

## UK Biological Security Strategy: call for evidence

### Wildlife and Countryside Link Response: March 2022

*Wildlife and Countryside Link is a coalition of 65 organisations working for the protection of nature. Together we have the support of over eight million people in the UK and directly protect over 750,000 hectares of land and 800 miles of coastline.*

This response is supported by the following Link members:

- A Rocha UK
- Amphibian and Reptile Conservation
- Born Free Foundation
- Buglife
- National Forum for Biological Recording
- Woodland Trust

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Wildlife and Countryside Link is a coalition of 65 organisations working for the protection of nature. Together we have the support of over eight million people in the UK and directly protect over 750,000 hectares of land and 800 miles of coastline. We welcome this opportunity to respond to the call for evidence, to inform a refresh of the UK Biological Security Strategy.

Invasive non-native species (INNS) are animals, plants or other organisms that have been introduced to places where they do not occur naturally, through deliberate or accidental human actions, causing negative environmental, social and/or economic impacts in those areas. The negative impacts of INNS within the UK are significant, and growing. INNS are one of the top five drivers of biodiversity loss and species extinction globally, implicated in 58% of the 247 global animal extinctions where the cause of

extinction is known.<sup>1 2</sup> They are also estimated to cost the UK economy at least £2 billion each year, for example through damage to and loss of crops, increased flooding risk, and additional building and construction costs.<sup>3</sup> These impacts will only increase as more species become introduced and established in the UK, further exacerbated by the effects of climate change.

Despite the severity of the threat posed to both biodiversity and the economy, there remains a major gap to effective INNS biosecurity within the UK. INNS do not receive sufficient resources, funding or focus compared to other areas of biosecurity. Indeed, compared to domestic animal and plant health biosecurity, our invasive species regime is drastically underfunded, receiving just 0.4% (£922k) of the total UK biosecurity spend.<sup>4</sup>

The UK is one of the most nature-depleted countries in the world. This refresh of the UK Biological Security Strategy is a critical opportunity to properly engage with and incorporate the issue of INNS, and to reflect the scale and the severity of the threat posed. In answering the questions below, we offer recommendations for how the strategy could achieve this, including:

- **A greater recognition of INNS within the scope of the Biological Security Strategy**, raising greater awareness of INNS as a biosecurity issue, and reflecting the scale and severity of the threat they pose to both UK biodiversity and the economy.
- **A greater focus on the prevention of invasive non-native species** from arriving and establishing in the UK in the first place; this is both more effective and efficient than management or attempted eradication of species once introduced.

We also discuss the issue of zoonotic disease in this response, both in relation to intensive livestock farming, and exotic pets.

## **1: What are the key biological security opportunities, challenges, threats and vulnerabilities facing the UK?**

The key challenge facing INNS biosecurity in the UK is the lack of a strong, strategic and fully resourced approach to prevention and management.

Biosecurity measures in the UK have thus far proven insufficient to prevent the arrival, establishment and spread of INNS. The number of INNS established in Great Britain has consistently grown since 1960;

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<sup>1</sup> IPBES Global Assessment, 2019 - <https://ipbes.net/global-assessment-report-biodiversity-ecosystem-services>

<sup>2</sup> Bellard C, et al. (2016). Alien species as a driver of recent extinctions. *Biology Letters*, 12: 20150623

<sup>3</sup> Wildlife and Countryside Link, 2020 - [https://www.wcl.org.uk/docs/Prevention\\_is\\_Better\\_than\\_Cure\\_Report\\_2020.pdf](https://www.wcl.org.uk/docs/Prevention_is_Better_than_Cure_Report_2020.pdf)

<sup>4</sup> Wildlife and Countryside Link, 2020 - [https://www.wcl.org.uk/docs/Prevention\\_is\\_Better\\_than\\_Cure\\_Report\\_2020.pdf](https://www.wcl.org.uk/docs/Prevention_is_Better_than_Cure_Report_2020.pdf)

there are currently hundreds of invasive species established in Britain, with an estimated minimum 12 new non-native species establishing every year.<sup>5 6</sup> Furthermore, invasive species legislation in the UK has significant shortcomings, and has not been adequately resourced or modernised; as stated, invasive species biosecurity receives a mere 0.4% (£922k) of the UK biosecurity budget. It is also the only biosecurity department without a dedicated inspectorate. The result of this is that the number of INNS established in Great Britain has consistently grown since 1960, across freshwater, marine and terrestrial environments.<sup>7</sup> This situation will only get worse with climate change, as warmer conditions and ecological disruption assist species introduction and establishment.

Further threats and vulnerabilities stem from the movement of people and goods. For example, the international model of plant trade that has developed over the last three decades - and our increasing reliance on imports of plant material - is already responsible for the introduction of at least 20 serious tree pests and diseases into the UK, ultimately causing the loss of tens of millions of trees.<sup>8</sup> There are at least 127 high risk pests and diseases that present a significant threat to UK trees if imported; of these, 47 could cost over £1 billion each to tackle, and would result in the loss of millions of trees.<sup>9</sup> The total cost of ash dieback disease to the UK is estimated at £15 billion.<sup>10</sup> Additionally, for the vast majority of plant imports, there are no biosecurity measures to exclude or check for unwanted hitchhiking species - for example, eggs or hibernating animals found in the soil or growing media. This horticultural trade pathway is a huge driver of INNS introduction and establishment, yet appropriate biosecurity measures and recognition of the threat are lacking.

Changes to the movement of people and goods post-Brexit poses further threats; non-European species are twice as likely to become invasive once established, compared to European species.<sup>11</sup> Freeports also pose a significant issue through their proposed relaxation of customs processes. This relaxation would extend environmental risks beyond the geographic location of the freeport itself, weakening the UK's ecological barrier. Free Trade Zones and freeports have therefore been identified as particularly high-risk sites for the accelerated introduction and early establishment of INNS.<sup>12</sup> In relation to the EU, the UK and Ireland benefit from a strong geographical advantage by virtue of their island status. The

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<sup>5</sup> JNCC Biodiversity Indicators, 2021 - <https://jncc.gov.uk/our-work/uk-biodiversity-indicators-2021/>

<sup>6</sup> GB Non-Native Species Report Card, 2017 - <http://www.nonnativespecies.org/downloadDocument.cfm?id=1116>

<sup>7</sup> JNCC Biodiversity Indicators, 2021 - <https://jncc.gov.uk/our-work/uk-biodiversity-indicators-2021/>

<sup>8</sup> <https://www.woodlandtrust.org.uk/press-centre/2020/12/cheap-imports-risk-millions-of-trees/>

<sup>9</sup> <https://www.woodlandtrust.org.uk/press-centre/2020/12/cheap-imports-risk-millions-of-trees/>

<sup>10</sup> Hill et al., (2019) - [https://www.cell.com/current-biology/fulltext/S0960-9822\(19\)30331-8](https://www.cell.com/current-biology/fulltext/S0960-9822(19)30331-8)

<sup>11</sup> Environmental Audit Committee Supplementary evidence submitted by Defra, 2019

<http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/environmental-auditcommittee/invasive-species/written/104755.pdf>

<sup>12</sup> Wildlife and Countryside Link, 2020 - [https://www.wcl.org.uk/docs/Link\\_freeports\\_consultation\\_response\\_July2020FINAL.pdf](https://www.wcl.org.uk/docs/Link_freeports_consultation_response_July2020FINAL.pdf)

geographical isolation should be utilised; for example, the UK and Ireland should together be enforcing world leading strict plant import regimes to protect existing tree and plant stocks from overseas threat. There is a strong need for continuous bilateral UK-Ireland cooperation, given the shared land border.

There are, however, several opportunities to improve INNS biosecurity. In 2019, the EAC recommended that the INNS biosecurity budget should be tripled to £6 million, and that this increased funding should support the development of a dedicated INNS inspectorate.<sup>13</sup> A 1-year trial inspectorate was secured, which has now been extended for another 3 years. This inspectorate should be made permanent, to allow the implementation of a stronger, more strategic approach to invasive non-native species which will prevent introduction at the border, and coordinate rapid response and effective management to minimise the impact on both biodiversity and the economy. Preventing invasive species from arriving and establishing in the first place is both more effective and efficient than attempting to manage or eradicate them once they have arrived. This investment would reduce the number of new establishments by 50-67% and provide a return on investment of £23 for every £1 spent.<sup>14</sup>

It is important that actions and priorities set out in the UK Biological Strategy are integrated across and work with other plans, policy and management to holistically drive improvement for INNS biosecurity in the UK. Findings from the recent consultation on a GB Plant Biosecurity Strategy, and the review of the GB INNS Strategy, should be fed into this refresh of the UK Biological Security Strategy.

Wildlife and Countryside Link's response to the GB Plant Biosecurity Strategy consultation can be found [here](#). In our response, we set out recommendations for stronger, more effective plant biosecurity - including the need for a dedicated INNS inspectorate - and the need to reduce our reliance on imports of plant and tree material. Building capacity and support for a domestic industry, complemented by increased use of natural regeneration of native trees and diverse, locally sourced, native planting stock, is crucial to reducing risk from this critical pathway. Indeed, the reduction of live plant and tree imports is the single most effective biosecurity measure that can be implemented to tackle the risk of INNS via this pathway.

Zoonotic disease spread by the intensive farming of animals also represents a significant biological threat. The UN Environment Programme report 'Preventing the next pandemic' (July 2020)<sup>15</sup> highlighted intensive farming as a potential cause of the next pandemic, setting out the conditions that make intensive animal farms petri dishes for disease:

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<sup>13</sup> EAC, 2019 - <https://publications.parliament.uk/pa/cm201919/cmselect/cmenvaud/88/8804.htm>

<sup>14</sup> Wildlife and Countryside Link, 2020 - [https://www.wcl.org.uk/docs/Link\\_freeports\\_consultation\\_response\\_July2020FINAL.pdf](https://www.wcl.org.uk/docs/Link_freeports_consultation_response_July2020FINAL.pdf)

<sup>15</sup> <https://www.unep.org/resources/report/preventing-future-zoonotic-disease-outbreaks-protecting-environment-animals-and-p15>

*“The intensification of agriculture, and in particular of domestic livestock farming (animal husbandry), results in large numbers of genetically similar animals. These are often bred for higher production levels; more recently, they have also been bred for disease resistance. As a result, domestic animals are being kept in close proximity to each other and often in less than ideal conditions. Such genetically homogenous host populations are more vulnerable to infection than genetically diverse populations, because the latter are more likely to include some individuals that better resist disease.”*

Intensive farms have already been the source of a number of pandemics, including the 2009 Swine Flu Pandemic which killed 17,000 people, which has been traced back to a pig farm in Mexico.<sup>16</sup> Indeed, one 2019 study of literature on disease origins suggests that *“since 1940, agricultural drivers were associated with >25% of all — and >50% of zoonotic — infectious diseases that emerged in humans, proportions that will likely increase as agriculture expands and intensifies.”*<sup>17</sup>

Intensive animal husbandry is spreading in the UK, with the number of intensive pig and chicken farms increasing by 7% between 2017 and 2020, reaching a total of 1,786 sites. The risk of zoonotic disease spreading from one of these sites represents a real and growing biological threat.<sup>18</sup>

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*<sup>19</sup>, 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.<sup>20 21</sup> Close contact with their pets puts owners at risk of infection.<sup>22</sup> In the case of salmonellosis, babies, children under five years old, pregnant women, the elderly and the immunocompromised are the highest risk groups.<sup>23</sup> Concerningly, *Salmonella* species carried by pet reptiles can be multidrug resistant; one study in Spain

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<sup>16</sup> <https://www.sciencedaily.com/releases/2016/06/160627160935.htm>

<sup>17</sup> <https://www.nature.com/articles/s41893-019-0293-3>

<sup>18</sup> <https://www.theguardian.com/environment/2020/apr/07/industrial-sized-pig-and-chicken-farming-continuing-to-rise-in-uk>

<sup>19</sup> Fiddes, M. (2013). Seroprevalence of *Chlamydia psittaci* in pet psittacine birds in Southern England.

<sup>20</sup> Public Health England, (2014) -

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/377731/Salmonella\\_in\\_reptiles\\_factsheet\\_2\\_.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/377731/Salmonella_in_reptiles_factsheet_2_.pdf).

<sup>21</sup> Public Health England, (2014) -

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/377731/Salmonella\\_in\\_reptiles\\_factsheet\\_2\\_.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/377731/Salmonella_in_reptiles_factsheet_2_.pdf).

<sup>22</sup> Kubiak, M. (2021) Bearded dragons. In: Handbook of Exotic Pet Medicine (ed. Kubiak, M.). John Wiley & Sons, 27-42

<sup>23</sup> Public Health England, (2014) -

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/377731/Salmonella\\_in\\_reptiles\\_factsheet\\_2\\_.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/377731/Salmonella_in_reptiles_factsheet_2_.pdf).

detected *Salmonella* species in 48% of the pet reptiles examined from households and pet shops, 72% of which were multidrug resistant strains.<sup>24</sup>

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.<sup>25</sup> 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.<sup>26</sup>

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. 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 'nonstatutory zoonoses'.<sup>27</sup>

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.<sup>28</sup> 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.<sup>29 30</sup> Non-native mammals must usually be put into

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<sup>24</sup> Marin et al. (2020). Pet Reptiles: A potential source of transmission of multidrug-resistant *Salmonella*. *Frontiers in Veterinary Science* 7, 613718

<sup>25</sup> AAP, (2021) - [https://www.aap.nl/uploads/inlinefiles/2021\\_Infected%26Undetected.pdf](https://www.aap.nl/uploads/inlinefiles/2021_Infected%26Undetected.pdf)

<sup>26</sup> AAP, (2021) - [https://www.aap.nl/uploads/inlinefiles/2021\\_Infected%26Undetected.pdf](https://www.aap.nl/uploads/inlinefiles/2021_Infected%26Undetected.pdf)

<sup>27</sup> APHA, (2021) - <http://apha.defra.gov.uk/vetgateway/surveillance/experts/zoonosis.htm>

<sup>28</sup> APHA, (2021) - <http://apha.defra.gov.uk/documents/bip/iin/bliv-8.pdf>

<sup>29</sup> DEFRA, (2021) - <https://www.gov.uk/government/publications/birds-live-healthcertificates>

<sup>30</sup> APHA, (2021) - <http://apha.defra.gov.uk/documents/bip/iin/pbtc2.pdf>

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.<sup>31 32</sup> 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.

## **2: How can the UK capitalise on the identified opportunities?**

### ***a. What are the key global, regional and domestic trends affecting UK biological security out to 2030?***

The number of INNS established in Great Britain has consistently grown since 1960, across freshwater, marine and terrestrial environments, with significant implications environmentally, socially and economically.<sup>33</sup> Numbers of established invasive marine species in the UK have more than doubled since 1999.<sup>34</sup> There are currently hundreds of invasive species established in Britain, with an estimated minimum 12 new non-native species establishing every year.<sup>35</sup> The problem of spreading invasive species is demonstrably intensifying in the UK across terrestrial, freshwater and marine habitats.<sup>36</sup> As the numbers of INNS arriving and establishing have increased, so too have their impacts in the UK. The severity of these impacts will only increase as new INNS are introduced, and as those already established expand their range, exacerbated by the effects of climate change.

Key pathways and drivers of INNS dispersal and introduction are also increasing. For example, the horticultural trade - a key pathway for the introduction of INNS into the UK, and the transportation of tree disease. In 2020, imports accounted for 89.8% of all trade value and 82.6% of net mass of trade in plants and plant commodities in the UK. Despite the total net mass of plant and plant commodity trade decreasing slightly from 2019-2020, total net mass in 2020 was at its highest since 2016, standing at 22,669 tonnes.<sup>37</sup> Within this, the net mass of non-EU trade in plants and plant communities between

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<sup>31</sup> DEFRA, (2020) - <https://www.gov.uk/guidance/importing-non-native-animals>

<sup>32</sup> DEFRA, (2021) - <https://www.gov.uk/government/publications/other-live-animalshealth-certificates>

<sup>33</sup> JNCC Biodiversity Indicators, 2021 - <https://jncc.gov.uk/our-work/uk-biodiversity-indicators-2021/>

<sup>34</sup> State of Nature, 2019 - <https://nbn.org.uk/wp-content/uploads/2019/09/State-of-Nature-2019-UK-full-report.pdf>

<sup>35</sup> GB Non-Native Species Report Card, 2017 - <http://www.nonnativespecies.org/downloadDocument.cfm?id=1116>

<sup>36</sup> JNCC Biodiversity Indicators, 2021 - <https://jncc.gov.uk/our-work/uk-biodiversity-indicators-2021/>

<sup>37</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1026652/planthealth-trade-statsnotice-21oct21.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1026652/planthealth-trade-statsnotice-21oct21.pdf)

2016 and 2020 increased by 7.9% to 8,891 thousand tonnes.<sup>38</sup> Similar growth in imports has been seen in tree trade, with a 1450% increase in value (from £6 million to £93 million) of tree imports observed between 1992 and 2019.<sup>39</sup> A reduced reliance upon imports would also deliver other benefits, such as the ability to eliminate peat from the horticultural supply chain – the growing medium of imported plants is rarely known, whilst a UK peat-free market would present economic opportunities for domestic producers and growers.

***b. How should the government prioritise its efforts to identify and respond to these?***

As discussed, the prevention of INNS from arriving and establishing within the UK is both more effective and efficient than managing species once they have arrived, and attempting to eradicate them.<sup>40</sup> Despite this, the UK currently spends more on managing than preventing invasive species damage. Expenditure on control of established invasive species is estimated at £9.85 million per annum – roughly ten times the expenditure on biosecurity (£922,000).<sup>41</sup> Government should therefore shift focus to instead prioritise efforts on improving INNS prevention, tripling the INNS biosecurity budget to £3 million, and as stated, providing a further £3 million for the dedicated INNS inspectorate.

This investment in INNS prevention would facilitate a more strategic approach to invasive species biosecurity and management, allowing for enhancements in rapid response capabilities and greater coordination of control efforts. This would ultimately prevent the establishment of 24 new invasive species and eradicate 10 established invasive species by 2040 - a 50-67% reduction in the number of new introductions and a 5% reduction in established species.<sup>42</sup> This would save the UK economy a total of £2.7 billion over 20 years, a return on investment of £23 for every £1 spent.<sup>43</sup> Further detail is available in our 2020 report '[Prevention is Better Than Cure](#)'.

Furthermore, the government must urgently focus attention on aiding the UK's nursery sector to build capacity and begin to supply more of the demand for trees and plants with domestically sourced and

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<sup>38</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1026652/planthealth-trade-statsnotice-21oct21.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1026652/planthealth-trade-statsnotice-21oct21.pdf)

<sup>39</sup> <https://www.woodlandtrust.org.uk/press-centre/2020/12/cheap-imports-risk-millions-of-trees/>

<sup>40</sup> Wildlife and Countryside Link, 2020 - [https://www.wcl.org.uk/docs/Prevention is Better than Cure Report 2020.pdf](https://www.wcl.org.uk/docs/Prevention%20is%20Better%20than%20Cure%20Report%202020.pdf)

<sup>41</sup> Wildlife and Countryside Link, 2020 - [https://www.wcl.org.uk/docs/Prevention is Better than Cure Report 2020.pdf](https://www.wcl.org.uk/docs/Prevention%20is%20Better%20than%20Cure%20Report%202020.pdf)

<sup>42</sup> Wildlife and Countryside Link, 2020 - [https://www.wcl.org.uk/docs/Prevention is Better than Cure Report 2020.pdf](https://www.wcl.org.uk/docs/Prevention%20is%20Better%20than%20Cure%20Report%202020.pdf)

<sup>43</sup> Wildlife and Countryside Link, 2020 - [https://www.wcl.org.uk/docs/Prevention is Better than Cure Report 2020.pdf](https://www.wcl.org.uk/docs/Prevention%20is%20Better%20than%20Cure%20Report%202020.pdf)

grown produce. Reducing reliance on imports is the most effective way of managing the risk of inadvertently importing serious INNS to the UK.

***f. What further steps should the UK take to maximise our resilience to and preparedness for natural hazards, accidental release, malicious biological threats, and emerging zoonotic pathogens?***

The UK can increase resilience to emerging zoonotic pathogens by taking robust action to prevent the opening of new intensive livestock farms and working to reduce existing numbers, thereby reducing the potential for new outbreaks of zoonotic disease. Less-intensive livestock farming systems offer a safer route, and should be encouraged within the farming transition and supported by high farm welfare standards.

**3: What lessons can we learn from the UK's biological security delivery since 2018, including but not limited to COVID-19?**

***a. Which are the key successes we should look to develop and build on, and where are areas for development?***

The COVID-19 pandemic has meant not only that more people have been spending time outdoors and in nature, but also that there is an improved public understanding and awareness of biosecurity concepts such as testing, quarantine, and preventing the spread of pathogens. This increased interest and awareness should be utilised to raise greater awareness of INNS and the importance of good biosecurity to manage the risks they pose, with both key stakeholders and the general public.

***d. What can we learn from other countries' biological security practises and experiences?***

Other countries have a more precautionary approach to invasive non-native species, from which the UK can learn. For example, countries such as New Zealand have a 'white-list' approach, with non-native species assumed to present a threat unless a scientific risk assessment demonstrates otherwise.

Several European countries have also taken a different, more precautionary approach to tackle problems within the exotic pet trade (as discussed), with the introduction of positive list legislation. 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 have used (Belgium<sup>44 45 46 47 48</sup>, Croatia<sup>49</sup>, Cyprus, Luxembourg<sup>50</sup>, and Norway<sup>51 52</sup>) or are considering (France<sup>53</sup>, Lithuania, the Netherlands<sup>54</sup> and Slovenia<sup>55</sup> – all legally adopted, but list under development; Austria, Denmark, Finland, Italy, Spain, Sweden – all under discussion) 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.

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<sup>44</sup> [http://www.ejustice.just.fgov.be/cgi\\_loi/change\\_lg.pl?language=fr&la=F&cn=2009071608&table\\_name=loi](http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&cn=2009071608&table_name=loi)

<sup>45</sup> [http://www.ejustice.just.fgov.be/cgi/article\\_body.pl?language=fr&caller=summary&pub\\_date=20-12-03&numac=2020043902](http://www.ejustice.just.fgov.be/cgi/article_body.pl?language=fr&caller=summary&pub_date=20-12-03&numac=2020043902)

<sup>46</sup> [https://assets.vlaanderen.be/image/upload/v1615561162/DWZ\\_BVR\\_220319\\_Positieve\\_lijst\\_reptielen.pdf](https://assets.vlaanderen.be/image/upload/v1615561162/DWZ_BVR_220319_Positieve_lijst_reptielen.pdf)

<sup>47</sup> [http://www.ejustice.just.fgov.be/cgi\\_loi/change\\_lg.pl?language=fr&la=F&table\\_name=loi&cn=2018072406](http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&table_name=loi&cn=2018072406)

<sup>48</sup> <https://wallex.wallonie.be/eli/arrete/2020/12/10/2021200297>

<sup>49</sup> [https://narodne-novine.nn.hr/clanci/sluzbeni/2017\\_02\\_17\\_404.html](https://narodne-novine.nn.hr/clanci/sluzbeni/2017_02_17_404.html)

<sup>50</sup> <https://legilux.public.lu/eli/etat/leg/rgd/2018/11/16/a1055/jo>

<sup>51</sup> <http://extwprlegs1.fao.org/docs/pdf/nor149019.pdf>

<sup>52</sup> <https://lovdata.no/dokument/SF/forskrift/2017-05-11-597>

<sup>53</sup> <https://www.legifrance.gouv.fr/jorf/id/JORFTEXT000044387560>

<sup>54</sup> <https://wetten.overheid.nl/jci1.3:c:BWBR0030250&hoofdstuk=2&paragraaf=1&artikel=2.2&z=2020-01-01&g=2020-01-01>

<sup>55</sup> <http://www.pisrs.si/Pis.web/pregledPredpisa?id=ZAKO1353>