



THE EXOTIC PET-DEMIC

UK'S TICKING TIMEBOMB EXPOSED

Born Free Foundation and the Royal Society
for the Prevention of Cruelty to Animals

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COVER STORY

Their intelligence and striking plumage make highly social macaws popular as pets. Captured and removed from their Latin America wild habitats in large numbers over recent decades, and also captive-bred, to supply the pet trade, they suffer significant welfare and health issues, including feather loss/damage due to self mutilation, as pictured. They can also inflict nasty injuries and spread serious infections to people. The immeasurable animal suffering, devastation of wild populations and compromises to human, animal and environmental health and safety means the time for much stricter regulation of the exotic pet trade is long overdue.



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Will Travers

**Will Travers OBE,
Co-founder and Executive President, Born Free Foundation**

The world's wildlife is in serious crisis, and the obsession we seem to have with owning rare and exotic animals is a big part of the problem. Animals of all kinds, including many that are threatened with extinction, are taken from the wild or bred in captivity to supply the seemingly insatiable demand for exotic 'pets'. Many of these are destined to end up in the United Kingdom, all too often in conditions which seriously compromise their welfare. Exotic pets can present a serious risk to the health and safety of their owners and other people and animals that might come into contact with them. In addition, non-native species can threaten our own native wildlife and may be vectors for disease.

In spite of this, our laws are failing to protect these animals, or to prevent the negative consequences of the trade.

This important report, the result of a collaboration between two of the UK's best-known animal charities, highlights just how extensive the trade in and keeping of exotic pets is in the UK, its damaging consequences, and how poorly it is regulated.

However you look at it, the proliferation of exotic pet keeping is a ticking timebomb. If the UK government is serious about halting and reversing nature's decline, protecting the welfare of sentient animals, and ensuring the safety of its citizens, it's high time tackling this trade was made a top priority.



Chris Sherwood

**Chris Sherwood,
Chief Executive, Royal Society for the Prevention of Cruelty to Animals**

One of the most significant changes the RSPCA has seen over the years has been the increase in the variety of animals that we rescue. Along with the many dogs, cats and horses that we help, we have had to come to the aid of lizards, snakes, tortoises, parrots, sugar gliders, raccoon dogs; the list is extensive. Many of the problems we see are the result of a lack of understanding of the needs of these animals. These are essentially wild animals, whose complex needs are dictated by the natural habitats in which they exist. It is very difficult to meet these needs in a normal domestic setting. As a result, many of these animals suffer. Primates are a good example and we welcome the government's proposals in the Kept Animals Bill to regulate their keeping, but we feel this does not go far enough.

As part of the RSPCA's strategy for 2020-2030, *Together For Animal Welfare*, we have set ourselves the ambitious target of reducing neglect, abuse and cruelty to companion animals - including exotic pets - by 50%. Changing attitudes, behaviours and laws will be critical to us reaching this ambitious target. This report is a major step forward, ensuring that MPs, policy makers and other key stakeholders are informed about the issues that keeping these animals cause and the impacts on local authorities, vets and organisations like the RSPCA. This report offers far-reaching recommendations as to how this could be achieved and we welcome further discussion on these proposals with all those interested in exotic animal welfare.

EXECUTIVE SUMMARY

The trade in and keeping of exotic pets in the UK poses significant risks to animal welfare, species conservation, animal and human health, and environmental integrity.

This report aims to prompt discussion and inform future policy on the trade in and keeping of exotic pets in the UK.

Scope, scale and demand

- Exotic pet trade and keeping in the UK has increased dramatically since the 1950s, and involves all five vertebrate classes and invertebrates, often in huge numbers. An estimated 1.8 million reptiles, amphibians and invertebrates, and 1.3 million indoor birds, are thought to be kept as pets in UK households. Accurate data for many species do not exist.
- Demand for exotic pets may be influenced by many factors including: an animal's rarity, behaviour, aesthetic appeal and value; cultural factors; the profile and personal circumstance of the owner; and the portrayal of animals in media and popular culture.
- Legislation relating to exotic pets is reactionary and has failed to keep up with or anticipate changes in demand, scope and scale, with ensuing consequences for conservation and animal welfare.

Animal welfare impacts

- The natural history and optimal husbandry and welfare needs of many species are incompletely understood by biological science.
- There is strong evidence that exotic pets are commonly deprived of one or more of the basic welfare requirements specified in UK legislation, which include a suitable environment, suitable diet, the ability to exhibit normal behaviours, social needs, and freedom from pain, suffering, injury and disease.
- The current regulatory system in the UK does not adequately protect exotic animals kept as pets.

Conservation and environmental impacts

- The exotic pet trade has been described as 'an important and increasing driver of biodiversity loss.'
- The collection of live animals from the wild for the exotic pet trade has led to serious, and in some cases catastrophic, population and species declines.
- The demand for, and increased value of, rare species exacerbates existing extinction risk.
- The escape or deliberate release of exotic pets can result in the establishment of invasive alien species, with potentially serious consequences for native wildlife and environments, and significant associated mitigation costs.
- A highly precautionary approach to the trade in and keeping of exotic pets is required to prevent potentially disastrous conservation and environmental consequences.

Human health and safety impacts

- Exotic pets present a risk of injury and infection to traders, keepers, handlers, and other close contacts.
- Injuries include scratches, lacerations, bites, venomous bites and stings, constriction, and associated issues such as wound infection. In some cases, exotic pets have caused the deaths of their owners or others.
- Exotic pets may also harbour zoonotic pathogens, which can cause serious disease in individual people, and may present a risk of emerging infectious diseases and potentially pandemics.
- Current UK regulations do not adequately mitigate the risk of human injury or infection from the trade in and keeping of exotic pets.

RECOMMENDATIONS

- Current UK regulation and policy in relation to the trade in and keeping of exotic pets is piecemeal, and insufficiently precautionary.
- The proposed licensing and registration system for pet primates under the Animal Welfare (Kept Animals) Bill, which received its First Reading in Parliament in June 2021, does not, as worded at its First Reading, prevent the commercial trade in primates between licence holders, and should be amended accordingly. Restrictions also need to be extended to include other species. The Bill needs to address the risks associated with the trade in and keeping of exotic pets in the UK, while not imposing a significant administrative burden on local authorities.
- Consideration should be given to the development and implementation of a robust ‘positive list’ system, which establishes lists of species that can be kept, subject to welfare guarantees and based on whether they meet specified criteria, and excludes or restricts the trade in and keeping of those that do not (or have not been assessed). Such a system has the potential to significantly reduce the scale and scope of exotic pet keeping in the UK, while also introducing a precautionary approach to risk. A robust positive list system, accompanied by appropriate licensing/registration processes, would also prove simpler and less expensive to administer than current or currently proposed regulatory frameworks, and could achieve a significant reduction in the conservation and animal welfare risks and impacts of the current system.
- The UK Government should consider and consult on its future approach to the trade in and keeping of exotic pets, with the aim of mitigating and preventing animal welfare, conservation, human and animal health and safety, and environmental risks, as well as respecting species protections in other countries. Such considerations should include a thorough evaluation of current legislation and its effectiveness, and an evaluation of systems already introduced or under consideration in other jurisdictions.

DEFINITIONS

This report considers the trade in and keeping of ‘wild animals’ as ‘exotic pets’ in the UK.

A number of different definitions exist for these terms, so it is important to articulate precisely what is meant by them for the purposes of this report. The definitions below have been taken from various pieces of existing or proposed UK legislation, and other relevant sources.

For the purpose of this report:

- **“Animal”** means animals of the classes Mammalia, Aves, Reptilia, Amphibia, Pisces and Insecta and any other multicellular organism that is not a plant or a fungus. The report primarily concerns itself with vertebrate animals (mammals, birds, reptiles, amphibians and fish).
- **“Wild animal”** means an animal not normally domesticated in the United Kingdom.
- **“Exotic pet”** refers to wild animals kept in captivity in a domestic setting for the primary purpose of personal interest, entertainment or companionship.

THE SCALE, SCOPE AND NATURE OF THE TRADE IN AND KEEPING OF EXOTIC PETS IN THE UK



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- Millions of wild animals are imported into the UK every year, many of which are likely destined to be kept as exotic pets.
- An estimated 1.8 million reptiles, amphibians and invertebrates, and 1.3 million indoor birds, are thought to be kept as pets in UK households.
- Exotic pet trade and keeping in the UK has increased dramatically since the 1950s but its scale and scope is difficult to ascertain with any accuracy, due to the lack of any licensing or registration requirement for most species.
- Demand for exotic pets may be influenced by an animal's rarity, behaviour, aesthetic appeal and value; cultural factors; the profile and personal circumstance of the owner; and the portrayal of animals in media and popular culture.
- Legislation relating to exotic pets is reactionary and unable to keep up with or predict where demand will be focused in the future, with potential consequences for conservation and animal welfare.

The Pet Food Manufacturers' Association (PFMA) conducts annual surveys to estimate the scale and scope of pet ownership across the UK. Its 2021 report estimated that 59% of households (17 million) in the UK keep a total of over 33 million animals, excluding fish, as pets, with 11% of households having acquired a pet since the start of the COVID-19 pandemic.¹

While dogs and cats comprise the overwhelming majority (24.7 million) of these animals, they include an estimated 1.8 million reptiles, amphibians, and invertebrates, and 1.3 million indoor birds (excluding domestic fowl and pigeons).

The Ornamental Aquatic Trade Association estimates that more than 100 million fish are kept in aquariums and ponds, and that the UK imports ornamental fish from 47 countries, with many being caught from the wild. (<https://ornamentalfish.org/>)

Historically there is evidence of animals being imported into the UK to supply the demand for exotic pets for more than eight centuries,² although the trend in exotic pet keeping began to increase after the Second World War, with 80 'foreign' animals reportedly passing through London Airport every month in 1952. By 1965 the average number was 8,000 per month, with reports asking whether the situation was "getting out of hand".³

Fast-forward to 2010, when 300,000 reptiles and amphibians were reported to have passed through Heathrow Airport alone.⁴

The current lack of licensing or registration requirements in the UK makes it difficult to accurately estimate the numbers of exotic pets belonging to different animal species. However, an examination of trade data for those species for which it is recorded and published can give some insight into the scale and scope of legal imports.

CITES IMPORTS

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) aims to ensure that international trade in specimens of wild animals and plants does not threaten the survival of the species. It does this by regulating international trade in species listed on its Appendices through a permitting system. Currently, roughly 5,950 species of animals are subject to these controls. Member governments ('Parties') are required to submit data annually on permits issued for trade in listed species, with the data being published on a publicly available and searchable central database⁵ ('CITES Trade Database').

In the decade 2010 - 2019, over 1,095,000 live animals representing at least 434 different species listed on the CITES Appendices were reported to have been imported into the UK from a total of 78 countries, for either 'Personal' or 'Commercial' purposes. Many will have been imported to supply the exotic pet trade.

The highest number of animals (440,324) originated from Indonesia, followed by Australia (270,447), Uzbekistan (85,477) and Fiji (55,483); these four countries supplied over three quarters of all CITES-listed live animals that were imported to the UK during that period (Figure 1).

Of the close to a quarter of a million live vertebrates of CITES-listed species imported to the UK, the overwhelming majority (86.7%) were reptiles, followed by fish (11.5%) (Figure 2).

Mediterranean tortoises were the most abundant CITES-listed reptiles imported to the UK (119,634), seahorses the most abundant fish (25,902), and red-eyed tree frogs the most abundant amphibians (1,314) (Table 1).

Whilst the data suggests the majority of live vertebrate animals imported to the UK were captive-bred, these figures should be treated with caution.^{6,7} For example, following a 1999 ban on the taking of wild specimens of Horsfield tortoise (*Testudo horsfieldii*), over 82,000 captive-bred Horsfield tortoises were declared to have been exported to European Union countries between 2000 and 2006, the overwhelming majority from Ukraine which had no previously known record of successfully breeding this species in captivity.

While CITES data are useful, they are limited to the species that are listed on the CITES Appendices, and therefore only represent a relatively small proportion of the total trade. CITES lists approximately 13.9% of known mammal species, 13.5% of birds, 8.3% of reptiles, 2.4% of amphibians, and 0.46% of fish.^{8,9}

Figure 1: Top 10 source countries for UK CITES live animal imports 2010-2019 (n=1,001,740)

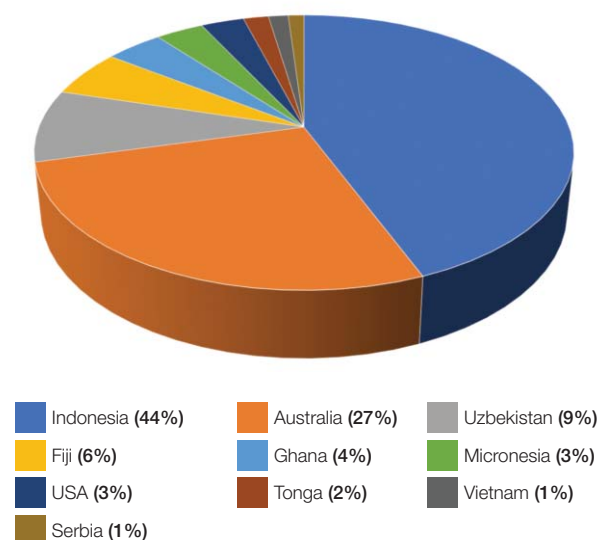


Figure 2: UK CITES live animal imports 2010-2019 by vertebrate taxa

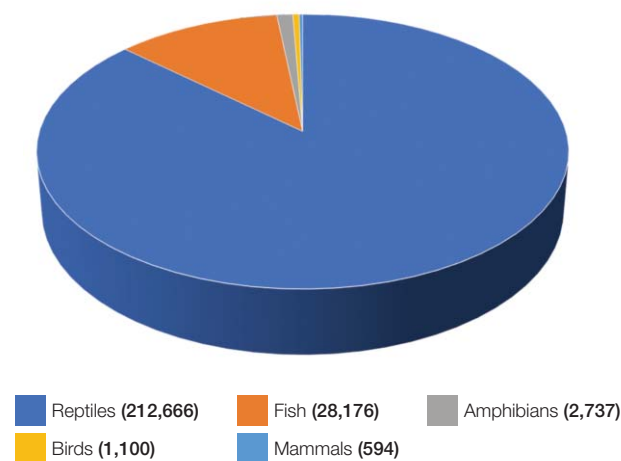


Table 1: UK imports of CITES listed live animal imports by taxonomic group, 2010-2019

Animal (Class)	Proportion of Total Vertebrate Trade	Proportion of Taxa Wild-Caught	Most Abundant Taxa
Reptiles	86.7% n = 212,666	14.3%	Mediterranean tortoises (<i>Testudo species</i>) - 119,634
Fish	11.5% n = 28,176	7.6%	Seahorses (<i>Hippocampus sp.</i>) - 25,902
Amphibians	1.1% n = 2,737	19.6%	Red-eyed tree frog (<i>Agalychnis callidryas</i>) - 1,314
Birds	0.4% n = 1,100	1.9%	Falcons (<i>Falco sp.</i>) - 648
Mammals	0.2% n = 594	0.7%	Long-tailed macaque (<i>Macaca fascicularis</i>) - 550*

*Suspected to be imported for the research industry

NON-CITES IMPORTS

In their study published in 2020, Green *et al.* examined data relating to UK imports of terrestrial non-CITES species obtained from the Trades Control and Expert System (TRACES) database via a Freedom of Information request to the UK's Animal and Plant Health Agency (APHA).¹⁰ TRACES is an online management tool used by European Union countries to record their import and export data of all non-CITES live animals, germplasm and animal-derived commodities.

The data revealed that for the 5-year period between 2014 and 2018, almost 49 million live terrestrial wild animals were imported into the UK, just over 45.5 million of which were bird species belonging to Galliformes (game birds) and Columbiformes (pigeons and doves).

Of the remaining 3.32 million animals, the USA was the source country for more than 2.32 million, followed by Singapore (225,785), the Czech Republic (163,491), Ghana (87,028) and Vietnam (77,234) (Figure 3); these five countries supplied over 85% of non-CITES listed live animals that were imported to the UK during that period. The majority (75%) of imported animals were amphibians, followed by reptiles (17%), mammals (5%), and birds (3%) (Figure 4).

Records providing taxonomic status to the species level were only present in 26% of circumstances, 76,512 animals were imported under 'mixed taxonomic import' and records for 12,749 individuals did not contain any taxonomic information.

Figure 3: Top 10 source countries for non-CITES live animal imports 2014-2018 by number of animals (n=3,151,859 - excludes Galliformes and Columbiformes)

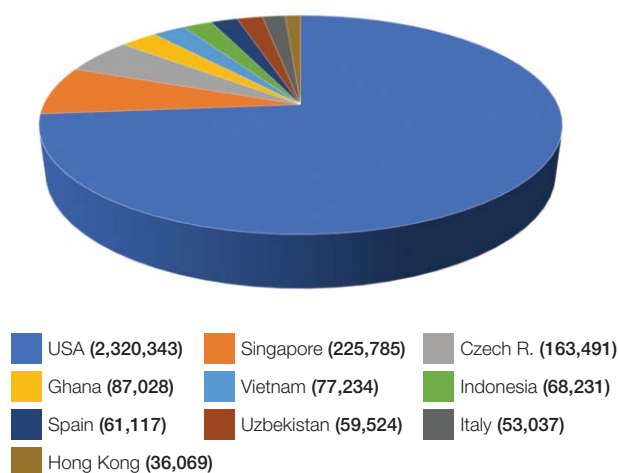
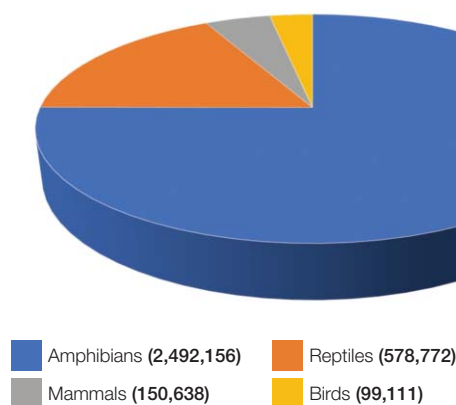


Figure 4: UK non-CITES live animal imports 2014-2018 by vertebrate taxa (n=3,320,677 - excludes Galliformes and Columbiformes)





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ILLEGAL TRADE

The above analyses do not include live wild animals that may be illegally imported into the UK, the trade in which, by its very nature, is difficult to estimate accurately. UK wildlife seizures reported on the TRAFFIC seizure database indicate that the UK authorities seized 601,308 live animals in the five year period 2016 - 2020.¹¹ This figure is likely to represent a small fraction of the total numbers of wild animals entering the UK illegally.

CITES species can potentially be misdeclared by smugglers, be undeclared amongst a shipment of legal wildlife and shipments can contain numbers which exceed the declared quantity.⁴ As a result, trade records should be viewed with a degree of uncertainty.¹² Green *et al.*'s study did not include aquatic vertebrates (e.g. fish) and invertebrates which are significantly represented in CITES data.

Despite the limitations described above, the data provided indicates that the scale and scope of UK live animal imports is very large.

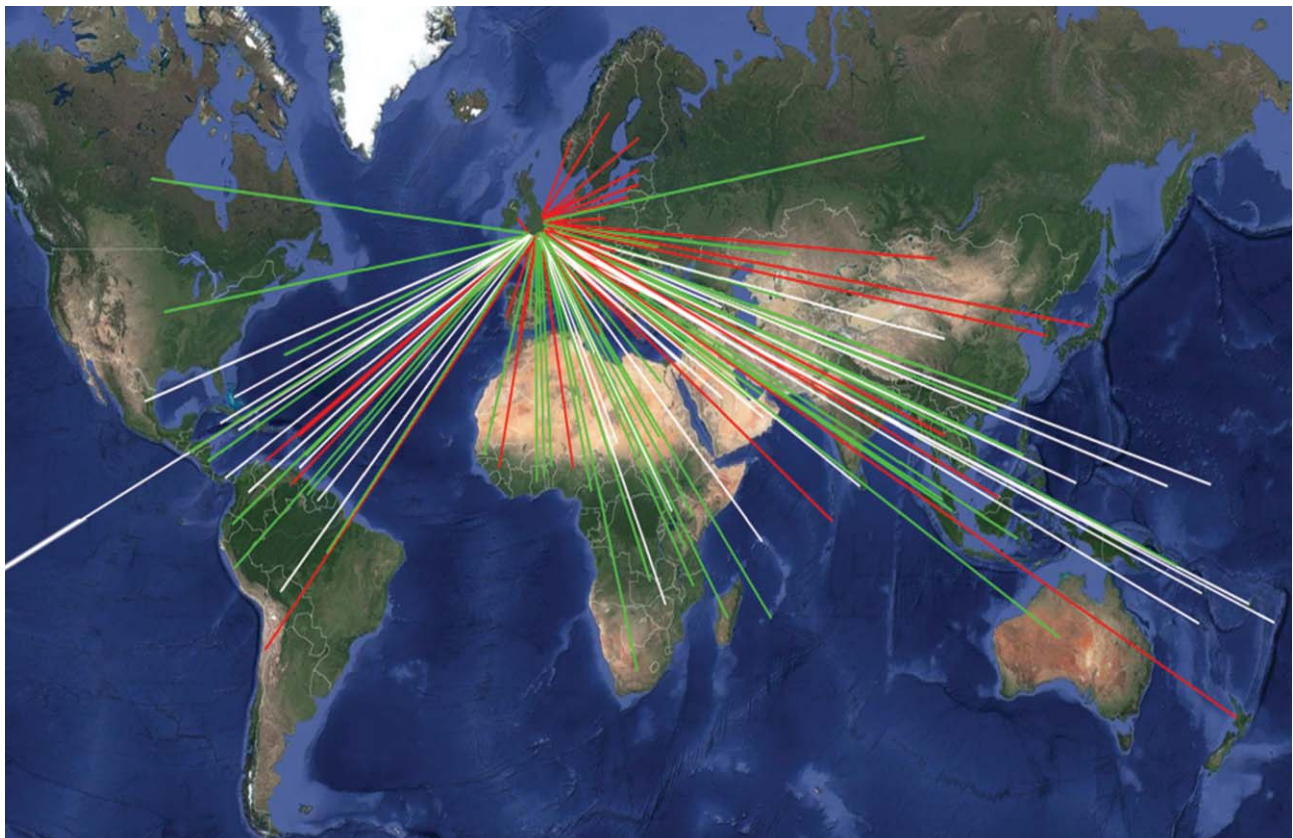
DEMAND

Whilst the keeping of animals was historically predominantly utilitarian, shifts in cultural and societal circumstances have resulted in animals being kept for a variety of reasons.^{13,14} The demand and trends of exotic pet ownership are ever changing but are influenced by the animal's attributes including its rarity, behaviour, aesthetic appeal and value; cultural factors; the profile and personal circumstance of the owner; and the portrayal of animals in media and popular culture.¹⁵⁻¹⁷ The latter is evidenced by the upsurges in trade in, for example, terrapins following the release of the film *Teenage Mutant Ninja Turtles*, and iguanas following the release of *Jurassic Park*.¹⁸ Similarly, the release of the film *Finding Nemo*, which featured a clownfish (*Amphiprion ocellaris*), was followed by an estimated 40% increase in demand for the species in the marine aquarium trade, resulting in wild population declines of up to 75%, and some local extinctions in parts of South and SE Asia.^{16,19,20}

The growth of online platforms has expanded the availability of information and trading opportunities for exotic pets. In the report 'One Click Away', The Blue Cross and Born Free Foundation analysed six popular online sites over a three month period in 2015, and found at least 53 different types of reptile, 37 types of exotic bird, 28 types of exotic mammal, and seven types of amphibians advertised for sale in the UK, most without even basic advice to potential buyers on how to keep the animals.²¹ Newly discovered species are often tracked down after being described in the scientific literature, and exploited before they are granted legal protection from trade. A study published in 2020 found that 137 reptile species described since 2000 already featured in the exotic pet trade, some of which appeared in trade within months of being described.²² Novelty and rarity appear to drive this demand, with range-restricted and rare species being "disproportionately overrepresented."²³ Likewise, the sale and promotion of exotic pets via social media is of growing concern and could undermine opportunities for public education and conservation awareness, while also legitimising the trade in the eyes of the public and increasing demand for exotic animals as pets.^{24,25}

In its current form, legislation relating to exotic pets is reactionary and unable to keep up with or predict where demand will be focused in the future, and the listing of species that need protection from the impacts of trade under international conventions can take many years. This not only places government and policy makers on the back foot, but also results in countless species being imported into the exotic pet trade before legislation can take effect, with potentially disastrous consequences for conservation and animal welfare (Figure 5).

Figure 5: A total of 110 countries exported live animals to the UK across the two studies outlined ('CITES Imports' and 'Non-CITES Imports', pp 6 & 7). (20 CITES only - red, 32 non-CITES only - white, 58 CITES and non-CITES - green).



ANIMAL WELFARE IMPACTS

- The natural history and optimal husbandry and welfare needs of many species kept as exotic pets are incompletely understood by biological science.
- There is strong evidence that exotic pets are commonly deprived of one or more of the basic welfare requirements specified in UK legislation, including a suitable environment, suitable diet, the ability to exhibit normal behaviours, social needs, and freedom from pain, suffering, injury and disease.
- The low welfare practice of keeping exotic animals with complex needs results in extensive animal suffering.

Pet owners in the UK have an ethical and moral, as well as a legal obligation to provide for the needs of the animals that they are responsible for to ensure their good welfare (Animal Welfare Act 2006 [England and Wales]; Animal Health and Welfare [Scotland] Act 2006; Welfare of Animals Act [Northern Ireland] 2011). Animal welfare has been defined as the state of an animal as regards its attempts to cope with its environment.²⁶ It incorporates both the physical and mental well-being of an animal and can range from very good to very poor.^{27,28}

However, the natural history and optimal husbandry and welfare needs of many species kept as exotic pets are incompletely understood by biological science, never mind pet owners.²⁹

Section 9 of the Animal Welfare Act 2006 identifies five welfare needs:

- The need for a suitable environment
- The need for a suitable diet
- The need to be able to exhibit normal behaviour patterns
- The need to be housed with, or apart from, other animals
- The need to be protected from pain, suffering, injury and disease

In this chapter, we examine exotic pet welfare according to these needs.

THE NEED FOR A SUITABLE ENVIRONMENT

Many exotic pets are not adapted to the UK climate so artificial heating and lighting are essential in an attempt to create tolerable environmental conditions.²⁹ However, the lack of commonly-accepted suitable temperature and light intensity gradients for exotic pet species, the huge variation in the availability and suitability of equipment to provide and monitor these gradients, and the lack of provision of accurate information to owners, results in many exotic pets in the UK being kept in conditions of heat and/or light which fall outside their usual tolerance limits.^{21,30,31} Ectotherms (cold-blooded animals) are completely reliant on their owners to provide suitable conditions of heat, humidity and ultraviolet B (UV-B) radiation levels, and several of the commonly-kept mammal and bird species (e.g. marmosets and African grey parrots) also have specific UV-B radiation requirements.^{29,32,33} Inadequate provision of UV-B radiation, heat and dietary calcium and vitamin D can result in nutritional secondary hyperparathyroidism (NSHP), a metabolic disease which causes lethargy, inappetence, skeletal deformities, pathological fractures, weakness, tremors, loss of coordination, seizures and limb paralysis.³²⁻³⁴ NSHP is common in reptiles, amphibians, common marmosets (*Callithrix jacchus*), and African grey parrots (*Psittacus erithacus*), with significant impacts on the health and welfare of these animals.³²⁻³⁴ While overt disease is well-documented, more subtle effects such as behavioural changes and immunosuppression often go unnoticed, the latter being an underlying factor in many of the health problems commonly seen in exotic pets in the UK.

THE NEED FOR A SUITABLE DIET

A considerable body of evidence indicates that poor diets are frequently fed to exotic pets in the UK, resulting in a range of common health problems. For example, exotic pet mammals frequently present with obesity, dental disease, diarrhoea, heart disease and nutritional secondary hyperparathyroidism (NSHP, as described in 'The need for a suitable environment').³⁵ Exotic pet birds commonly suffer NSHP; increased susceptibility to infection; rhinolith formation (a mass formed in the nose which may restrict breathing); atherosclerosis (a chronic disease of the arterial walls); feather damaging behaviour; and kidney disease; while reptiles commonly present with NSHP; poor skin health; kidney disease; increased susceptibility to infection; constipation; abnormal egg development and failure to lay; and cloacal and bladder stones, due to poor nutrition.³⁵

These findings are not surprising. To provide exotic pets with a balanced diet requires a detailed understanding of what constitutes a balanced diet for each species, a readily-available supply of balanced diets for pet owners to purchase, and compliance of pet owners with dietary recommendations.

While nationally or internationally recognised dietary nutrient recommendations to ensure adequate and safe nutrition have been published for the most commonly kept domestic pet species (e.g. dogs, cats, rabbits, rats, mice, guinea pigs, hamsters, gerbils), equivalent nutrient recommendations are not readily available for even the most commonly-kept exotic pet species.³⁶⁻³⁸ Instead, knowledge of exotic pet nutrition is largely based on the diseases of captive wild animals that have been attributed to nutritional deficiency or excess, a small amount of experimental data involving dietary manipulations in relatively few species, extrapolation of incomplete or superficial data about the wild diets of species, and extrapolation of knowledge relating to domestic animals.

Several challenges arise when attempting to replicate the diet of wild animals in captivity. The wild diets of species commonly-kept as exotic pets are highly complex and often seasonably variable. For example, in one study wild sugar gliders fed mostly on insects and spiders during spring and summer, and on gum, sap, honeydew and manna (a plant secretion) during autumn and winter; in other studies, sugar gliders ate flowers most of the year and sap and insects and other invertebrates outside of the flowering season.³⁹ For many species, the wild diet is incompletely documented, and in cases where dietary items and their relative amounts in the diet have been well-catalogued, the nutritional content of these wild diet items is rarely measured and compared to the nutritional content of available captive diet items.⁴⁰ Differences in wild and captive lifestyles which impact nutritional requirements, such as activity levels and environmental parameters, also need to be considered.

The result is that there are very few, if any, exotic pet species for which well-evidenced, species-specific recommendations for a balanced diet exist.



As a consequence, there is a paucity of readily available, balanced, commercially-produced, species-specific pet foods for exotic pets in the UK, and information sources for pet owners are highly variable in quality.³⁰ Common commercially-available diets for specific groups of animals, for example tortoise pellets and parrot seeds mixes, are not species-specific, and are often inappropriate for the taxonomic groups for which they are advertised. Tortoise pellets are usually too high in protein and too low in fibre and fluid for herbivorous *Testudo species* (the most commonly-kept tortoise species in the UK), leading to growth problems.⁴¹ The edible parts of commercial parrot seed mixes are typically nutritionally imbalanced, being high in fat and omega-6 fatty acids and low in calcium, vitamin A, vitamin D, essential amino acids and iodine, and parrots show selective feeding behaviour, choosing to eat the highest fat items such as sunflower seeds.^{42,43} Obesity, fatty liver syndrome, vitamin A and calcium deficiency have been associated with feeding a seed-based diet in parrots.⁴³ Commercially-available invertebrates for insectivorous (insect-eating) reptiles and amphibians are also typically nutritionally poor, tending to be too low in calcium, with an inverse calcium:phosphorus ratio, and low in vitamins A and D3.^{44,45} Therefore supplementation by gut loading (feeding food animals) and dusting food items with vitamin and mineral supplements is required, and appropriate UV-B radiation and heat provision must be provided to enable the reptile or amphibian to process and absorb these nutrients – all additional levels of complexity which make it more difficult for pet owners to provide balanced nutrition.^{34,46}

The end result is that many exotic pets in the UK do not have the opportunity to eat a balanced diet and they commonly suffer nutritional disease as a consequence.

THE NEED TO BE ABLE TO EXHIBIT NORMAL BEHAVIOUR PATTERNS

There is strong evidence to indicate that many exotic pets in the UK are not being provided with sufficient space or appropriate environments that permit normal behaviours. Commercially available enclosures for exotic pets are typically many thousands of times smaller than the wild home ranges of these species, as a result of which normal ranging behaviours and activity levels are significantly restricted. For example, it is common practice to keep a bearded dragon, a highly active foraging lizard from central Australia with an average home range of 2.9 hectares, in a 120cm x 60cm x 60cm container; an African pygmy hedgehog, a crepuscular and nocturnal forager that typically covers several miles in one night, in a 90cm x 60cm cage; and a grey parrot, a highly social, cognitively complex bird which flies long distances in central and West African forests, with an average home range of greater than 10km, on its own, in a small cage, house or aviary.

Restricting these animals to small spaces has significant impacts on their health and welfare. Common health problems, such as obesity in exotic mammals, have been linked to lack of opportunity to exercise.^{47,48}

Restricted space can impede recovery from disease. For example, snakes have poor respiratory secretion clearance so provision of increased space to permit greater activity can aid recovery from respiratory disease, a very common health problem in animals of this taxonomic group.^{49,50} Recent research indicates that corn snakes in larger than typical enclosures were more active and spent more time stretched out.⁵¹ When given the choice between two sizes of enclosure, snakes exhibited a strong preference for the larger enclosure when active.⁵¹

Lack of space for flight significantly impacts the welfare of birds. African grey parrots have been shown to be highly motivated to gain access to large open spaces, the motivation being almost as high as for food, while flight restriction (e.g. by wing clipping) increases the risk of behavioural disorders such as feather plucking and development of learned fear or anxiety disorders.^{52,53}

THE NEED TO BE HOUSED WITH, OR APART FROM, OTHER ANIMALS

Normal behaviour is that expected of physically and psychologically healthy animals. It is also closely associated with the opportunities for animals to develop appropriate social groupings.

Social needs among animal taxa are arguably best understood in primates. The Code of Practice for the Welfare of Privately Kept Non-Human Primates recognises that '*Social interaction with companions of the same species not only provides essential stimulation and learning opportunities, but it also provides a source of comfort, reassurance and enjoyment. Removing a primate from its family or social group may have adverse psychological, emotional and physical welfare implications for the individual, and for the remaining primates.*' It also notes that '*In their natural environment, primates that come into conflict can escape from one another to avoid physical and visual contact and, where appropriate, disperse to other areas*', and that '*The captive environment places certain restrictions on such strategies, which can lead to stress.*'⁵⁴ The Northern Ireland Government advises that '*With the exception of a few solitary species, primates should not be kept singly.*'⁵⁵

In spite of this, many social primates in the UK are kept alone, leading to psychological distress, behavioural abnormalities and suffering.⁵⁶

Sugar gliders, small marsupials that appear in the exotic pet trade, are also highly social animals that live in colonies in the wild. When housed on their own, or in inappropriate groups with insufficient social stimulation, they often develop behavioural disorders including self-mutilation, stereotypic behaviours, or aggression. Stress in sugar gliders may lead to eating disorders and cannibalism.⁵⁷

Social issues are also well recognised in pet parrots in the UK. African grey parrot (*P. erithacus*) chicks are typically hand-reared to imprint them onto humans in order to provide birds to the pet trade that are more tolerant of human contact.³² This has negative consequences on both physical and mental health – hand-reared African grey parrots (*P. erithacus*) have poorer overall health, increased aggression, and develop attention-seeking behaviours or stereotypic behaviours more frequently than parent-reared birds.³²

THE NEED TO BE PROTECTED FROM PAIN, SUFFERING, INJURY AND DISEASE

Disease or injury are commonly observed in exotic pets in the UK. In 2016, the British Veterinary Association (BVA) Voice of the Veterinary Profession survey found that more than half of companion animal vets had treated exotic pets in the previous year, and 77% of those vets had only seen exotic pets when they were sick or injured, rather than for a routine health check.⁵⁸ In 2018, of more than 4,500 companion exotic animals rescued by RSPCA's officers, over 380 were rescued because they were sick, including more than 270 exotic pet birds, and over 70 reptiles (RSPCA, unpublished data).

Disease and injury commonly occur due to inadequate husbandry. A recent survey of UK veterinary surgeons revealed that the husbandry of pet reptiles reported by most owners was inadequate or inappropriate, and poor husbandry contributed to a high proportion of disease incidents.⁵⁹ Poor health is often advanced at initial veterinary presentation, as many species hide signs of illness and owners often do not recognise such signs until animals are very sick, so while husbandry correction is a routine part of exotic animal practice, it often comes too late.^{29,60}

Table 2: Examples of common health problems in exotic pets that are associated with inappropriate husbandry.

Taxonomic group	Common health problems associated with poor husbandry
Mammals	Obesity, dental disease, nutritional secondary hyperparathyroidism (NSHP)
Birds	Malnutrition, feather damaging behaviour (ranging from over-preening to complete feather removal and associated tissue injury), respiratory disease, inflammation and infection of the feet
Reptiles	NSHP, abnormal skin shedding, skin inflammation and infection, ovarian problems and egg retention, inflammation and infection of the mouth, constipation, kidney disease, respiratory disease, septicaemia
Amphibians	NSHP, obesity, hypovitaminosis A (which can result in shortened tongue, poor immune system function, poor reproductive success and reduced larval survival), facial trauma
Fish	Skin trauma, skin infections, branchiomycosis ('gill rot')
Invertebrates	Fungal infections, abnormal shedding of the exoskeleton (in arthropods, particularly tarantulas)

However, significant disease and injury also occur higher up the trade chain during collection, breeding, holding and transit, prior to animals arriving in UK homes. Many animals captured for the live trade suffer high levels of mortality through the capture and transport process, or do not survive at their final destination for anything like their normal life span.

Mortality among African grey parrots captured from the wild for the pet trade, for example, may be as high as 50-90%,⁶¹ although even at that level of mortality the trade into European and other pet markets remains profitable. A 2014 publication detailed an investigation into the practices of a major exotic companion animal wholesaler in the United States, revealing shocking rates of morbidity and mortality among many traded taxa; the causes of morbidity and mortality included cannibalism, crushing, dehydration, emaciation, hypothermic stress, infection, parasite infestation, starvation, overcrowding, stress/injuries, and euthanasia.⁶²

These high mortality rates increase pressure on wild populations as traders and traffickers increase their offtake in anticipation of such losses and/or seek to replace the dead animals, resulting in further animal suffering.

CONSERVATION AND ENVIRONMENTAL IMPACTS

- The exotic pet trade has been described as ‘an important and increasing driver of biodiversity loss.’
- The collection of live animals for the exotic pet trade has led to serious, and in some cases catastrophic, population and species declines.
- The demand for, and increased value of, rare species exacerbates existing extinction threats.
- The escape or deliberate release of exotic pets can result in the establishment of invasive alien species, with potentially serious consequences for native wildlife and environments, and significant associated costs.
- A highly-precautionary approach to the trade in and keeping of exotic pets is required to prevent potentially disastrous conservation and environmental consequences.

IMPACTS ON CONSERVATION OF SPECIES IN TRADE

Wild animals bought and kept as pets are either captive bred and/or reared, or caught from the wild. Many common species, such as bearded dragons, are bred in captivity, but others are taken from the wild through legal or illegal means, and if the offtake is unsustainable this can result in species declines. In their analysis of the global trade in exotic pets, Bush *et al.* (2014) describe the trade as an ‘important and increasing driver of biodiversity loss’.⁸ Diverse species are targeted, with some more highly prized than others. Rarer species typically command high prices from collectors.⁶³ The increased value humans place on rarity has been identified as a driver of extinction for some species in trade.⁶⁴ Efforts in source countries to conserve native species that are in demand elsewhere can be undermined by the exotic pet trade, with the strength of demand and the attraction of high profit margins often outweighing the resources available in source countries to protect native species.⁶⁵ The trade may also have a role in the emergence and spread of zoonoses.⁶⁶

One recent study estimated that 90% of reptile species and 50% of individual reptiles in trade are taken from the wild, and over three-quarters of species are not covered by international regulations such as CITES.²² Data from CITES also shows the difference in the numbers from each clade that are wild-caught, emphasising the difference in how they are used. Most crocodylians traded are from non-wild sources (90%) and are destined for use in the fashion industry, whereas the majority of reptiles, including snakes and tortoises, are wild-caught (68.6%, 46.6% and 52.3% respectively) and destined for the pet trade, with large numbers often taken. For example, D’Cruze *et al.* estimated that 55,500 Indian star tortoises were extracted during 2014 from the Andhra Pradesh area of India alone.⁶⁷ As a result, some species can be heavily impacted by the trade resulting in significant declines, for example Curao turtles⁶⁸ and the turquoise dwarf gecko (*Lygodactylus williamsi*)⁶⁹ with some traded species being reported to be close to extinct in the wild, such as Vietnam’s Cat Ba tiger gecko (*Goniurosaurus catbaensis*).⁷⁰ Data indicate that reptile species that appear in trade are five times more likely to be threatened with extinction, and mammal species are three times more likely.⁸

Many of the reptile species involved are traded legally as they fall outside the current international or national legislation governing trade in wild-caught species. Others are collected and exported illegally, and enter trade chains in consumer countries without their origin being questioned or sufficiently investigated. Some are not listed under CITES simply because they are new to science. Such species are often highly-prized by collectors because they are novel and, as a result, some herpetologists (those who study or specialise in reptiles and amphibians) will not report any location details of a newly discovered species, since they know that this species is then likely to enter the trade as collectors start looking for specimens.⁷¹

The market for wild birds collapsed following bans on their imports into Europe and the USA which were introduced to reduce avian influenza risk, although there is still a thriving trade in some countries for some species that results in many wild birds being caught and traded, either legally or illegally. In some cases, those involved in the trade may not even realise that what they are doing is illegal.⁷² Both the illegal and legal trade create welfare problems with birds being transported in very poor conditions and experiencing poor survival rates. For



example, many young African grey parrots (*P. erithacus*) die because they are taken from the nest too young; 66% were reported to have died while with a trapper or in transit to a major trading city.⁷³ Adult birds can be caught by luring them onto sticky traps, sometimes using a captive individual to call for them. As well as having serious welfare implications, such methods are also indiscriminate, catching other non-target birds, although these additional casualties will not be recorded. Welfare issues are not just caused by capture,⁷⁴ but by breeding and keeping popular species in substandard conditions.⁷⁵ The collection of some species has driven catastrophic declines and extinctions in the wild, such as Spix's macaws (*Cyanopsitta spixii*);⁷⁶ while Ghana has lost between 90 - 99% of its African grey parrot population.⁷⁷

Other bird species are traded legally, with trade in some, such as African grey parrots (*P. erithacus*), being regulated by CITES. However it should be noted that the upgrading of African grey parrots to Appendix 1 from Appendix 2 in 2016/17 does not appear to have reduced the numbers being traded with the same number of birds being imported into the UK in 2019 as were imported in 2012.⁷⁸

It is estimated by the trade that more than 90% of ornamental fish from marine sources, and 5-10% from freshwater, are wild-caught (<https://wcof.ornamentalfish.org/>). The trade in ornamental fish has significant potential consequences for both conservation and animal welfare, although there is little data on mortality during capture, transport and sale. The movement of these animals can be complicated, with fish often being caught and held in the country of origin until being shipped abroad. To reduce weight and therefore shipping costs, the fish are typically transported in a minimum volume of water, resulting in rapid contamination with excrement and depleted oxygen levels. The fish can be repackaged at each stage, but this often happens without giving the animals the necessary time to acclimatise. Those that survive are then sold and transferred to tanks that may be totally unsuitable for them, especially for species with specific requirements like the cardinal tetra (*Paracheirodon axelrodi*) that live in black waters of the River Negro; these fish use the black water to hide from predators and the clear water of an aquarium means they cannot hide.

IMPACTS OF TRADED SPECIES ON NATIVE ENVIRONMENTS IN DESTINATION COUNTRIES

Humans have been travelling across the globe for many generations. Increasing human populations with disposable income and the globalisation of travel opportunities have resulted in an exponential increase in international travel and commerce in recent times. Accompanying them, either intentionally or accidentally, have been a wide variety of animals and plants that have then colonised the new worlds they have found themselves in. On landing, many of these species will attempt to fill the niche they occupy in their native country. Some will fail due to climate, competition, disease or predation, but some will find themselves in areas where the natural means of controlling their populations are not present, allowing them to proliferate.

Non-native species can have three main impacts when colonising:

- Transmission of novel pathogens, e.g. chytrid fungi *Batrachochytrium dendrobatidis* (*Bd*) and *Batrachochytrium salamandrivorans* (*Bsal*) which can have devastating impacts on native amphibian populations;⁷⁹
- Disruption of ecosystem services (the contributions of ecosystems to human wellbeing), e.g. round gobi (*Neogobius melanostomus*) which has disturbed ecosystems in the North American Great Lakes through disruption of native food webs;⁸⁰
- Predation, competition and hybridization, e.g. grey squirrel (*Sciurus carolinensis*).⁸¹

The impacts of some non-native species in their adopted countries may not yet be fully understood; the ring-necked parakeet (*Psittacula krameri*) in the UK is one such example.⁸² Others are well known for the problems they create. Grey squirrels, for example, were introduced to Britain in the 19th century and have spread throughout much of mainland Britain, outcompeting the native red squirrel through direct competition as well as through the introduction of squirrel pox, a disease to which red squirrels are naive.⁸¹

Other animals have a major impact on the ecology of the habitat they find themselves in through predation. Burmese pythons (*Python bivittatus*)⁸³ have adapted to the Florida everglades having either escaped or been released by people who no longer want them as pets. They have been successfully breeding and spreading across the area and preying on many of the native animals found in this ecosystem.

These examples provide another good reason to take a highly-precautionary approach to the trade in exotic wild animals as pets. Attempts to deal with invasive species when they have become established are far more complex, expensive, and likely to fail, than preventing the importation of such species in the first place. American mink were only determined to be living in the wild in the Outer Hebrides eight years after the last mink farm closed.⁸⁴ The cost of removing 2,200 mink from the Outer Hebrides has been estimated at £6.4 million⁸⁵ and is ongoing. Management methods aimed at eliminating established invasive species can also result in serious animal welfare impacts.

The current legislation on invasive alien species (IAS) in Europe and the UK includes prevention as one of three principles for managing IAS, along with early warning, rapid response and management where required.⁸⁶ The current GB Invasive Non-Native Species Strategy (GBINNSS) also highlights prevention, noting that it is the least environmentally-damaging intervention.⁸⁷ Prevention requires that certain species be flagged as a threat and a risk analysis carried out; examples can be found on the UK's Non-Native Species Secretariat (NNSS) website.⁸⁸ Additional measures include the development of pathway action plans (PAPs) for certain pathways that have the potential to introduce IAS into new areas. Great Britain has drafted a Non-Native Species Pathway Action Plan for Zoos,⁸⁶ including 12 actions to be taken on by zoos, zoo inspectors and national agencies to prevent escapes and to manage the situation should animals escape, but it does not include any prohibitions on the movements of animals.

There is currently no PAP for pets, despite the GBINNSS stating that there is a need to identify pathways of greatest risk, and the fact that the pet trade has been cited as one of the greatest risks for the introduction of IAS.⁸⁹ Some species kept and traded as pets represent clear and immediate threats to native habitats and wildlife. A horizon scanning exercise of the species most likely to establish in Great Britain in the next 10 years identified raccoons (*Procyon lotor*), raccoon dogs (*Nyctereutes procyonoides*) and Siberian chipmunks (*Tamias sibiricus*) as high risk.⁹⁰ Although the trade in these species has now been prohibited by the Invasive Species (Enforcement and Permitting) Order 2019⁹¹ they have been present as pets in the UK for some years and have been observed in the wild. It may be that feral populations have become established but have yet to be discovered.

A comprehensive analysis⁹² identified 33 pathways responsible for the establishment of IAS in Great Britain since 1933. Another analysis based on species of European Union concern identified 28 pathways. It should be noted that escaped pets did not figure highly in the first analysis (coming 13th out of 36) but came 2nd in the latter analysis, accounting for 20% of species. Combining these results, 10 priority pathways were identified, with escapes for ornamental collections and pets listed at 8 and 9. However, given the limited resources available, only the first five pathways were considered initial priorities.

The impacts of other species may be more subtle. The transmission of chytrid fungus to wild amphibians in many parts of the world has been linked to the trade in amphibians for pet and other markets.⁷⁹ Other diseases may well represent threats to wildlife and humans alike,⁹³ and in light of the current pandemic caused by COVID-19, preventative measures to control the movement of non-native species should clearly be prioritised.

HUMAN HEALTH AND SAFETY IMPACTS

- Exotic pets present a risk of injury and infection to traders, keepers, handlers, and other close contacts.
- Injuries include scratches, lacerations, bites, envenomation (injection of venom into the body by the bite or sting of a venomous animal), constriction, and associated issues such as wound infection. In some cases, exotic pet animals have caused the deaths of their owners or others.
- Exotic pets may also harbour zoonotic pathogens, which can cause serious disease in individual people, and may present a risk of emerging infectious diseases and, in extreme cases, pandemics.
- Current UK regulations do not adequately mitigate the risk of human injury or infection from the trade in and keeping of exotic pets.

The trade and keeping of exotic pets pose significant risks to human health and safety, not just to exotic pet owners, but to all close contacts of these animals. Injury, zoonotic and emerging disease are real risks, and epidemics and pandemics can potentially result. Current UK legislation does not adequately protect people from injury and zoonotic disease associated with exotic pets, and given the significant potential for harm, a highly-precautionary approach is recommended.

INJURY

What are the risks?

Injuries that may be sustained when coming into contact with exotic pets include:

- Bites, scratches and lacerations by mammals, birds and reptiles
- Heavy blows by large mammals, lizards and crocodilians
- Crush injuries, including constriction by certain snakes
- Beak injuries from parrots
- Envenomation via the stings of venomous scorpions and bites of venomous snakes and lizards
- Skin and eye irritation by the urticating (barbed) hairs of most New World tarantulas
- Skin irritation by potentially toxic compounds in amphibian skin secretions

With all injuries that break the skin, there is a risk of infection which may progress to cellulitis (infection of the deep layers of skin and underlying tissue) and involve unusual pathogens.^{94,95} The most severe injuries, including maulings, strangulation and venomous snake bites, involving large cats, bears, primates, large constrictor snakes or venomous snakes, can result in death.⁹⁴ It is difficult to accurately estimate the number of people affected by injuries from exotic pets in the UK. Minor injuries are likely to be managed without seeking medical attention, and so go unreported. However, where medical attention is sought, one study of NHS Health Episode Statistics for hospital admissions and bed days for 2004–2010 in England using the categories ‘injury, envenomation or sting; bitten or struck by crocodile or alligator; bitten or crushed by other reptiles: contact with venomous snakes and lizards; contact with scorpions’ showed a total of 760 full consultation episodes, 709 admissions and 2,121 hospital bed days, noting that some zoo-associated incidents may also have been included in these data.⁹⁶

Herpetologists appear to be at high risk of being bitten by snakes. Although UK figures are unavailable, in a survey of 14 experienced professional herpetologists and 14 members of a herpetological Society in Queensland, Australia, the 28 individuals had sustained 119 bites by potentially dangerous species, and hundreds of clinically significant bites.⁹⁷

ZOONOTIC DISEASE

What are the risks?

1. Risk of zoonotic disease in exotic pet owners and other close contacts

Zoonotic diseases, or zoonoses, are diseases that can be transmitted from animals to humans. Any individuals that come into close contact with exotic pets carrying zoonotic pathogens are at risk of zoonotic disease, including breeders, sellers, transporters, veterinary staff, owners, family and friends of owners, and the wider public. A vast number and range of zoonotic pathogens are known to be carried by exotic pets. Some examples of these pathogens, and the associated clinical disease in humans, are included in supplementary material to give an indication of the scale and potential impact of this problem.

The prevalence of potentially zoonotic pathogens among exotic pets in the UK is generally poorly understood. Examples of zoonotic pathogens that are known to cause disease in people include *Chlamydia psittaci*,⁹⁸ which appears to be widespread among pet psittacine birds (parrots) and can cause serious respiratory disease, endocarditis and hepatitis in people, and *Salmonella* species which are found in the gastrointestinal tracts of most reptiles and can result in serious gastroenteritis in people.^{34,99} Close contact with their pets puts owners at risk of infection.³⁴ In the case of salmonellosis, babies, children under five years old, pregnant women, the elderly and the immunocompromised are the highest risk groups.⁹⁹ Concerningly, *Salmonella* species carried by pet reptiles can be multidrug resistant; one study in Spain detected *Salmonella* species in 48% of the pet reptiles examined from households and pet shops, 72% of which were multidrug resistant strains.¹⁰⁰

The prevalence of zoonotic pathogens in exotic mammal pets was investigated by a rescue organisation in Europe which routinely tests for zoonotic pathogens during intake and quarantine. Between 2016 and 2020, of the 262 animals rescued directly from private owners, 22 animals (8.4%) carried a parasitic zoonosis; five animals (1.9%) carried a zoonotic virus; and 15 animals (5.7%) carried a bacterial zoonosis. Overall, one or more zoonotic pathogens were detected in one in every seven exotic mammals admitted by the organisation.⁹³ Rescued stray exotic mammals, which are most likely to be former pets, were found to have an even higher prevalence of zoonotic pathogens, with 39 of 78 stray animals (50%) carrying one or more parasitic or bacterial zoonotic agents.⁹³ Another recent investigation found that one-quarter (26.5%) of the mammals in wildlife trade harbour 75% of known zoonotic viruses, a level much higher than domesticated and non-traded mammals.¹⁰¹ Primates, ungulates, carnivores, and bats were found to present the most significant zoonotic disease risk.¹⁰¹

Zoonotic disease prevalence in people in the UK is also poorly understood. Zoonotic disease data is collected in England and Wales through national surveillance schemes for any laboratory-confirmed infections, surveillance for specific zoonoses through national reference laboratories, and notifications of infectious disease (NOIDs).¹⁰² However, recorded human cases are just the 'tip of the iceberg' and there are likely many more zoonotic spill-overs that we are unaware of as many patients do not seek medical attention, doctors may not request laboratory testing, positive results may not be notified, and not all zoonotic diseases are notifiable under public health legislation.¹⁰²



2. Risk of emerging infectious disease outbreaks

Emerging infectious diseases in humans are diseases whose incidence has increased in the past two decades, or is predicted to increase in the near future.¹⁰³ In extreme cases, emerging infectious diseases may result in pandemics, of which COVID-19 is an example. Zoonotic diseases are estimated to account for 75% of emerging infectious diseases.¹⁰⁴ Exotic pets and other wild animals carry many of these zoonoses; recent emerging infectious disease outbreaks associated with non-domesticated animals include Sudden Acute Respiratory Syndrome (SARS), Ebola virus, salmonellosis, and monkeypox.¹⁰⁵ Increased trade in, and ownership of, exotic pets will likely lead to increased exposure to zoonotic agents and increased risk of emerging infectious diseases.¹⁰⁵

Are current regulations in the United Kingdom sufficient to protect people from injury and zoonotic disease?

Despite the risk of zoonotic disease and injury from exotic pets, robust and comprehensive legislation is not in place to protect potential exotic pet owners, and other contacts of these animals, from harm.

Protection from serious injury is provided for, to some degree, by the Dangerous Wild Animals Act 1976. This legislation exists primarily to protect the safety of the general public from injury by privately kept dangerous wild animals. It was introduced following a number of widely-publicised incidents involving escapes and attacks on members of the public by large cats, and a growing trend in large cats being advertised for sale and bought as pets.^{106,107} However, the Act does not offer a definition or threshold for 'dangerous' and many exotic pets not listed in the Act's Schedule pose a risk of severe injury to people, as highlighted by the death of a reptile owner in the UK in 2018 due to asphyxiation by his 8ft long African rock python, a species which is not included in the Act's Schedule.^{108,109}

Legislation does little to reduce the risk of zoonotic disease from exotic pets in the UK. There are no restrictions on the species of animal that can legally be owned as a pet based on zoonotic disease risk, and no requirement for exotic pets bred in the UK to be tested for zoonotic pathogens of concern before being traded. Surveillance for certain zoonotic diseases in animals in the UK is carried out by the Animal and Plant Health Agency (APHA), however this provides an incomplete picture. Only some zoonotic diseases, such as rabies and bovine tuberculosis, are notifiable in animals in the UK; some others, such as *Salmonella*, have specific control programmes in place in relation to certain species (predominantly domesticated animals, e.g. for *Salmonella*: cattle, sheep, goats, pigs, horses, deer, rabbits, chickens, turkeys, ducks, geese, partridges, pheasants, guinea fowl, quail and pigeons); while most other potentially zoonotic organisms fall into the category of 'non-statutory zoonoses'.¹¹⁰

The Human Animal Infections and Risk Surveillance group (HAIRS), a multi-agency, cross-government horizon scanning and risk assessment body, aims to identify and risk assess emerging and potentially zoonotic infections which may pose a threat to UK public health.¹¹¹ While horizon scanning and risk assessment is valuable, it does little to prevent those in contact with exotic pets from becoming infected. For example, in an assessment of the risk that a new virus (variegated squirrel bornavirus 1) found in five squirrel species in Germany presents to the UK human population, the output regarding pet squirrels of these species kept in the UK was to provide information to key veterinary pathologists that deal with exotic pets, since there is currently no mechanism for identifying owners of these animals.¹¹²

Certain health requirements apply to some species imported to the UK, such as quarantine, vaccination or infectious disease testing, depending on species and country of export. However, these requirements are highly variable. There are no animal health import requirements for pet reptiles, amphibians or invertebrates, with the exception of salamanders, pet bees, and pet crustaceans and molluscs.¹¹³ Imported pet birds must be accompanied by a health certificate, and may be subject to quarantine and clinical inspection in relation to avian influenza requirements.^{114,115} Non-native mammals must usually be put into quarantine for four months before being brought into England or Wales, or four months or less if being brought into Scotland, depending on the situation, due to rabies risk, and health certificates may include requirements such as clinical inspection prior to release, rabies vaccination and parasite treatment.^{116,117} However, as systematic pathogen testing for zoonotic pathogens is not carried out for all imported exotic pets, the risk of importing zoonotic diseases remains high.

Several European countries have taken a different, more precautionary approach to tackle this problem, with the introduction of positive list legislation (see below section on 'Positive list of pets: a proposed regulatory system for pet keeping in the UK'). Positive lists specify which species are permitted to be kept as pets based on risks to animal welfare, the environment and human health, and several countries (Belgium, Cyprus, the Netherlands (recommended – positive list not yet introduced) and Norway) have used or are considering using zoonotic disease risk as one of the criteria when determining which species are permitted. This kind of precautionary approach can help to prevent trade in and ownership of high-risk animals, thereby greatly reducing associated zoonotic disease risk.

LEGISLATION/REGULATION



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- It is currently legal in the UK to keep almost any animal as a pet, although certain requirements apply to some species.
- Current UK regulation and policy in relation to the trade in and keeping of exotic pets is piecemeal, and insufficiently precautionary.
- A number of European countries have introduced 'positive lists' for exotic pets belonging to certain taxa.
- The UK Government should consider and consult on its future approach to the trade in and keeping of exotic pets, with the aim of mitigating animal welfare, conservation, human and animal health and safety, and environmental risks. Such considerations should include a thorough evaluation of current relevant legislation and its effectiveness, and an evaluation of systems already introduced or under consideration in other countries.

CURRENT UK LEGISLATION

It is currently legal in the UK to keep almost any animal as a pet, although certain requirements apply to some species. Table 3 lists the key pieces of legislation which cover various aspects of keeping, commercial use, taking and release of wild animals as pets. Differing legislation across devolved administrations adds further complexity.

Table 3: Summary of current UK legislation by activity and species covered. Superscript V denotes regulations that apply to vertebrates; superscript I denotes regulations that apply to invertebrates.

Activities and species covered	Legislation
Owners and keepers of all exotic animals^V kept as pets must take reasonable steps to meet their animals' welfare needs and prevent unnecessary suffering.	The ANIMAL WELFARE ACT 2006 in England and Wales, the ANIMAL HEALTH & WELFARE (SCOTLAND) ACT 2006 and the WELFARE OF ANIMALS ACT (NORTHERN IRELAND) 2011
Keepers of specific 'dangerous wild animals'^VI require a licence from their local authority and are required to be inspected every one or two years when licences are renewed. The focus is primarily on protection of the public, although welfare is briefly touched on. Species classed as 'dangerous' are listed in Schedules to the Acts.	THE DANGEROUS WILD ANIMALS ACT 1976 in England, Scotland and Wales and THE DANGEROUS WILD ANIMALS (NORTHERN IRELAND) ORDER 2004.
Businesses that sell animals^V as pets must be licensed by their local authority and inspected every one to three years for licence renewal. Licence terms vary across devolved administrations, and in some cases are at the discretion of the local authority. More recently introduced legislation includes a requirement for online businesses to obtain a licence, and expands the scope to businesses throughout the supply chain beyond those who sell directly to the public.	THE ANIMAL WELFARE (LICENSING OF ACTIVITIES INVOLVING ANIMALS) (ENGLAND) REGULATIONS 2018; THE PET ANIMALS ACT 1951 in Wales and Scotland, but from September 2021 THE ANIMAL WELFARE (LICENSING OF ACTIVITIES INVOLVING ANIMALS) (WALES) REGULATIONS 2021 and THE ANIMAL WELFARE (LICENSING OF ACTIVITIES INVOLVING ANIMALS) (SCOTLAND) REGULATIONS 2021; the PESHOPS REGULATIONS (NORTHERN IRELAND) 2000 and the WELFARE OF ANIMALS ACT (NORTHERN IRELAND) 2000.
Exhibiting animals,^V or keeping or training them for exhibition as part of a business in England requires a licence from a local authority, and in other nations registration (licensing is due to be introduced in Wales ¹¹⁸). This covers animals used in encounter businesses/mobile zoos in schools and parties, film, television programmes, adverts and theatre productions.	THE ANIMAL WELFARE (LICENSING OF ACTIVITIES INVOLVING ANIMALS) (ENGLAND) REGULATIONS 2018; the PERFORMING ANIMALS ACT (REGULATION) ACT 1925 in Wales and Scotland.
Import and commercial use of certain threatened species^VI in international trade is regulated by international convention and associated domestic implementing legislation. The sale, display to the public or other commercial use, ¹¹⁹ of species granted the highest level of protection (via listing on Annex A of the UK Wildlife Trade Regulations), requires an Article 10 certificate to demonstrate legal acquisition.	EU WILDLIFE TRADE REGULATIONS (EC) 338/97 implement the CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES OF WILD FAUNA AND FLORA (CITES). THE TRADE IN ENDANGERED SPECIES OF WILD FAUNA AND FLORA (AMENDMENT) (EU EXIT) REGULATIONS 2018 made minor changes to EU Wildlife Trade Regulations when the UK left the EU. The CONTROL OF TRADE IN ENDANGERED SPECIES REGULATIONS (COTES) implements national measures in the UK, including defining offences and penalties.
Keeping and trading non-native species^VI is controlled to prevent damage to the native environment. Releasing or allowing non-native species to escape is an offence. The keeping or selling of specific 'invasive alien species' (IAS) is strictly controlled. Currently, 30 species of animals are listed as IAS of concern because of their invasiveness and ability to establish in the wild. These species cannot be kept, sold, bred, imported or exported. Keepers of IAS species who had the animals before the species was listed can continue to keep these animals legally as long as the animals are permanently marked, securely kept and prevented from breeding.	THE WILDLIFE AND COUNTRYSIDE ACT 1981 s14; THE INVASIVE SPECIES (ENFORCEMENT AND PERMITTING) ORDER 2019; THE WILDLIFE (NORTHERN IRELAND) ORDER 1985 (as amended) (articles 15 & 15A); THE INVASIVE ALIEN SPECIES (ENFORCEMENT AND PERMITTING) ORDER (NORTHERN IRELAND) 2019
Keeping and trading certain native species^VI is legally restricted. Keepers of listed bird species must be registered and minimum cage sizes are specified. The sale of wild birds and their eggs is regulated. It is also an offence to possess or trade specific native wild animals.	THE WILDLIFE AND COUNTRYSIDE ACT 1981 THE WILDLIFE (NORTHERN IRELAND) ORDER 1985 (as amended)
Taking certain species^VI from the wild in the UK is prohibited. Wild birds and their eggs and certain species listed on Schedule 5 cannot be taken from the wild, except under licence.	THE WILDLIFE AND COUNTRYSIDE ACT 1981 THE WILDLIFE (NORTHERN IRELAND) ORDER 1985 (as amended);

LEGISLATION IN OTHER JURISDICTIONS

Positive list of pets: a proposed regulatory system for pet keeping in the UK

What is a positive list of pets?

A positive list regulatory system, in relation to pet keeping, permits the private ownership of only those species included on the positive list. Animals of species not on the list are not permitted to be kept or may only be permitted under specific conditions or by means of application for an exemption.¹²⁰

The development and implementation of a positive list of pets, based on the systematic, objective, evidence-based assessment of risks to animal welfare, human health, and the environment, aims to ensure that species are only permitted to be kept if the risks are low. The assessment process uses available scientific evidence and, if there is contradictory data or insufficient evidence, the precautionary principle should be applied, and the species being assessed is not included on the list.¹²⁰

When positive list legislation is first introduced, it is recommended that existing pets of species not included on the list may continue to be kept under 'grandfather provisions', with restrictions on selling and breeding.¹²⁰ Provisions may also be made for rescue centres, transporters and veterinary practices to provide temporary accommodation to non-listed species, and for facilities such as zoos and establishments licensed for scientific procedures to be exempted from the legislation.¹²⁰ A mechanism to amend the positive list should also be established.¹²¹

Why propose a positive list of pets in the UK?

Consequent to the current patchwork of UK legislation which permits almost any animal to be kept as a pet, a vastly diverse, constantly-changing array of species are kept legally in UK homes, with all the inherent risks to animal welfare, wildlife conservation, human and animal health, and environmental integrity, as described previously in this report.

The current legislative framework places the UK government and devolved administrations on the back foot. Lists of non-native species, native species and dangerous wild animals included in current legislation relevant to pet keeping require constant review and rectification to keep up with the latest pet keeping trends, with concomitant interim risks. Zoonotic disease risk is not considered at all in the current legislative framework for pet keeping.

Introducing a positive list of pets in UK legislation would ensure that the risks to animal welfare, the environment and human health have been assessed prior to permitting species to be imported, traded and kept as pets, thus reducing avoidable animal suffering, and negative environmental and human health impacts.

Which countries in Europe have introduced a positive list of pets in legislation?

Eight European countries have introduced positive lists of pets in legislation:¹²² Belgium, Croatia, Cyprus, Lithuania, Luxembourg, Malta (applies to pet shops only),¹²¹ Norway, and the Netherlands. In the Netherlands and Lithuania, a positive list is enshrined in legislation, while the formation of the list itself is currently under development.¹²² In some countries, the positive lists only cover species within certain taxonomic groups, e.g. Belgium (mammals),^{123,124} Croatia (birds, fish and corals),¹²⁵ the Netherlands (mammals, currently under development)¹²⁶ and Norway (mammals, birds, reptiles, fish and several invertebrate classes),^{127,128} while the positive lists of Cyprus¹²⁹ and Luxembourg¹³⁰ cover species within all taxonomic groups (mammals, birds, reptiles, amphibians, fish and invertebrates).

The Belgian positive list of mammals is the longest-standing positive list regulatory system in Europe. The current system has been in place since 2009 and the list was updated in 2018.¹²³ An impact assessment in 2016 demonstrated that the positive list had been very effective in regulating the trade of exotic mammal pets in Belgium.¹³¹ Between 2009-2014, only 46 cases involving 129 rescued and confiscated exotic mammals were recorded, and the online trade in prohibited species was minimal.¹³¹

Which criteria have been used to form positive lists of pets?

Where known, the criteria used by European countries to form positive lists of pets are shown in Table 4. Five peer reviewed scientific methodologies for assessing the suitability of animal species as pets have also been published.¹³²⁻¹³⁶ The criteria used for the longest-standing positive list regulatory system in Europe is similar to the checklist described in Schuppli and Fraser (2000).¹²¹

Table 4: Summary of criteria used in the formation of positive lists of pets in European countries. Where specific criteria are unknown, the purpose of introducing the positive list is indicated.

Country	Criteria used to form positive list or purpose of positive list where criteria unknown			
	Animal welfare	Environment	Human health	Other
Belgium (Brussels¹³⁷, Wallonia¹³⁸ and Flanders¹³⁷)	Whether or not the animals are easy to keep and house must be taken into account, considering their essential physiological, behavioural and ecological needs.	The existence or not of clear indications that when captive specimens escape into the wild, the species could remain there and thus constitute an ecological threat must be taken into account.	The extent to which the animals of the species concerned are aggressive and/or dangerous in nature or constitute another particular danger to the health of man must be taken into account.	Bibliographic information must be available concerning the keeping of the animals. In the case of contradictory data, the animal should be given the benefit of doubt, (i.e. not included on the list).
Croatia¹²⁵	N/A	Specific criteria unknown. Positive list introduced to regulate the trade in potentially invasive alien species.	N/A	N/A
Cyprus¹³⁹	Specific criteria unknown. Positive list introduced for three reasons: 1) wild animals have complex social and behavioural needs and these needs cannot be met when these animals are kept in captivity and in isolation and therefore suffer greatly when kept as pets;	2) taking wild animals from nature contributes to the decline of these populations and in certain cases may lead to the extinction of species;	3) wild animals carry certain diseases that are dangerous to humans and as these animals are not adapted to live with humans, when stressed, they may attack or hurt their owners.	N/A
Luxembourg¹⁴⁰	Specific criteria unknown. Positive list introduced to better protect animals, and guarantee their dignity, safety and well-being.	N/A	N/A	N/A
Netherlands¹⁴¹ (recommended framework, list currently under development)	Assessment system based on determining risk factors related to: 1) hazards for the animal (animal welfare/ animal health);	N/A	2) Risk factors related to dangers for humans (zoonoses or personal injury).	N/A
Norway¹²⁰ (reptiles)	Not species that are poorly-adapted to captivity or require specialist care.	N/A	Not species that are capable of transmitting zoonotic diseases to people and other animals or pose a risk to public safety.	Not species that are typically wild-caught.
Norway (mammals, birds, reptiles, fish and several invertebrate classes)¹²⁷	N/A	Specific criteria unknown. Positive list introduced to prevent the introduction, release and spread of alien organisms that cause, or may cause, adverse consequences for biodiversity.	N/A	N/A

CONCLUSION

The trade in and keeping of exotic pets in the UK involves millions of animals belonging to a vast range of species. A lack of licensing or registration requirements for the majority of kept animals makes estimating their numbers extremely difficult.

Demand is often driven by factors such as appearance, rarity, the profile of the owner, and the portrayal of animals in the media, rather than by the suitability of animals as pets. The focus of demand can also rapidly change.

The environmental, nutritional and social needs of many of the species being traded and kept in the UK are poorly understood, and inadequately provided for by many traders, owners or support services. As a result, there is widespread individual animal suffering, whether the animals are bred in captivity or collected from the wild with the latter often resulting in devastating consequences for wild populations.

Many exotic pets also pose risks to the health and safety of people and other animals, through the infliction of injuries and the spreading of disease. Some can also compromise native wildlife and habitats if they escape or are released by their owners, and once established can be difficult and expensive to manage or eradicate.

A highly precautionary approach to the trade in and keeping of exotic pets is clearly required. The proposed licensing and registration system for pet primates under the Animal Welfare (Kept Animals) Bill, which was introduced to Parliament in June 2021, will not, as worded at its First Reading, prevent the commercial breeding of and trade in primates between licence holders.

Consideration should be given to the development and implementation of a robust 'positive list' system covering all taxa, which establishes lists of species that can be kept subject to them meeting strict animal welfare, wildlife conservation, and human, animal and environmental safety criteria. Such a system has the potential to significantly reduce the scale and scope of exotic pet keeping.

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