase: this will inevitably have an impact on insect populations. With relatively short life cycles, sensitive ecological requirements, and a wide range of powers of dispersal invertebrates are likely to be one of the first groups to show the impact of a changing climate.

- A dramatic reduction in the release of climate warming gases is urgently required.

- We must mitigate the harm that the environmental changes will have on isolated populations of invertebrates – good habitat management, maintenance of water levels, provision of shade and structural variety will help to slow the impacts of climate change.
- We also need to rapidly improve the connectivity of habitats to give invertebrate a way out of trouble.

Safe from light pollution and other harmful radiation

Technology increasingly emits electromagnetic radiation; it forms a growing and valued part of modern life. Yet we have failed to consider how this radiation may affect other animals.

Night-time light pollution disrupts the lives of nocturnal and diurnal invertebrates including moths, ground beetles, mayfly larvae and glow-worms. It has been established as a cause of insect decline that can impact on the pollination of plants and the health of ecosystems. The problem of light pollution is widely recognised and a number of Dark Sky Reserves/Parks have been established. Although we know what needs to be done to reduce light pollution more generally, there is no coordinated effort to address the issue.

Radar, radio, telecommunications and electrical fields pervade the atmosphere. We know that insects can detect, and are affected by, types of electromagnetic radiation and scientists are concerned that this radiation is capable of damaging wildlife. However, there has been insufficient work on understanding how this might affect insect populations and ecosystem health.

- Radiation pollution tends to be even less regulated than chemical pollution, knowledge needs to be developed, awareness raised, public support achieved, measures introduced and reduction targets set in law.

Safe from invasive species

Invasive Non-Native Species (INNS) are one of the greatest threats to biodiversity across the planet. The introduction of INNS to ecosystems typically leads to a reduction in species richness and abundance, and to the general degradation of the environment.

The annual cost of INNS such as Signal crayfish (*Pacifastacus leniusculus*), Carpet sea squirt (*Didemnum vexillum*) and the Killer shrimp (*Dikerogammarus villosus*) to the British economy is estimated to be at least £1.7 billion.

The international trade in pot plants poses a particular threat. Billions of pounds worth of plants and trees are transported around the world every year. They may bring colour to homes and gardens but with them they carry unwanted organisms in the soil. Non-native species such as New Zealand flatworm (*Arthurdendyus triangulatus*) and New Guinea flatworm (*Platydemus manokwari*) can wreak havoc on native wildlife, while invasive slugs such as the Spanish slug (*Arion vulgaris*) can harm garden plants and crops.

Ballast water is another major pathway for non-native species to move around the world. Cruise ships, tankers and freight ships take on water before they set sail, which is then discharged at their destination. Stowaway animals and plants are released into the sea or estuary where they can establish and cause damage to native species and habitats. The Ballast Water Management Convention came into

force in 2017, but the UK has yet to take steps to enforce the Convention. All ships in international traffic are required to manage their ballast water and sediments to new standards.

In Europe, North American crayfish species, such as the Signal crayfish (*Pacifastacus leniusculus*), pose a particular threat to native wildlife. An estimated annual cost of €454 million is incurred due to the damage caused by and/or the control of invasive crayfish species. Aquatic organisms, such as these, are accidentally transported between waterbodies by recreational water users.

The introduction of invasive non-native species to freshwater ecosystems leads to a reduction in species richness and abundance, with mayflies, caddisflies, snails, freshwater shrimps and other crustaceans being particularly vulnerable – it is also likely that invasive clams have caused the national extinction of Witham orb mussel (*Sphaerium solidum*). Many non-native species originate from the region around the Black and Caspian Seas, with over a hundred freshwater species known to have spread from there so far.

- Eradicating invasive species after they have become established can be expensive or impossible, and so preventing the spread of invasive non-native species is key to limiting harm – this means taking significant action to limit the pathways, particularly soil, live plants and ballast water.



“Home Sweet Home” won the ‘Bug Homes’ category 2020, and shows a mining bee and a Willughby's leaf-cutter bee emerging from a bee hotel. © Lee Frost

Friendlier relationships with bugs

Overcoming prejudice and ignorance, and spreading enlightenment and knowledge, will enable society to transform its relationship with invertebrates and take the action it needs to achieve a happy coexistence with nature.

Big-up small animals

Although insects and other invertebrates are essential for our survival, and over 99% of species are beneficial, people often first think of harmful or hard to love species. While attitudes are changing – in particularly with regard to bees – insects still have an image problem that must be addressed.

Huge, vested interests make massive profits by killing insects. This can have direct impacts on wildlife, but also the PR produced by these industries serves to taint our attitude towards small animals and encourage prejudice. Newspapers also find that scary stories about small animals sell papers and attract people to websites, and they are willing to produce articles that ignore scientific evidence and the bigger environmental context to exploit the fears of individuals.

- Developing a collective understanding of the harm caused by habitat loss and damage, light pollution, pesticides, invasive species and other factors will be key to securing behaviour change and support for measures that may have financial and societal implications.
- Attitudes can change and raising awareness of the wonder, beauty and essential roles of invertebrates will develop greater tolerance and respect for them.

Improving our knowledge

Knowledge is key to people being able to take effective action to protect and sustain bug populations. Invertebrates are a highly diverse group that is subject to variable levels of recording, monitoring and popularity. Invertebrates are better understood in the UK and Northern Europe than in most countries in the world, but only some groups have national recording schemes and are served by good species identification resources (e.g. butterflies, moths, dragonflies, hoverflies, bumblebees). Most invertebrate species are not well recorded or monitored and identification resources are either unavailable or difficult to use.

We know that habitat loss and fragmentation, pollution and climate change are major factors working in conjunction to cause declines. However, there remain major gaps in our knowledge and understanding regarding what aspects of these factors are most significant, and which habitats and habitat features are crucial for maintaining and restoring insect populations.

The impacts of emerging factors such as imported diseases, invasive species and 5G radiation are poorly understood. A better understanding of invertebrate ecology, causes of decline and success of solutions will enable the design and implementation of conservation measures. Fostering an appreciative relationship with the species we have pushed to the edge will encourage people to look after them.

The fate of species is the bottom line of nature conservation – their status is the tell-tale for how well we are looking after our land and water resources.

- We must keep track of bug populations, just as we would track any other key environmental or economic asset. Developing a fuller comprehension of these species with which we share the

planet, and providing them with safe space to survive, are rudimentary acts of empathic compassion, as well as being in our own self-interest.

Sharing our world

People benefit from improved contact with wildlife. Reduced contact with nature, sometimes referred to as 'nature deficit disorder' erodes the empathy that people feel towards all wildlife.

- Human engagement with nature is easiest to achieve in areas where human population densities are high so urban environments will be as important to our delivery strategy as rural environments.
- It is particularly important that we open the eyes of children to the wonder and value of invertebrates and find ways to effectively engage them in their environmental future.



A carder bee, shot by the Luminar Young Bug Photographer of the Year 2020 © Jamie Spensley