House of Commons
Environmental Audit Committee

Invasive species

First Report of Session 2019

Report, together with formal minutes relating to the report

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Environmental Audit Committee

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Invasive species

Summary

Invasive non-native species (INNS) are one of the top five threats to the natural environment. They cost the economy £1.8 billion per year, yet the Government is not providing the funding needed to tackle the threat.

INNS are those that have moved outside of their natural range and negatively affect native biodiversity, ecosystem services and public health, through predation, competition or by transmitting disease. The number of INNS in the UK and its Overseas Territories is among the highest globally and is growing with the expansion of international trade, transport and travel. Around 40 invasive species are expected to become established in the next 20 years in Great Britain and preventing this from happening must be a top Government priority.

It is hundreds to thousands of times cheaper to prevent invasive species from establishing, rather than tackling them once they are established. Biosecurity and closing pathways are critical first lines of defence to prevent the introduction of INNS. Expenditure on biosecurity in Great Britain is approximately £220 million per year, yet invasive species only receive 0.4 per cent of that sum (£0.9m). While the Government’s GB-wide working and Non-Native Species Secretariat is highly regarded, its funding does not match the scale of the challenge. We recommend that its funding is significantly increased to at least £3 million a year.

We support the Government’s latest focus on pathways and prevention, but for it to be effective, there needs to be a step-change in awareness, so that the public can assist in preventing the introduction of species, spot likely invaders and aid eradication efforts. The Government should update and enhance its biosecurity public awareness campaigns and put significantly more resources into engaging members of the public, replicating the approach taken in New Zealand, by training at least two per cent of the population (1.3 million) biosecurity volunteers. This ‘biosecurity citizens’ army’ would be a huge boost to the UK’s resilience to climate change and add significant people power to the fight to eradicate priority invasive species. The Government should also undertake a review of Local Action Groups to identify best practice and enhance their coordination through the Non Native Species Secretariat.

The example of the invasion of oak processionary moth, now established in Greater London from imported oak trees, highlights the importance of swift biosecurity and trade restrictions. We welcome the introduction of DEFRA’s monthly biosecurity meetings to identify future threats, but action has been too little, too late. The Government needs to ensure that with problem species are identified and banned from import before they present a risk to the UK. To improve biosecurity at the UK’s borders and tackle the risks from increased online trade and new trade routes, we recommend that a dedicated inspectorate is established, with similar funding to other such inspectorates.

Invasive plant pathogens are of increasing concern. For example, ash dieback is caused by a non-native fungus and is estimated to cost £15 billion over the next 100 years. Yet pathogens they are not included within the remit of the Invasive Non Native Species Strategy. Given the large threat they pose to the environment and economy, we recommend that the next Invasive Non Native Species Strategy includes invasive...
pathogens since the methods of prevention and control are broadly similar. We recommend that a rapid response emergency fund is established for agencies when they need short term funding to tackle a threat and avoid species spreading out of control, as should have happened when oak processionary moth first arrived in the UK in 2006.

The UK Overseas Territories (OTs) are home to 90 per cent of the UK’s biodiversity and the introduction of invasive species has been recognised as the biggest threat to island biodiversity and caused numerous extinctions. The UK Government funds a range of projects and programmes in the OTs, including infrastructure developments to improve their accessibility and increase tourism. Increased accessibility increases the risk of introducing invasive species. Construction projects have resulted in the introduction of invasive species, such as fire ants in Montserrat. Many of the OTs lack biosecurity legislation and we recommend that this must be established and resourced to ensure that each OT has up to date biosecurity legislation and adequate powers of enforcement by the end of 2020.

Large scale projects to eradicate invasive species, such as those to remove deer and rats from South Georgia, present huge opportunities to restore rare and unique wildlife. Yet these projects are costly and have been largely privately financed in the past. The Government should consider implementing a system to match-fund contributions from private partners for large scale eradication projects where there can be the greatest wins for biodiversity.
1 Introduction

1. Invasive non-native species (INNS) are one of the top five threats to biodiversity worldwide.\(^1\) On average INNS cost the UK economy £1.8 billion per year, mainly affecting agriculture, forestry, horticulture, utilities, construction and transport infrastructure.\(^2\)

2. In April 2019, we launched our inquiry to examine the Government’s progress since our predecessor Committee’s 2014 report: Invasive Non Native Species.\(^3\) As part of our inquiry we held a useful evidence session at St Catharine’s College, Cambridge on biosecurity and the Overseas Territories and had an insightful discussion with the Cambridge Conservation Initiative. We also visited the Walthamstow Wetlands to learn from Thames Water about its approach to tackling invasive species. We received 125 written responses and held four public evidence sessions, hearing from 27 witnesses including academics, non-governmental organisations, trade associations and Government agencies. During Invasive species week (Monday 13 - Friday 17 May) we opened an online discussion forum for members of the public to contribute their views, which received 655 submissions. Finally, we heard from Lord Gardiner, Parliamentary Under Secretary of State for Rural Affairs and Biosecurity, Professor Nicola Spence, Chief Plant Health Officer and Dr Niall Moore, Chief Non-Native Species Officer at DEFRA. We are grateful to all those who hosted us and participated in the inquiry.

Defining invasive species

3. An invasive species is “any non-native animal or plant that has the ability to spread, causing damage to the environment, our economy, human health and the way we live”\(^4\). Non-native species are those living outside their natural range which have arrived by human activity, either deliberately or accidentally. Of these, invasive species are those that negatively affect native biodiversity, ecosystem services and public health, through predation, competition or by transmitting disease. Professor Helen Roy, from the Centre of Ecology and Hydrology (CEH) told us, “when we think of all of the non-native species, it is very important to remember that about 15 per cent are the troublesome ones”.\(^5\)

4. Witnesses to our inquiry stressed that the onus of the definition should be on the human movement of a species, rather than those that have moved on their own accord; so the expansion of a species from mainland Europe into the UK would not be considered a non-native species.\(^6\) Dr Paul Walton from Wildlife and Countryside Link, told us why the distinction is important:

… [INNS are] explicitly those species that have been directly moved by human agency. That can be deliberately through the pet trade and people releasing their terrapins into ponds in Glasgow... There are also the

\(^{1}\) Q1 [Professor Roy], Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). 2019. *Global Assessment Report on Biodiversity and Ecosystem Services*

\(^{2}\) Invasive Species Ireland. 2013. *Demonstrating the costs of invasive species to Britain*; Williams et al. 2010. *The Economic Cost of Invasive Non-Native Species on Great Britain*, CABI; Wildlife and Countryside Link (INV0020);

\(^{3}\) Committee on Climate Change, Adaptation Sub-Committee (INV0049)


\(^{6}\) Q1 [Professor Roy]; Q26 [Dr Walton]; Q76 [Dr Dunn]
hitchhikers, such as flatworms arriving on pot plants. These are species that are moved by direct human agency, and that is really what we need to focus on. It would be a mistake if we were to confuse these two issues and spend our time, effort and resources trying to stop species that are arriving here through climate change.  

5. Others argued that although species that have arrived through climate change may not be considered INNS, their possible impact on the UK should still be assessed and monitored. Climate change is likely to change the areas from which INNS could come, and their range within the UK, the number of species and their composition.  

**Impacts of invasive species**

6. INNS harm biodiversity, animal, plant and human health and bring large economic costs. They are one of the main drivers of global biodiversity loss after land/sea use change, direct exploitation, climate change and pollution. The 2019 UN global assessment report on biodiversity concluded that the numbers of invasive species per country have risen by around 70 per cent since 1970. INNS have contributed to 40 per cent of the animal extinctions that have happened in the last 400 years and are the biggest threat to biodiversity on islands. The number of INSS in the UK and its Overseas Territories is among the highest globally and their presence is growing with the expansion of international trade, transport and travel. We heard that around ten new species become established in the UK each year, and on average, two of these may become invasive.

7. INNS affect plant and animal health. For example, signal crayfish are the main cause of the rapid decline in native crayfish through transmission of crayfish plague. Livestock diseases are known to be carried by invasive ticks and mosquitos. The ash dieback epidemic, caused by a non-native fungus, is predicted to kill half of the UK’s native ash trees with a cost of £15 billion over the next 100 years. Invasive plants can also affect the physical environment and ecosystem function. Himalayan balsam can exacerbate the erosion of riverbanks and Japanese knotweed undermines the structural integrity of buildings (figure 1). These species also outcompete native plants.
8. A small proportion of non-native species established in the UK harm human health. Some of these can be serious such as the spread of Lyme disease by non-native deer, giant hogweed which causes skin rashes and blistering, and the oak processional moth, whose caterpillars can cause skin irritation and breathing difficulties. The INSS posing the greatest threat to human health are mosquitoes and ticks.\textsuperscript{18} Future threats to the UK are also posed by the Asian tiger mosquito (which carries human diseases, including chikungunya and dengue fever) and the Asian hornet which can cause anaphylaxis.\textsuperscript{19}

9. During our inquiry, organisations highlighted the economic costs of INNS to their operations. The City of London Corporation told us it spent close to £100,000 tackling the oak processional moth across its open spaces last year and DEFRA’s eradication of the Asian longhorn beetle in Kent in 2019 cost approximately £2 million.\textsuperscript{20} Thames Water is planning to spend £4.7 million over the next five years and South West Water and several other water companies are investing around £2 million on invasive species management.\textsuperscript{21} The water industry’s research body (UKWIR) concluded that unless action is taken now, the costs to the environment and the economy from INNS will increase exponentially.\textsuperscript{22}

**Governance of invasive species**

10. Major international agreements dealing with INNS have been ratified by the UK including the Bern Convention and the Convention on Biological Diversity (CBD), which

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\textsuperscript{17} Courtesy GBNNSS
\textsuperscript{18} Public Health England (INV0083)
\textsuperscript{19} Defra (INV0035); Public Health England (INV0083)
\textsuperscript{20} City of London Corporation (INV0055); Defra (INV0035)
\textsuperscript{21} Q183
\textsuperscript{22} Anglian Water Services (INV0050)
require parties to prevent their introduction. The Aichi Targets, which fall under the CBD, include a commitment by 2020 that INNS and their pathways are identified and prioritised, priority species are controlled or eradicated, and pathways are managed to prevent species’ introduction and establishment. In 2019 the Government admitted its progress on meeting this target was “insufficient”.

11. The European Commission co-ordinates activity on invasive species across the EU. Since our last inquiry, the EU Invasive Alien Species Regulations have come into force to control INNS entry and spread across the Single Market. It has a three-pronged hierarchical strategy of prevention, early detection and rapid eradication and, finally, management. This recognises that prevention is more cost-effective and better for the environment than dealing with an already-established invasive species.

12. At the core of the EU regulation is the list of Invasive Alien species of Union concern (see Annex). Listed species are subject to restrictions on keeping, importing, selling, breeding and growing. Member States are also required to take action on pathways of unintentional introduction, to take measures for the early detection and rapid eradication of these species, and to manage species that are already widely spread in their territory. There are 49 species listed: 26 animals and 23 plants.

**Domestic legislation**

13. Domestic legislation and regulation of non-native species in the UK is scattered across a large number of overlapping legal frameworks. Introduced prior to the EU regulations, the Wildlife and Countryside Act 1981 (WCA) is the principal legislation dealing with non-native species. The WCA makes it illegal to release or allow to escape into the wild any animal, or to plant or grow in the wild any plant, that is listed in Schedule 9 to the Act. The Natural Environment and Rural Communities Act (NERC) 2006 amended the WCA 1981 and gave the Secretary of State powers to ban the sale of invasive non-native species known to cause damage to wildlife in England and Wales. Subsequently, the Infrastructure Act 2015 amended the WCA to put in place powers to issue species control agreements and species control orders.
Government coordination

14. Invasive species are a devolved policy matter in the UK, although they are not bound by borders. The Government established the Great Britain Non-Native Species Secretariat (GBNNSS) in 2006 to help coordinate work across England, Wales and Scotland.\(^{32}\) There has been a GB-wide strategy since 2009 with the latest version published in 2015.\(^{33}\) Northern Ireland works with the Republic of Ireland in an All-Ireland Forum, on a whole island basis. Professor Peter Robertson from the University of Newcastle, suggested that the remit of the existing GB Programme Board should be broadened to include Northern Ireland, while maintaining a dialogue through the All-Ireland Forum.\(^{34}\)

15. Dr Niall Moore, chief non native species officer at DEFRA, explained that the Government has four biosecurity regimes: animal health, plant health, aquatic animal health (fish health) and bee health. He said these biosecurity regimes had been around for decades, whereas those for invasive species were 40 to 70 years behind.\(^{35}\) Lord Gardiner’s responsibility for biosecurity was only added to the Ministerial role in July 2016. He acknowledged that there was much more to be done:

> Invasive species have not had the recognition that animal, plant and bee health have had. […] This is an area where we are being damaged and we are being damaged because we have not been rigorous enough with it in previous decades and indeed previous centuries. We have been sleepwalking, in my view, over the last 100-plus years.\(^{36}\)

16. The Government has missed its legal targets on invasive species, and we are concerned that they are not receiving the same priority and funding as animal and plant health regimes. We welcome the Government coordinating work on invasive species across England, Wales and Scotland. We recommend it should review whether this should be extended to include Northern Ireland given its lack of executive.

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\(^{32}\) The GBNNSS covers policy and ministerial support, risk analysis, communications and the overseas territories with a team of 4.2 full time equivalent staff.

\(^{33}\) Defra, Scottish Government, Welsh Government. 2015. [The Great Britain INNS Strategy](#)

\(^{34}\) Professor Peter Robertson ([INV0042](#))

\(^{35}\) Q383

\(^{36}\) Q481
2 Prevention and biosecurity

17. In line with European and international agreements, the UK recognises that prevention is the first step in managing the risk of invasive non native species (INNS). Dr Paul Walton from Wildlife and Countryside Link, told us that prevention is preferable to avoid any ecological damage, but also economically “it is hundreds, perhaps thousands, of times cheaper to prevent these problems from happening in the first place than trying to fix them after the event” (figure 2).\textsuperscript{37} Professor Peter Robertson from the University of Newcastle, highlighted that to prevent INNS, it is important to reduce the “propagule pressure”, or rate of arrival of species.\textsuperscript{38} Dr Walton agreed:

> If you can slow that rate down, if you can do something to reduce the rate [for example] at which dangerous shrimp eggs are being released into our freshwater systems, you have a real chance of reducing the probability of establishment. Even what might seem fairly modest biosecurity measures are not a waste of time.\textsuperscript{39}

18. DEFRA expects that, given current rates of arrival, there are likely to be 240 non native species becoming established over the next 20 years, of which between 15 and 20 per cent (36 - 48 species) will become invasive.\textsuperscript{41} Methods for preventing INNS establishing

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\textsuperscript{37} United States Government Accountability Office. 2015. Aquatic invasive species, p14
\textsuperscript{38} Q4
\textsuperscript{39} Q4
\textsuperscript{40} United States Government Accountability Office. 2015. Aquatic invasive species, p14
\textsuperscript{41} DEFRA (INV0127). Across Great Britain. In addition, the species that are now limited in extent (e.g. ring-necked parakeet, quagga mussel, killer shrimp, Alpine newt, pitcher plant etc.) will spread and those already widespread will continue to impact and many will also continue to spread (e.g. American skunk cabbage, Himalayan balsam, Japanese knotweed, Rhododendron, Giant Hogweed, signal crayfish, demon shrimp, muntjac, sika and American mink)
include closing down pathways, enhancing biosecurity at ports and borders, raising public awareness and preventing secondary transfer, horizon scanning and risk assessing new threats.\footnote{42}

**Pathways and their control**

19. Pathways are the routes of introduction and spread of INNS.\footnote{43} In May 2019, the Government published its comprehensive pathway analysis, required by the EU Regulations.\footnote{44} DEFRA told us that by assessing 1,954 established non-native species in GB, eight unintentional pathways had been prioritised, with an extra two added from analysis of species of Union concern.\footnote{45} These are: (1) hull fouling,\footnote{46} (2) horticulture escapes, (3) contaminants of ornamental plants, (4) ballast water,\footnote{47} (5) stowaways on fishing equipment, (6) other stowaways, (7) contaminants of aquaculture animals, (8) ornamental escapes (from wildlife collections), (9) pet escapes and (10) zoo or botanic garden escapes.

20. Biosecurity and pathway control measures are critical as the first line of defence to prevent the introduction of non-native species.\footnote{48} These measures range from banning the import of animals or plants that pose a particular risk; inspections at borders, farms and nurseries; imposing quarantines; treating or destroying affected plants and animals; and monitoring emerging disease risks worldwide.\footnote{49}

21. The 2015 INNS Strategy stated that once pathways are identified, it would “seek to identify and give priority to those pathways that pose the greatest risk and develop pathway action plans (PAPs) for priority pathways”.\footnote{50} We asked Dr Niall Moore from DEFRA, what progress had been made on the PAPs, given the UK’s comprehensive pathway analysis was a year late:

… we have not sat around waiting to do the pathway analysis. We have actually been taking some forward. We agreed an action plan on zoos and aquaria back in 2016 and we are working on ones for recreational boating and angling at the moment, which we think are key ones that we want to tackle.\footnote{51}

22. DEFRA estimates that between 36 and 48 new invasive species will become established in the next 20 years in Great Britain. Slowing the rate of arrival of invasive species is the first priority to prevent their establishment and we heard that even the smallest biosecurity measures are worth taking.

\footnotesize
\begin{itemize}
\item \textsuperscript{42} Defra, Scottish Government, Welsh Government. 2015. \textit{The Great Britain INNS Strategy}
\item \textsuperscript{43} The IAS Regulation
\item \textsuperscript{44} Defra. 2019. \textit{Comprehensive Pathways Analysis}. The EU Regulations require Member States to carry out comprehensive pathways analysis within three years and to draw up an action plan to address priority pathways for species of EU concern
\item \textsuperscript{45} Defra (INV0035)
\item \textsuperscript{46} Where species attach to the hulls of ships
\item \textsuperscript{47} Ballast water is carried by ships for stability it is taken up or discharged when cargo is unloaded or loaded, or when a ship needs extra stability in poor weather and can carry thousands of aquatic or marine microbes, plants and animals
\item \textsuperscript{48} The IAS Regulation
\item \textsuperscript{49} House of Lords European Union Committee. \textit{Brexit: Plant and Animal Biosecurity}, 21st Report of the 2017–19 Session, HL191
\item \textsuperscript{50} Defra, Scottish Government, Welsh Government. 2015. \textit{The Great Britain INNS Strategy}
\item \textsuperscript{51} Q402; GBNNSS. 2016. The \textit{Zoos Pathway Action Plan}
\end{itemize}
23. We welcome the publication of the Government’s comprehensive pathway analysis and recommend that it completes pathway action plans for all ten of its listed priorities by the end of 2020.

Trade

24. Invasive species rely on human movement, the rise in air and sea transport of goods and people, including a threefold increase in travel in the last 20 years, has significantly increased the numbers of invasive species globally.\(^{52}\) Biosecurity refers to a set of precautions that aim to prevent the introduction and spread of harmful organisms.\(^ {53}\) The UK currently follows EU legislation on biosecurity, with decisions on implementing biosecurity measures made predominantly at an EU level. The UK also benefits from EU-wide intelligence gathering and disease notification systems, systems for tracing plant and animal movements, and coordinated research efforts.\(^ {54}\) In the event the UK leaves the EU, it will not be automatically part of this framework.\(^ {55}\)

25. Leaving the EU is also likely to lead to changes in trade patterns. Dr David Aldridge from St Catharine’s College Cambridge, observed that “trade patterns historically have been fantastic predictors of invasion pathways” and since we have traded more with Europe in the past 25 years, 88 per cent of the invasive species that have arrived in the UK were first detected in Europe.\(^ {56}\) He went on to explain:

In fact, we can quite reliably predict what the next invaders are by watching them spread across Europe towards the UK. There is about a four-year lag before we detect them in the UK. At the moment we have a very powerful tool by working with partners in the European Union to see what is coming next and to start to prepare.\(^ {57}\)

26. Dr Aldridge warned that if the UK increases trade further afield then it will not be able to learn from approaches by European neighbours. He was most concerned about trade with South America and Asia bringing in INNS.\(^ {58}\) Many of the new and novel species reaching the UK through trade routes arrive as “stowaways” or hitchhikers. Stowaways on passenger planes are a major and expanding source of INNS introductions. Ports have also found to be “epicentres of invasion”.\(^ {59}\)

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\(^{52}\) IPBES. 2019. Global Assessment Report on Biodiversity and Ecosystem Services Summary for policy makers; see also National Farmers Union (NFU) (INV0028)

\(^{53}\) Forestry Commission and APHA. 2018. Prevent the introduction and spread of tree pests and diseases

\(^{54}\) These are the Animal Disease Notification System (ADNS), the Rapid Alert System for Food and Feed (RASFF), the European Alien Species Notification System (EASIN NOTSYS) and the European Union Notification System for Plant Health Interceptions (EUROPHYT).


\(^{56}\) Q163

\(^{57}\) Q163

\(^{58}\) Qq163–164

Marine ballast water

27. Around 90 per cent of the world’s trade is carried by ship.\(^{60}\) Professor Helen Roy from CEH, described how global shipping is a key pathway for INNS, transported through ballast water and hull fouling:

> It is the species that attach to the hulls but also some of the species will hitchhike within the ballast water, such as little species of plankton, zooplankton, tiny immature stages of animals and plants that can move around. With shipping moving at the kind of scale that it does, species can come from far and wide.\(^{61}\)

28. Prevention is the only real mechanism of reducing the impacts of INNS in the marine environment as, once they are established, they are expensive and rarely feasible to remove.\(^{62}\) There are a number of provisions which would afford increased protection, for example, ensuring vessels arriving or leaving UK waters have stringent hull cleaning and for all ships to have a ballast water management plan.\(^{63}\) Our predecessor Committee recommended in 2014 that the Government should “immediately move to ratify the International Convention for the Control and Management of Ships’ Ballast Water and Sediments (BWMC)” to tackle the threat of invasive species.\(^{64}\) Yet the UK has still not acceded to the Convention.\(^{65}\) The Institute of Marine Engineering, Science and Technology (IMarEST) told us this was “disappointing” and explained that over 80 International Maritime Organization Member States have acceded to the Convention, representing over 80 per cent of global shipping tonnage.\(^{66}\)

29. In February 2019, the Department for Transport said that the UK was still collating the data and information required to complete the legislative process.\(^{67}\) We asked Professor Elizabeth Cottier-Cook from the Scottish Association of Marine Science, whether she considered that more data was needed before the Convention could be ratified:

> **Professor Cottier-Cooke:** All the evidence is there. Hundreds of publications have been produced. I don’t get it; I really don’t get it.

> **Professor Thomas:** As something of a doubter in this field, I think it is madness that we have not done this.\(^{68}\)

\(^{60}\) International Maritime Organisation. [Overview](https://www.imar.org.uk/overview) (Accessed 15/06/2019)

\(^{61}\) Q5

\(^{62}\) Biosecurity Research Initiative at St Catharine’s (BioRISC) (INV0039)

\(^{63}\) Centre for Ecology & Hydrology (INV0027)

\(^{64}\) Environmental Audit Committee. 2014. *Invasive non-native species*, Fourteenth Report of Session 2013–14, HC 913. The International Convention for the Control and Management of Ships’ Ballast Water and Sediments (also known as the Ballast Water Management Convention) came into force in 2017 requiring ships to manage their ballast water and sediments in line with their ballast water management plan, and to carry a ballast water record book and an International Ballast Water Management Certificate


\(^{66}\) Institute of Marine Engineering, Science & Technology (IMarEST) (INV0052)

\(^{67}\) International Convention for the Control and Management of Ships’ Ballast Water and Sediments: Written question 223798

\(^{68}\) Qq64–65
30. We asked Lord Gardiner why there had been no action, five years on from our predecessor Committee’s recommendation. He responded:

I have had discussions with colleagues in the Department for Transport, and I will put my neck out and say that I think this is an issue that we should address and get done. [...] Invasive species are arriving at an alarming rate, particularly since the Ponto-Caspian species, which are arriving because of the navigability through from the Black Sea. In the Rhine there are species that will eventually reach us. 69

31. We asked the Department for Transport for an update on progress. Ms Nusrat Ghani, Parliamentary Under-Secretary at the Department for Transport, responded:

This work was rescheduled in order to ensure that the legislation reflects the newest amendments to the Convention which were accepted by the International Maritime Organization in April 2019. We are committed to completing the regulations and acceding to the Convention in 2020. 70

32. Despite 80 other countries implementing the Ballast Water Management Convention the Government has further delayed its implementation to 2020, six years after it was first recommended. We echo Lord Gardiner’s concerns that invasive species are arriving on ships to our island nation at an alarming rate and consider this would prove to be a simple measure to limit the arrival of new species. *The Government must urgently accede to the Ballast Water Management Convention at the earliest possible opportunity.*

**Trade restrictions**

33. While the UK follows EU decisions on biosecurity, it is able to take recommendations to the EU standing Committee on specific species where it believes there is a threat. If the EU decides not to take EU-wide action then national measures, such as banning trade in a species, can be taken if there is evidence that it poses a national threat. 71 Lord Gardiner highlighted the example of *Epitrix* (potato flea beetle) and how the Government moved to ban the import of Spanish potatoes through a Statutory Instrument. The approach taken to biosecurity by Australia and New Zealand was raised by a number of witnesses as being exemplary. 72 They operate a strict white list, which only allows entry to species listed, whereas the UK operates a black list, instead specifying species that are not allowed in. We asked Dr Richard Shaw, Centre for Agriculture and Bioscience International (CABI), whether the UK needed to change its approach:

There are 2,000 species plus a few hundred on the black list, and those are the ones you perhaps need to prevent. It is a big step to change to a white list system from a black list system. New Zealand is much more efficient.
because literally everything is banned unless it is on the list to come in. That is how you would really prevent it, but that is probably a step way too far as far as imports and trade are concerned in this region.\textsuperscript{73}

**Horticulture**

34. The Government’s comprehensive pathway analysis showed that two of the top five pathways related to plants: horticultural escapes and contaminants of ornamental plants. Most established non-native species in GB have arrived for ornamental purposes as garden plants and for landscaping (figure 3).

35. There is significant evidence that the main pathway of spread for many pests and diseases is on/in plants for planting, their compost, timber, wood packaging material and firewood. Invasive plant pathogens are of increasing concern.\textsuperscript{75} For example, ash dieback caused by a non-native fungus, was first reported in 2012, and is now present in all English counties.\textsuperscript{76} The outbreak occurred as UK ash trees were raised in a nursery in the Netherlands, and then imported back into the UK carrying the disease. The British Ecological Society said that it had been known since 1992 that ash trees in continental Europe were affected by ash dieback, and this information should have been used as a warning sign against importing products which could carry this devastating fungal disease.\textsuperscript{77}

\textsuperscript{73} Q356
\textsuperscript{74} GBNNSS. 2017. GB Non-Native Species Report Card
\textsuperscript{75} Pathogens are disease causing organisms which affect plant and animal health are diverse and include fungi, nematodes, bacteria and viruses.
\textsuperscript{76} Committee on Climate Change, Adaptation Sub-Committee (INV0049)
\textsuperscript{77} British Ecological Society (INV0054)
36. There are 47 other known tree pests and diseases that could arrive in Britain which may cost an additional £1 billion or more to manage. Wayne Grills from the British Association of Landscape Industries, told us about the challenges of preventing pests and diseases entering the UK:

We now have over 1,000 pests and diseases on the Plant Health Risk Register. We have about 100 more each year coming in, so that is the kind of issue that we have to deal with. [...] Xylella has an incubation period of up to six months, so plants can look very healthy when they come through the borders, but some of these things that are being imported from Europe can be in the ground within 48 to 72 hours of ordering.

Imported trees - Oak processionary moth

37. Oak processionary moth (OPM) was first discovered in the Kew area of London in 2006. OPM caterpillars are a threat to plant, animal and human health. Large numbers can strip an oak tree bare and leave it vulnerable to pests, diseases and other stresses like drought (figure 4). It also poses a threat to human health, as contact with the caterpillar hairs can cause itching skin rashes, eye irritations, sore throats, breathing difficulties and, in rare cases, allergic reactions in people and animals.

![Figure 4. Oak processionary moths.](image)

The species gets its name from the distinctive processing behaviour of the caterpillars which tend to move in nose-to-tail lines.

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78 Woodland Trust ([INV0121](INV0121)) and Confor ([INV0012](INV0012))
79 Q179
80 Forest Research, [Oak Processionary Moth](http://Accessed 12/06/2019)
81 Courtesy of Tony Kirkham, RBG Kew
38. OPM came into the UK as eggs on imported trees from the Netherlands. After initial discovery in 2006, early control efforts had limited success—in part due to a lack of coherent response and an overall coordinating body. Dr Anna Brown from the Forestry Commission, said it was not clear whether it was a plant health issue or a public health issue, so there were delays while it was determined who should lead the response. In 2011 following the spread of the species across south west London, the Government’s policy objective changed from eradication to containment. The Forestry Commission now combines rapid response to any new outbreaks with containment of spread. If left unchecked, the species would probably spread across the country.

39. In 2018, legislation was introduced to restrict the import of trees over 1.2m tall, with a girth of over 8cm, since these trees posed the greatest threat. Yet these controls have not worked as outbreaks of OPM continue in 2019. In July 2019, the Government strengthened its import restrictions further. The UK will only permit imports of certain oak trees, including those from OPM free countries, those from designated pest-free areas including Protected Zones (PZ) - an area of the European Union declared free of OPM and those that have been grown under complete physical protection for their lifetime. The Woodland Trust told us that, whilst it welcomed the stronger legislation, it believes its UK Sourced and Grown (UKSG) biosecurity assurance scheme is the only reliable mechanism to prevent infected trees arriving in the UK.

40. We asked Professor Nicola Spence from DEFRA, what the Government was doing to prevent other plant pathogens, like Xylella, arriving in the UK:

Under the regulations on olive trees, you can only import olive trees if they have additional declarations to show that they have been tested and shown to be free of Xylella, have a plant passport and they are all inspected. We do have strict regulations; however, we are currently reviewing that. We feel that we probably need to do more, particularly on olive.

[...] We are looking currently at what the legal options are. We would take national measures. We will discuss it with the EU standing committee to see whether the Commission is prepared to do more. If not, then we will consider national measures, which we would put to Ministers in the next few weeks.

41. DEFRA officials were keen to stress that the Department has developed monthly biosecurity meetings, chaired by Lord Gardiner since the ash dieback outbreak in 2012, which “look at animal health risks, plant health risks, bee health and invasive species in the round”.

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82 Evans. 2007, Proposal for Oak Processionary Moth Rapid Reaction response prepared by Forest Research on behalf of the Forestry Commission’s Plant Health Service
84 RBG Kew. Oak Processionary Moth [Accessed 05/06/2019]
85 DEFRA. 2018. Oak Processionary Moth National Measures
86 DEFRA, APHA, Forestry Commission. Horticulture industry urged to check for Oak Processionary Moth, Press release, 28 June 2019
87 DEFRA, APHA, Forestry Commission. Tighter restrictions on oak tree imports come into force, Press release, 12 July 2019
88 Woodland Trust (INV0121)
89 Q401
90 Q425
91 Q425
42. The import of trees and plants represents a significant pathway for the introduction of invasive species and invasive plant pathogens. We have been disappointed with a lack of engagement from the horticultural trade sector during our inquiry, with limited evidence being presented on what measures the industry is putting in place to prevent outbreaks. The example of the oak processionary moth invasion highlights the importance of swift biosecurity and trade restrictions and better coordination across Government Departments. The Government’s new regulations are welcome, but they are too little, too late. It must be ready to legislate for other risks as soon as they are identified.

43. We welcome the introduction of DEFRA’s monthly biosecurity meetings, but, given the risks and based on past performance, the Government needs to ensure that these result in action with problem species identified and banned from import before they present a risk to the UK. It should also work to support the UK horticulture industry to ensure that it relies less on imports. Given the Government’s intention to plant more trees, for example the northern forest, it should produce guidance for the public sector in its procurement of trees and mandate a biosecurity assurance scheme.

**Border inspections**

44. Some witnesses called for improvements in border control. The Biosecurity Research Initiative at St Catharine’s (BioRISC), suggested that the UK should prioritise resources on more effective border controls and quarantine facilities. It highlighted that borders focussed mostly on economic pests and rarely addressed the issue of stowaways or those accidentally transported. The National Farmers Union called for more resources to ensure border inspections are robust and investment in expertise to understand the potential threats and the various pathways for INNS. Professor Peter Robertson, who previously worked for the Animal and Plant Health Agency (APHA), told us that changing trade patterns post-Brexit could be mitigated by:

- Investment in an inspectorate dedicated to the interception of invasive species at the border.
- A programme of horizon scanning of new and emerging risks associated with changing patterns of trade.
- Early engagement with new trading partners to help identify and manage high risk pathways of introduction.

45. Dr Paul Walton from Wildlife and Countryside Link highlighted that there are biosecurity arrangements in place for plant and animal diseases with dedicated inspectorates, but none for invasive species despite their increasing numbers. He too supported the creation of a specific inspectorate for invasive species. Lord Gardiner’s response to this idea was:

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92 E.g. Biosecurity Research Initiative at St Catharine’s (BioRISC) (INV0039); Wildlife and Countryside Link (INV0020); National Farmers Union (NFU) (INV0028)
93 Biosecurity Research Initiative at St Catharine’s (BioRISC) (INV0039)
94 National Farmers Union (NFU) (INV0028)
95 Professor Peter Robertson (INV0042); see also Q16–17
96 Q6
97 Q16
Yes. The concept of an inspectorate is something we should consider, given that we have other inspectorates. I certainly am more than sympathetic to that consideration. It is something that in the spending review we will be looking at because it is vital that we raise the bar on the considerations of invasive species.98

Dr Moore added that he and his colleagues had identified 51 potential duties of an invasive species inspectorate or enforcement functions, of which 39 are not covered by existing inspectorates.99 DEFRA also told us that its updated horizon scanning exercise planned for 2019 will take into account possible changes in future trading relationships.100

E-commerce and market place bans

46. The risk of increased numbers of invasive species arriving through e-commerce was raised by several witnesses.101 While there are a number of invasive species listed in current legislation (EU IAS Regulation, Wildlife and Countryside Act) and there are restrictions on the sale and intentional spread of these species, a number of websites (e.g. ebay, gumtree) and local retailers continue to sell these species, sometimes unintentionally (without knowledge of current legislation) and sometimes mislabelled as a native species. We heard that as consumer behaviour changes, the threat from the e-commerce pathway is likely to rise significantly.102 The Ornamental Aquatic Trade Association (OATA) told us that there needs to be an effective way of dealing with e-commerce. It said it has repeatedly sent examples of illegal aquatic plant sales found on eBay and Amazon to the APHA as the relevant regulator but as yet, the only action available to them is to advise sellers about the law.103 OATA told us it consistently advised against the sale and keeping of five aquatic plants in the early 2000s, all of which are key problem species today: Water Fern, Parrot’s Feather, Floating Pennywort, Water Primrose and Australian Swamp Stonecrop. The Government only banned their sale in 2014.104

47. We asked Lord Gardiner what he would do about the increased risk of invasive species arriving through e-commerce. He responded:

Action this day. Absolutely, whether you buy it online or at a nursery, they should be subject to absolutely the same biosecurity arrangements. We are getting a lot of the aquatic plants because of people who dispose of them irresponsibly. That is why we have them in ponds and watercourses. If it is emerging that online trading is proving a route for banned species and it is not being satisfactorily dealt with by the online retailers, we must take action, yes.105
48. There is a risk that changing trade routes if we leave the EU could allow more invasive species to arrive from South America and Asia. Online trade is a new and significant risk for introducing invasive species and although regulations are in place, there is an enforcement and penalty gap. We welcome DEFRA’s consideration of establishing a dedicated INNS inspectorate. We recommend this is established by the end of 2020 with similar resourcing to other inspectorates, to improve biosecurity at the UK’s borders and tackle the risks from increased online trade and new trade routes. Should the Government engage in new bilateral trade deals, invasive species must be factored into risk assessments and enhanced biosecurity measures introduced at points of entry, where risks are identified.

Public awareness of biosecurity

49. Many of the key pathways identified in the Government’s Comprehensive Pathway Analysis involve the general public or groups such as recreational water users like anglers, boaters and hikers. INNS can be introduced accidentally or deliberately, dumped from gardens and aquariums. CEH suggested that improved biosecurity should be the aim of public awareness campaigns. Kate Hills from South West Water described the challenges of raising public awareness:

A lot of people are talking about biosecurity. I do not think a lot of people know what it means. The public has just got used to the term “biodiversity” and now we have introduced this rather dull new subject. It is being talked about. It is not being done properly.

50. To date, Government campaigns have focussed on aquatic biosecurity through its Check Clean Dry and Be Plant Wise campaigns. Check, Clean, Dry aims to raise awareness amongst recreationists and water users to check, clean and dry their equipment to halt the spread of invasive species. The Be Plant Wise campaign is designed to raise awareness, among gardeners, pond owners and retailers, of the damage caused by invasive aquatic plants and to encourage the public to dispose of these plants correctly. CABI told us that “the Check-Clean-Dry campaign is widely quoted as a great example of education and engagement, Be Plant Wise is a little less well known”. Dr Alison Dunn told us that the campaigns are effective, but public awareness of the biosecurity campaigns is declining:

Check Clean Dry and Be Plant Wise are flagship campaigns by DEFRA and we have found that where people are aware of those campaigns, their biosecurity behaviour does change, but awareness is not very high. In fact, I think it may even, over the last few years, have gone down. 

106 GBNNSS. Comprehensive pathway analysis 2019, May 2019
107 Centre for Ecology & Hydrology (INV0027)
108 Q261
109 Thames Water (INV0018). Clean check dry was developed by Defra, the Environment Agency and other stakeholders (Royal Yachting Association (RYA), British Rowing, Canoe England and Angling Trust)
110 Be Plant Wise was launched by Defra and the Scottish Government. The Horticultural Trade Association, Ornamental Aquatic Trade Association, Royal Horticultural Society and Plantlife support the campaign.
111 CABI (INV0053)
112 Q68
51. Dr Wayne Dawson from the University of Durham, said that these Government campaigns had been successful, as had those that educated people not to dump plant waste over garden fences, yet he highlighted that biosecurity campaigns beyond the aquatic environment may be needed:

There probably needs to be a more sustained public awareness campaign for all sorts of different species, particularly those that can be released from dumping from horticulture but also the pet trade. Very recently, I saw [a terrapin] in the River Wear in Durham; it had clearly been let out by somebody who did not want it any more. I do think there needs to be a more sustained campaign.  

52. A 2017 consumer attitudes survey suggested that plant buyers’ awareness of pests and diseases is low, both in terms of the general threat to British trees and woodlands from pests and diseases, and of the individual pathogens posing a threat. DEFRA told us that, should it get extra funding in the spending review, then it will “revive” its leaflets on terrestrial plants, pond plants and its general leaflet. Lord Gardiner added that this summer it has “stepped up at ports and airports the work on “Don’t Risk It” and “Check, Clean, Dry””. DEFRA explained why it had focussed on freshwater plant species:

The resources have been limited, so we have concentrated our efforts particularly on “Check, Clean, Dry” and, as the Minister said, trying to keep out these Ponto-Caspian freshwater species from getting here. That is why we have also concentrated our efforts on those pathways of angling and recreational boating.

DEFRA told us that it thought it needed “an extra £120,000 to £200,000 per year” for communication, which might help to leverage money from the private sector.

Role of citizen science

53. Professor Helen Roy described the importance of citizen science, where members of the public help to identify invasive species:

It is amazing what people can do, what they can identify and how they can get involved. As a volunteer, I run the Harlequin ladybird survey. That species of ladybird is quite colour/pattern variable, so you would think it might be quite tricky, but it is amazing how good people can get at spotting a species, if they get enough information. That kind of information flow to the people on the ground is very important for connecting them to the decision making that they are ultimately going to be part of.
Many witnesses recognised New Zealand as a “world leader” in biosecurity and praised its Biosecurity Strategy 2025 (see box).

### New Zealand Biosecurity Strategy 2025

The strategy aims to make every New Zealander a biosecurity risk manager and to get every business managing their own biosecurity risk. To achieve this the following targets were set for 2025:

- 75% of adult New Zealanders understand what biosecurity means and why it is important
- 100,000 New Zealanders regularly take action to control plant or animal pests in their community (400,000+ people currently are estimated to be part of a community group that manages weeds or pests)
- 90% of relevant businesses are actively managing pests and disease risk associated with their business. The initial focus will be on the five international risk pathways: craft, mail, cargo, passengers, and express freight. Later this will be extended to domestic risk pathways, such as coastal shipping and movement of equipment between farms.

Baselines for each of these targets were researched in March 2018.

Biosecurity skills - New Zealand has a target that by 2025 at least 150,000 people with identified skills can be quickly drawn on to provide support and respond to biosecurity outbreaks in New Zealand.

54. Dr Shaw from CABI explained what would be needed for the UK to establish a similar strategy:

New Zealand has a Biosecurity 2025 plan where they are training 150,000 people to do just that—to be trained to operate in the field and implement biosecurity. That equates, if you multiply the population, to 2 million people in Britain, and the budget they have put in is equivalent to £83 million a year if you take the number of people as a ratio. […] That is the best in the world. We are not the worst in the world, but we have a long way to go to get to that level.

### Secondary transfer

55. Another aspect of biosecurity is preventing the secondary spread of species. Dr Aldridge said he was worried about the transfer of INNS between water bodies where they can spread rapidly and be difficult to control. There are multiple pathways into the

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120 Q18; Q24; Q165; Q180; Q261; British Ecological Society (INV0054); CABI (INV0052); Institute of Marine Engineering, Science & Technology (IMarEST) (INV0051); Anglian Water Services (INV0050); Biosecurity Research Initiative at St Catharine’s (BioRISC) (INV0039); PML Applications Ltd (INV0037); Yorkshire Invasive Species Forum (YISF) (INV0032); Yorkshire Integrated Catchment Solutions Programme (iCASP) (INV0019); Wildlife and Countryside Link (INV0020);
121 New Zealand Government. Biosecurity 2025 [Accessed 20/05/2019]
122 Q334
123 Q132
freshwater environment, from agriculture, tourism, recreation, and environmental/ water management. The public may unwittingly transfer species through recreational activities such as canoeing, Dr Alison Dunn explained:

Things can become attached; small propagules and things can become attached to your equipment. For example, your canoe often has a bit of water in the bottom at the end. I might come out of a river and I might have all sorts of things—fragments of plants, and one fragment of crassula [New Zealand pigmyweed] or Japanese knotweed can form a whole new colony, as can the odd killer shrimp. All these things can be moved around.\footnote{124}

56. Many of the water companies’ written evidence highlighted the need to raise awareness around invasive species and biosecurity practices among water recreationists.\footnote{125} Dr David Aldridge told us that international water sports events could be one of the main pathways of “contaminants” or stowaways arriving in the UK:

If we look at the two major invaders that have established in the UK in the last five or 10 years, the killer shrimp arrived in Grafham Water in 2010, and the quagga mussel arrived in Rosebery Reservoir in 2014, and these species have subsequently spread to other reservoirs, sometimes separated by long distances, so it is very likely the major pathways here are either water sports events or angling.\footnote{126}

57. Dr Dunn said that the risks can be “vastly improved by good biosecurity practices”, by having facilities to wash down equipment and encouraging people to use them.\footnote{127} Dr Emily Smith from the Angling Trust, told us that for the World Lure Championship held in 2018, it had translated biosecurity advice into 11 different languages and distributed it to participants before they arrived in the UK to limit the number of species brought in.\footnote{128} Richard Atkinson from British Canoeing, told us how they are starting to have biosecurity stations at some of their competitions to encourage participants to wash down their boats after big events.\footnote{129}

58. Kate Hills, South West Water, highlighted the limited number of pre-washdown stations available, and told us how South West Water were installing the first pre-washdown station in Britain.\footnote{130} She explained the difficulty of installing and implementing such facilities:

It is working out how to do it. How many boats or fishing people do you get to an event? How much water do you need to wash that down? Have all the sites got hot water? What do you do with that contaminated water? How big a sump do you need to collect that? You can filter out the big bits, but how do you treat the little bits and the rest of it? Then, what do you do with the rest of that water?\footnote{131}
Invasive species

Water transfers

59. Dr Alison Dunn told us that water companies were “very good on biosecurity around equipment, movement and people”, but the risk from water transfers between water companies were on a different scale. Water transfers are schemes designed to move water between water resource zones either within the same company or between companies or a third party. A transfer may take place via piped network links of raw (untreated) or treated water or utilise river, canal or natural transfers. The need for water transfers is likely to increase with climate change as water availability changes in different regions.

60. Work is already under way to develop plans for new strategic transfers between water companies including a transfer between United Utilities, Severn Trent and Thames Water; and transfers from Thames Water to Affinity Water and Southern Water. Water Resources in the South East told us that clarity and certainty is needed over the standards required and what, if any, mitigation measures are acceptable to prevent the spread of INNS.

Without clear and consistent standards, companies are at risk of progressing transfer schemes which ultimately are not feasible, wasting customers’ money and risking timely critical resilience.

It said that this needed to be provided early in the option screening process, so that schemes which risk the transfer of invasive species that cannot be reasonably mitigated can be discounted and alternative options identified. Phil Brewin from the Association of Drainage Boards said it may not be feasible to control INNS at the point of transfer and it would be “much more practical to try to prevent them infesting the watercourse in the first place”.

61. Many of the key pathways for INNS involve the general public and specific user groups such as anglers and boaters. It is vital therefore that they are aware of the risks and how to minimise them. In light of the increased resourcing provided to DEFRA at the 2019 Spending Review, we recommend that it revives its public awareness campaigns on invasive species and broadens them further than their present focus on aquatic plants. We recommend that a baseline survey is also conducted to determine the effectiveness of campaigns.

62. We have been impressed by New Zealand’s approach to train 150,000 people in biosecurity by 2025. The same approach in the UK would equate to two million trained members of the public which would add a significant biosecurity resilience resource. The Government should significantly expand its approach to public engagement to reach a minimum of two per cent of the population (1.3 million) to help identify invasive species and respond to biosecurity outbreaks. This ‘biosecurity citizens’ army’ would be a huge boost to the country’s resilience to climate change and add significant human resources to the fight to eradicate priority species.
63. **We support Water Resources in the South East’s demand for clear guidelines on water transfers, and call on Government to work with water companies to develop guidance and standards to manage the risks involved. The starting point should be that the transferring company should be certified as INNS free before a transfer takes place.**

**Horizon scanning**

64. Regular horizon scanning exercises are needed to identify future threats from INNS. The Government’s last assessment was conducted in 2014 and was effective in identifying species that became invasive in the following years, such as the quagga mussel and Asian hornet. BioRISC told us that the effectiveness of EU and UK regulations, based on blacklisting unwanted species, is compromised since a quarter of new invasive species were not known to be problematic in their country of origin. Describing the 2014 exercise, Dr Aldridge noted:

> In the last five years, I think eight of that top 10 have established in the UK, so that might show that we are very good at predicting future invaders, but probably we are rubbish at preventing them from establishing. Horizon scanning is good but it is only good if we can then do something with that information.

65. BioRISC said that without horizon scanning to consider probable invasives and systematic reviewing of the evidence to plan responses “we are likely to be ill-prepared for future arrivals”. DEFRA told us that it was concerned about “sleeper species”, which are already present in the UK that may develop invasive qualities triggered by climate change. Kathryn Brown head of adaptation at the Committee on Climate Change, said that the UK is not taking a risk-based approach when horizon scanning for future INNS:

> We highlighted [in the climate change risk assessment] a gap that there are an awful lot of studies and an awful lot of very good, amazing research looking at specific species, but that what was missing was a more risk-based approach, thinking about these unknown invasives that will be coming along, of which we may not get much warning—do we have the processes in place to deal with those on the hoof where maybe we don’t have much early warning?

66. Wildlife and Countryside Link was concerned that leaving the EU would bring additional work for horizon scanning and retaining a list of priority invasive species in domestic UK law:

> DEFRA’s proposal to replace current access to the EU IAS Scientific Forum with existing UK agencies and organisations risks INNS legislation being inadequately underpinned by, and responsive to, up to date and accurate...
information, science and data. These UK bodies do not, to our knowledge, currently possess the relevant expertise or data processing capacity to carry out this role effectively.144

67. Prof Robertson told us the UK has been a significant contributor to the new EU Regulation and maintaining this collaboration is to the advantage of both sides. He recommended close cooperation with the European Commission and seeking observer status on key committees would be a valuable element of this.145

68. DEFRA said a horizon scanning exercise, using expert consensus techniques, will be carried out in 2019—expanding on its 2013 exercise—to include species of plants that are present in the wild but not yet invasive (these were excluded from the 2013 exercise).146 They told us that access to the EU Invasive Alien Species Information System would be available within three months of any update as it is a publicly available system. DEFRA officials were keen to stress that the EU had copied the UK’s risk assessment methodology and therefore the Government had the expertise to do this in the future.147 When asked about additional staff and resources for this work, Dr Moore said:

I do not think we need anything extra. As part of the bid we were developing, we were anticipating there might be an extra need, but I am pretty sure we can function with what we currently have for our risk analysis.148

Lord Gardiner added:

with our monthly biosecurity meetings—and shorter than that, if necessary—we are, through our horizon scanning, constantly refreshing and revising where there could be threats from invasive species because our principal objective is to prevent arrivals.149

69. The UK is very good at horizon scanning for new invasive species, but is poor at taking action as a result. The Government needs to be more proactive, using its horizon scans to inform border authorities and inspectorates of new threats before they arrive.

70. The UK will need to replace the European Commission’s invasive species functions in the event we leave the EU. We are satisfied that the expertise for this exists, but question whether extra funding may be needed to replace its role. The Government must ensure that there is ongoing collaboration with the EU on research and the list of species of Union concern to counter new risks.
3 Tackling invasive species

Rapid response

71. Where potential INNS have been identified by horizon scanning, the Government develops pathway measures to lower the risk of arrival (e.g. American lobster, many aquatic species, zoo escapes etc.) or prepares contingency plans to prevent their establishment (e.g. for raccoons, Asian hornet).\textsuperscript{150} DEFRA outlined that it had successfully delivered rapid responses to the Asian tiger mosquito and the Asian hornet but this “will continue to be challenging and require considerable vigilance”.\textsuperscript{151}

72. Dr Shaw from CABI praised the Government for its early detection and rapid response to the Asian hornet, saying it was “an exemplar” performance from Government.\textsuperscript{152} Lord Gardiner told us how 40,000 registered beekeepers have been engaged in early detection and surveillance. The Government has created an app called Asian Hornet Watch which members of the public can use to report sightings. The Centre for Ecology and Hydrology conducts a triage process and sends out an inspector if there is a credible sighting.\textsuperscript{153} Professor Helen Roy told us “so far, every one of the Asian hornets has been successfully eradicated”.\textsuperscript{154} Dr Moore from DEFRA said it was a model of good practice and that DEFRA had changed its response, moving away from developing action plans, towards taking action:

Rather than developing plans for the sake of plans, we would prefer to concentrate on actions. We are attempting to eradicate monk parakeets, topmouth gudgeon, water primrose and variable-leaf water milfoil, and we have a whole string of other new priorities we would like to tackle as well.\textsuperscript{155}

73. He explained how the Government had learned from past experience:

The ring-necked parakeet is a great example of where we failed way back when. [...] rather than tackling them when there were about 500 or 1,000 individuals [...] back in about 1995 or 1996. We ducked the issue and commissioned research. By the time that was done, we were looking at a situation where we now have 30,000 and 40,000 and the population is rising. Ministers previous to Lord Gardiner decided we would not do the same with monk parakeets when the population was beginning to take off. It was at about 100 or 120. We now have it down to 20 and they will be gone within two or three years.\textsuperscript{156}
74. Dr Austin from the Environment Agency told us that it was still aiming to have eradicated topmouth gudgeon by 2021. Dr Smith from the Angling Trust told us that the Government’s approach was well coordinated for tackling certain species (e.g. Asian hornet, water primrose and topmouth gudgeon), but for others, such as floating pennywort, it has been “quite slow to respond”. She added that this was very much dependent on whether there was funding for a specific species.

**Long term control and management**

75. Long term control and management is the final approach to dealing with invasive species in the hierarchy. This is due to the high costs involved with long-term management, and the challenges involved in eradicating well-established INNS from their environments.

**Enforcement of the EU Regulation**

76. For widely spread species of Union concern, the EU IAS Regulation requires effective management measures to be put in place, to minimise their impacts. The Government has confirmed that the Invasive Alien Species (Enforcement and Permitting) Order 2019 is due to come into force on 1 December 2019. 14 of the 49 species listed as ‘species of Union concern’, including grey squirrels, muntjac deer and floating pennywort, have been identified as being widely spread in England and Wales and will require effective management measures. We heard that the only realistic prospect of management for these species would be an on-going commitment to their long-term control, which turns the focus on prevention upside down, prioritising management.

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157 Q349
158 Q247
159 Article 19, EU Regulation No. 1143/2014 on the prevention and management of the introduction and spread of invasive alien species
159 These are species whose potential adverse impacts across the European Union are such that concerted action across Europe is required. In the UK the full list includes: Nuttall’s waterweed, Chilean rhubarb, Giant hogweed, Floating pennywort, Himalayan balsam, Curly waterweed, American skunk cabbage, Parrot’s feather, Egyptian goose, Chinese mitten crab, Muntjac deer, Signal crayfish, Grey squirrel and all subspecies of Trachemys scripta otherwise known as “slider terrapins”.
160 Professor Peter Robertson (INV0042)
Grey Squirrels

Since the non-native invasive grey squirrel (*Sciurus carolinensis*) was first introduced to England in 1876 and Ireland in 1911, it has spread throughout the British Isles, becoming the most widely distributed and abundant squirrel species in the UK.\(^\text{162}\)

Current estimates of the grey squirrel populations fall anywhere in the range of 2.5 and three million, while the native red squirrel is estimated at 140,000. Grey squirrels are linked to the decline in the red squirrel through the transmission of squirrel pox virus and they are also associated with environmental and economic damage to forestry.\(^\text{164}\)

The grey squirrel is considered a priority invasive species, featuring on the list of species of Union concern as it is currently not widespread across the rest of the EU. Without conservation management, red squirrels could become extinct in England in approximately ten years.\(^\text{165}\)

**Grey squirrels – a strategic approach?**

77. The proposed enforcement provisions for grey squirrels mean that Natural England will no longer issue release licences for grey squirrels - in future, rescued and rehabilitated grey squirrels cannot be released back into the wild.\(^\text{166}\) The majority of the written evidence we received around squirrels was not in favour of the changes to enforcement and did not support lethal methods of eradication for species that are widespread, citing animal welfare reasons.\(^\text{167}\) The RSPCA told us:

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\(^\text{163}\) © Craig Shuttleworth/Red Squirrel Survival Trust. 2010.

\(^\text{164}\) Q468


\(^\text{166}\) Defra. 2019. *Invasive non-native species and grey squirrels.* This move will bring England into line with Wales, Scotland and Northern Ireland, where release licences are not issued

\(^\text{167}\) E.g. RSPCA ([INV0001]); Tiggywinkles Wildlife Hospital ([INV0104]); Urban Squirrels ([INV0072]); Pan Orthodox Concern for Animals ([INV0112]); Pamela High ([INV0089]); Sally Carr ([INV0082])
... species already widely established in the UK, such as grey squirrels and muntjac deer should be tackled at a local level where there is a threat to existing indigenous species such as the red squirrel but their widespread nature means it will be impossible to put in place an eradication management plan at a UK level.\textsuperscript{168}

78. Dr Paul Walton from Wildlife and Countryside Link highlighted the need for strategic action on grey squirrels, citing Scotland as a good example of such practice:

It is a strategy agreed by the Scottish Government and NGOs, which is basically three strands. You have red squirrels in the Highlands and there is a cordon sanitaire along the Highland boundary line where grey squirrels are controlled to prevent them going on; there is a pocket of grey squirrels up in Aberdeen and a localised eradication going on there that is almost successful; and then there is control of the squirrel pox-infected animals coming up across the Tweed to try to protect some red squirrel pockets in southern Scotland. That is a very strategic approach, not killing every grey squirrel. It is about taking that strategic approach to it in the context that we know that there is going to be further spread of grey squirrels, potentially.\textsuperscript{169}

79. Urban Squirrels, a licensed wildlife rescue unit that specialises in grey squirrels, raised the concern that despite the EU Regulation requiring management measures which are based on an analysis of costs and benefits, no risk assessment in relation to grey squirrels in the UK has been undertaken.\textsuperscript{170} While there is evidence that grey squirrels cost the UK economy an estimated £6–10 million per year, much of this cost is attributed to control, rather than recorded losses (i.e. reduced timber yield).\textsuperscript{171}

80. The Government launched a consultation on its approach to INNS management measures on 18 July 2019.\textsuperscript{172} It stated that exemptions for particular species would not be consistent with EU Regulations. Defra told us that for the grey squirrel specifically, it was working on a method of control using fertility bait, to stop them reproducing.\textsuperscript{173} When pressed on whether the Government would be undertaking eradication of the grey squirrel, Lord Gardiner told us:

Our requirement under the EU regulations is that eradication is one of those options, but of course we are seeking an eradication or seeking containment, particularly in the areas where there are red squirrels. This work, we think, with the fertility bait is the one that will arrive at that solution.\textsuperscript{174}

\textsuperscript{168} RSPCA (INV0001)
\textsuperscript{169} Q24
\textsuperscript{170} Urban Squirrels (INV0072)
\textsuperscript{171} Williams et al. 2010. The Economic Cost of Invasive Non-Native Species on Great Britain, CABI
\textsuperscript{172} DEFRA. 2019. Consultation on invasive species management measures
\textsuperscript{173} Q468
\textsuperscript{174} Qq469–473
Invasive plants and biological control

81. Dr Shaw from CABI, explained the difficulty of managing invasive plants since they can rapidly reproduce:

> It takes just one plant at the top of the river chucking out seed and it reinvades, so you cannot really operate at that catchment scale. But the fungus does not know any boundaries. It will spread wherever it can. The same goes for Crassula where we have very sensitive sites. It seems to know the scientific quality status of a site before it invades it. It seems to know where to be in Ramsar sites and SSSIs. It is almost impossible to control. We have spent a lot of money trying things like hot foam and liquid nitrogen in desperation. […] With floating pennywort, the tiniest fragment is a disaster ...

![Image](image.png)

Figure 5. Floating Pennywort, Walthamstow, London.

82. There are four methods of controlling invasive plants: mechanical, chemical, natural and environmental. Chemical controls for invasive plants in water are limited as they could be distributed through the freshwater system. Chemical control, though effective,
Invasive species can be very costly. CABI has estimated that to attempt to eradicate Japanese Knotweed with chemicals would cost around £1.6 billion. Chemical control of this and other species has been deemed unsustainable and work for some time has focused on biological control.

83. Biological control or ‘biocontrol’ uses a species’ own predators against them. These biocontrol agents can be bacteria, fungi, viruses, or parasitic or predatory organisms, such as insects. Biocontrol has the potential to play an important role in freshwater habitats where the chemical and mechanical control of invasive species is impractical or prohibitively expensive. Since April 2011, Defra, the Welsh Government and Natural England have been funding CABI to investigate biological control options for invasive, non-native aquatic and riverside weeds. In the past, biological control has had a poor reputation because species have been introduced with no natural predators that in turn become invasive, but Dr Shaw from CABI explained how thorough the process now is for identifying control species for plants:

You cannot get past the cane toad story, which was an act of madness with a vertebrate predator that will eat anything it can fit in its mouth. These are specialist natural enemies. You have talked about oak. There are plenty of species that feed only on oak and will never feed on anything else. That is what we seek in biocontrol. Japanese knotweed has 186 insects feeding on it. We found only one that was specific enough to be considered for release. It is an incredibly thorough host-range testing process and safety testing. Our careers are on the line, as much as the UK environment.

84. Dr Shaw told us that CABI was working on solutions to Japanese knotweed, Himalayan balsam, Crassula helmsii and floating pennywort with Government funding under the EU Water Framework Directive. He said he has a weevil from Argentina which is a voracious feeder of floating pennywort in CABI’s quarantine facility, and it is being reviewed to see whether it is safe to release. Dr Shaw also highlighted the importance of early research to identify biocontrols:

It is something that New Zealand and Australia start, the moment they have a serious invader that is out of control, they start a biocontrol programme, knowing that, in five to 10 years, they may have a potential solution. But it is not a guaranteed success.

85. We welcome the Government funding biological controls for invasive plants and we are reassured that the risks are being thoroughly assessed prior to their release into the natural environment. The Government should look to rapidly expand support for biocontrol research in the future.

178 CABI. Establishing the psyllid: field studies for the biological control of Japanese knotweed. [Accessed 13/06/2019]
179 Commonwealth Scientific and Industrial Research Organisation - CSIRO. 2019. Biological Control of invasive species
180 CABI. 2018. Progress with Weed Biocontrol projects
181 For example, The rapid spread of Australia’s cane toad pests, BBC news, March 2017
182 Q354
183 Q352; Defra, Scottish Government, Welsh Government. 2015. The Great Britain INNS Strategy
184 Q352
185 Q352
Responsibilities

86. The Government directly supports the management of about 20 species across GB, covering about 10 per cent of the most invasive species. Its strategy includes four main types of long-term management: large scale eradication, containment, control and mitigation. The British Ecological Society (BES) said that implementation of the GB INNS strategy has been hindered by lack of funding or clear lines of responsibility. In many cases, the responsibility for management is devolved to landowners to locally reduce damage to biodiversity, crops, forestry and fisheries, or to developers to reduce the risks of spread (e.g. Japanese Knotweed).

87. Dr Aldridge from St Catharine's College told us that a lack of defined responsibilities was hampering action. He illustrated this with the example of the gulf wedge clam, found in a Lincolnshire ditch in 2015. He said:

It now occupies a 10-kilometre stretch of this river. It is nowhere else in the UK … We know it is driving ecological change, but we have not done anything about it.

… to control that clam and to eradicate it would cost about £30,000. We are not talking about a lot of money, but time and time again we see different stakeholders, different companies saying, “You do something about it,” “No, you do something about it.” The problem is that when these things arrive early on, they are not necessarily causing an economic or an ecological problem. We only tend to be reactive when the costs start to ramp up, and by that stage it is too late.

88. The Environment Agency told us it was “well aware” of the clam and did not “currently believe that there is a risk of that spreading beyond that point”. Dr Austin explained that the responsibility of the landowner is to prevent further spread of those species, but there is “not necessarily give a duty to eradicate”. The Environment Agency spends £2m a year managing invasive species, including a major £650,000 floating pennywort eradication operation in 2017. We asked Dr Austin if it would it be useful for the Environment Agency to have the responsibility for invasive species containment, rather than the landowner:

Responsibility is fine as long as it comes with funding. It is for Government to decide how to allocate the funding and how to allocate that responsibility.

89. Phil Brewin from the Association of Drainage Authorities, considered that there was a role for Government to support landowners in their management of invasive species:

there is the potential here to unlock the capacity of landowners themselves and farmers. We should really be looking at the new environmental land

187 British Ecological Society (INV0054)
188 Professor Peter Robertson (INV0042)
189 Q177
190 Q178
191 Q315
192 Qq318–319
193 Q296, Q314
194 Q299
management scheme. There is an opportunity to fund farmers for tackling things like invasive species and helping us not only achieve favourable condition but sustain it in the long term in the face of pressures like climate change.\(^n\)\(^{195}\)

90. In law, landowners have the responsibility for invasive species, yet there is no enforcement method for Agencies to compel them to tackle invasive species or provide funding for them to act or to act on their behalf. The management of invasive species should feature as one of the public benefits in the Government’s new environmental land management scheme that is to be developed under its Agriculture Bill. We regret the delay to this important piece of legislation and urge the Government to introduce it early in this new Parliamentary session.

**Scope of the Government’s strategy - pathogens**

91. The GB INNS strategy covers the terrestrial, freshwater and marine environments but does not include non-native genetically modified organisms, bacteria or viruses, nor animal or plant diseases. Wildlife diseases, including those affecting invertebrates (e.g. crayfish plague) and plants (e.g. ash dieback), are increasingly harming UK biodiversity and threatening livestock health and public health and wellbeing.\(^n\)\(^{196}\) Professor Thomas considered disease as the biggest challenge to biodiversity and the largest gap in knowledge when it comes to non-native species.\(^n\)\(^{197}\) The scope of the GB INNS Strategy includes invasive species that carry disease,\(^n\)\(^{198}\) but does not cover animal or plant diseases such as ash die back, sudden oak death or chytrid fungus.\(^n\)\(^{199}\) Plant health policy covers both invasive plant pests and plant diseases, including invasive plant pests and diseases, such as the oak processionary moth.\(^n\)\(^{200}\) Both Professor Cottier Cook from the Scottish Association of Marine Science and Dr Dawson from Durham University, told us that a more holistic approach was needed to tackle invasive pathogens, particularly as horticulture is a major pathway of invasive plants, pests and pathogens.\(^n\)\(^{201}\)

92. Kathryn Brown from the Committee on Climate Change said that the Government’s approach should be more joined up:

… when we think about [climate] adaptation we don’t think about invasive species as a separate policy from pathogens and diseases. To us, they are all wrapped up together. At the moment, the policy landscape across Government treats these things very separately.\(^n\)\(^{202}\) […] We think there is a gap in the policy response.\(^n\)\(^{203}\)

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195 Q288; see also Professor Peter Robertson (INV0042)
196 Professor Andrew Cunningham (INV0126)
197 Q81
198 For example the grey squirrel, signal crayfish and the tiger mosquito would all be the invasive species that may or may not have damaging impacts independently of the diseases they carry.
199 Defra (INV0035); Defra, Scottish Government, Welsh Government. 2015. *The Great Britain INNS Strategy*. The amphibian chytrid fungus, *Batrachochytrium dendrobatidis*, which originates from South East Asia and has devastated amphibian populations and caused around 90 species extinctions globally.
201 Q80
202 Q22
203 Q23
93. The Committee on Climate Change also suggested that there was a need for better integration of human health issues within the Secretariat. Dr Brown from the Forestry Commission told us that she did not think the separation of pathogens was a problem since they were able to target specific strategies to each industry and audience. She added that the 25 Year Environment Plan provided an overarching umbrella under which the different strategies sat. Richard Shaw from CABI considered that as long as it was not passed like a “hot potato between two different Departments, then it was okay.” He commented that confusion at the EU level was not helping:

Plant health regulations are very clear. The invasive species regulation in Europe is supposedly separate to plant health, but recently the EU has done a risk assessment on the box tree moth caterpillar, which is clearly a plant health issue. It is a very strange greying of the lines, in my opinion.

94. We asked Lord Gardiner whether he would consider including pathogens in the next version of the GB INNS Strategy, he replied:

The reason pathogens are not included in the invasive species strategy is because they are already included through the EU and ourselves in animal health and, from Professor Spence’s point of view, in the plant health regimes and regulations, so they are covered. Nicola will have considerable knowledge of all the areas of pathogens on the plant health side, but they are designed so that animal health regulations and plant health regulations—the invasive ones—all absolutely meet, but pathogens are dealt with within animal and plant health regulations.

95. We consider there needs to be a more joined up policy approach with pathogens included in the scope of the GB Non Native Species Secretariat and Strategy, particularly diseases affecting wildlife. We recommend that the next Invasive Non Native Species Strategy includes invasive pathogens given the large threat they pose to the environment and economy and since their methods of prevention and control are broadly similar.

Funding

96. Dr Niall Moore from DEFRA explained that the other four biosecurity regimes, (animal health, plant health, aquatic animal health (effectively fish health), and bee health), have been around for decades, whereas for invasive species, “we are about 40 years behind our plant health colleagues and 70 years behind our animal health colleagues.” Professor Pete Robertson, from the University of Newcastle, told us that compared to other regimes such as plant health, the amount spent on INNS was “tiny.” We asked DEFRA to provide a comparison of funding. This is detailed in table 1:
Table 1: Comparison across the biosecurity spectrum of annual expenditure, level of threat and success.

<table>
<thead>
<tr>
<th>Regime</th>
<th>Spend (£m)</th>
<th>% Spend</th>
<th>Listed species</th>
<th>Establishments in last 20 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal Health</td>
<td>200</td>
<td>91.2</td>
<td>53</td>
<td>0</td>
</tr>
<tr>
<td>Plant Health</td>
<td>13.2</td>
<td>6.0</td>
<td>409</td>
<td>9</td>
</tr>
<tr>
<td>Aquatic Animal Health</td>
<td>3.1</td>
<td>1.4</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>Bee Health</td>
<td>2.2</td>
<td>1.0</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>INNS</td>
<td>0.9</td>
<td>0.4</td>
<td>49</td>
<td>25 (17–33)</td>
</tr>
<tr>
<td>Total</td>
<td>219.4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

97. Overall expenditure on GB biosecurity is approximately £220 million per year, with invasive species receiving 0.4 per cent of this. Phil Brewin told us “there isn’t a great deal of funding for invasive species control. [Internal Drainage Boards] are generally funding it out of our normal maintenance budgets”. He said a particular problem was that funding was available for projects but not for daily routine actions that would avoid future costs. Dr Smith from the Angling Trust, also made a plea for more sustained funding. Kate Hills, from South West Water, agreed and said there was not enough funding for management projects. She explained:

To have effective control, you need to be strategic, collaborative, and co-ordinated at the right scale, with the right resource. [...] The local action groups do some brilliant work, but I worry that it is not necessarily at the top of the catchment, moving down; it is more piecemeal, which means it may not be worthwhile. It needs a much more strategic, co-ordinated, resourced approach.

Local Action Groups

98. Local action groups (LAGs) were established by DEFRA under the 2009 GB INNS Strategy. Some groups cover a county or region, whilst other are focussed on a single river catchment. BES said that funding for LAGs was “inadequate” and suggested that they need to be expanded to ensure an even spread, with guaranteed long-term funding and professional regional LAG coordinators. Anglian Water described the coordination and action at the local level “patchy” and said they are not “achieving the necessary impact”.

99. Lord Gardiner explained that DEFRA funded the establishment of the LAGs between 2011 and 2015, spending £1.5m to get them up and running. Of the 29 LAGs set up, just 18 are still active (see Annex). Dr Moore said the New Forest has one of the most active...
ones, controlling around 17 species and The Norfolk Mink Project is doing fantastic work on mink at a large level.\footnote{Q41; Q42} We asked whether there was an intention to provide funding in the future for LAGs:

**Dr Moore:** Yes, and this is part of the bid or bids we will be putting together. We have earmarked roughly £300,000 for this. However, there is work going on with RAPID LIFE, which is an EU LIFE-funded project to develop regional invasive species management plans, RIMPs, which are like the GB strategy but at a regional level. That is a three-year project finishing in 2020. We use that as a model, plus the Water Framework Directive funding from 2011 to 2015, to see how much funding we would need.

**Lord Gardiner of Kimble:** The question may no doubt be what happens after exit. We will be continuing with a new DEFRA LIFE team and it will oversee the LIFE projects in England, including replacing the EU-agreed contribution. It is very important that that work continues and we recognise that.\footnote{Q490–492}

Government and Agency funding

100. The review of the GB INNS Strategy in 2014 found that there were shortcomings in the Government’s approach—in particular around a lack of funding for rapid responses compared with long-term control, and the need for more resources targeted towards eradicating species where it is considered feasible.\footnote{Q42} There are six main government agencies responsible for delivering INNS actions related to biodiversity.\footnote{DEFRA (INV0127)} The GBNNS programme board noted in 2019, that “spend by GB agencies on INNS is low compared to the total spend on biodiversity: less than 2.3 per cent of the total”.\footnote{DEFA (INV0127)}

101. Despite the GB INNS Strategy prioritising prevention and rapid response over long-term control, Prof Robertson told us that a significant amount of the NNSS budget was being mis-spent on long term management on campaigns for squirrels or the ruddy duck.\footnote{Q42} In most cases, long-term management involves an ongoing, perpetual commitment to funding a particular form of management. Prof Robertson warned that often these forms of management are ineffective because the funding runs out.\footnote{Q30} He considered that more money should be directed towards prevention:

Currently we do spend the vast proportion of the money that is out there on the management of existing problems. Shifting that, so that we spend more on prevention, for me requires extra funding, and extra direction, and a focus on prevention so that we plug the hole in the bottom of the boat rather than spending a large amount of money trying to bail out a boat without first fixing the holes in the bottom.\footnote{Q42}
102. DEFRA’s evidence does not contest this point and says that most of its INNS expenditure is on long-term control rather than prevention and early warning (probably over 80 per cent). It told us “we are not currently eradicating all species that could be considered a priority for eradication in GB. We therefore need to consider expanding our current effort to include additional species”.

The GBNNNS has set out its future resource requirements for existing and likely future priority rapid responses. For 13 of the species it needs specialist capacity to respond rapidly to them (table 2).

Table 2. DEFRA’s Rapid response eradication priorities.

<table>
<thead>
<tr>
<th>Generic group</th>
<th>English name</th>
<th>Status</th>
<th>Specialist team</th>
<th>Cost to complete</th>
<th>Likely to need escalation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terrestrial vertebrates</td>
<td>American Bullfrog</td>
<td>Ongoing</td>
<td>No</td>
<td>£10k</td>
<td>No</td>
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<tr>
<td></td>
<td>Monk Parakeet</td>
<td>Ongoing</td>
<td>✓</td>
<td>£60k</td>
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<tr>
<td></td>
<td>Ruddy Duck</td>
<td>Ongoing</td>
<td>✓</td>
<td>£270k</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Aesculapian Snake</td>
<td>Priority established</td>
<td>?</td>
<td>£75k</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Pallas’s Squirrel</td>
<td>Contingency</td>
<td>✓</td>
<td>£50k</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Indian House Crow</td>
<td>Contingency</td>
<td>✓</td>
<td>£30k</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Coypu</td>
<td>Contingency</td>
<td>✓</td>
<td>£50k</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>South American Coati</td>
<td>Contingency</td>
<td>✓</td>
<td>£50k</td>
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</tr>
<tr>
<td></td>
<td>Raccoon Dog</td>
<td>Contingency</td>
<td>✓</td>
<td>£50k</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Raccoon</td>
<td>Contingency</td>
<td>✓</td>
<td>£50k</td>
<td>No</td>
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<tr>
<td></td>
<td>Fox Squirrel</td>
<td>Contingency</td>
<td>✓</td>
<td>£50k</td>
<td>No</td>
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<td></td>
<td>Siberian Chipmunk</td>
<td>Contingency</td>
<td>✓</td>
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<td>No</td>
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<td></td>
<td>Sacred Ibis</td>
<td>Contingency</td>
<td>✓</td>
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<td>No</td>
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<td>Terrestrial plants</td>
<td>Purple Pitcher-plant</td>
<td>Priority established</td>
<td>No</td>
<td>£200k</td>
<td>N/A</td>
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<tr>
<td></td>
<td>Sea Myrtle</td>
<td>Priority established</td>
<td>No</td>
<td>£10k</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Japanese Stiltgrass</td>
<td>Contingency</td>
<td>No</td>
<td>£10k</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Chilean Needle Grass</td>
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<td>No</td>
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<td></td>
<td>Asiatic Tearthumb</td>
<td>Contingency</td>
<td>No</td>
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<td>N/A</td>
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<tr>
<td>Terrestrial invertebrates</td>
<td>Asian Hornet</td>
<td>Contingency</td>
<td>✓</td>
<td>£200k</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Note: Ongoing = species which are an ongoing rapid response priority; Priority established = species which are already established in GB and which are potential priorities for rapid eradication; Contingency = species not yet in GB which are likely priorities for a rapid response eradication should they arrive.
<table>
<thead>
<tr>
<th>Generic group</th>
<th>English name</th>
<th>Status</th>
<th>Specialist team</th>
<th>Cost to complete</th>
<th>Likely to need escalation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshwater animals</td>
<td>Topmouth Gudgeon</td>
<td>Ongoing</td>
<td>✓</td>
<td>£560k</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>White River Crayfish</td>
<td>Priority established</td>
<td>?</td>
<td>£50k</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Marbled Crayfish</td>
<td>Contingency</td>
<td>?</td>
<td>£50k</td>
<td>No</td>
</tr>
<tr>
<td>Freshwater plants</td>
<td>Water Primrose</td>
<td>Ongoing</td>
<td>No</td>
<td>300k</td>
<td>N/A</td>
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<tr>
<td></td>
<td>Fanwort</td>
<td>Priority established</td>
<td>No</td>
<td>£100k</td>
<td>N/A</td>
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<tr>
<td></td>
<td>American Watermilfoil</td>
<td>Contingency</td>
<td>No</td>
<td>£50k</td>
<td>N/A</td>
</tr>
<tr>
<td>Marine</td>
<td>American Lobster</td>
<td>Contingency</td>
<td>?</td>
<td>£50k</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Japanese Sting-Winkle</td>
<td>Contingency</td>
<td>?</td>
<td>£75k</td>
<td>N/A</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>£2,510k</td>
<td></td>
</tr>
</tbody>
</table>

103. Prof Robertson added that “few agencies have the resources to respond to the unpredictable nature of invasive non-native species arrivals, and applications for grants or between-year bids for funds can lead to significant delays”. Sara Redstone from Royal Botanic Gardens, Kew, echoed these concerns for local authorities:

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Certainly, when oak processionary moth first arrived in the Kew area, one of the most significant time lags was areas that the local authority were responsible for, because you had to identify the pest, then present a plan of action to the environment committee, and once the environment committee recommended a course of action, it needed to go to the finance committee. There is possibly a role for central Government or maybe an agency to have funding available so that a rapid reaction is definitely possible wherever the pest or invasive species occurs.
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Prof Robertson also advocated that a central fund for rapid responses to invasive species should be established, held or facilitated by a coordinating agency, which can then support rapid responses at short notice. Dr Austin from the Environment Agency said that it “could be a better way forward” from the strategic perspective of priorities. Yet he warned that it could have a negative impact by removing the incentives for individual departments to enhance biosecurity. Dr Brown from the Forestry Commission said there “would be merits in having a contingency fund for outbreaks” but added that DEFRA is quite good at managing a different range of issues.

104. We asked Lord Gardiner why the overall budget for INNS was so small. He replied:

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You have hit upon something we should be and are going to be considering as part of our forthcoming spending review proposals. I cannot say any more than that, but we recognise that with invasive species being one of the
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230 Professor Peter Robertson (INV0042)
231 Q335
232 Professor Peter Robertson (INV0042)
233 Q344
234 Q344
five major adverse impacts on our environment, we need to raise the bar on this. There is very good work going on. We need to do more of it. It needs to be more comprehensive.  

105. DEFRA agreed to provide us with its latest estimates of funding carried out by the NNSS on behalf of the GB Non-native Species Programme Board from July 2019. These are shown in table 3 as additional sums to current funding on an annual basis. The Government has since announced its Comprehensive Spending Review which included £30m for domestic biodiversity. At the time of writing it is unclear where this funding will be allocated.

Table 3. DEFRA’s Key areas for increased investment are (on an annual basis): The extra requirement is therefore in the region of £1,125k. This would give a total expenditure of just under £2.2M, still below expenditure on the Bee Health regime. Funding the highest priorities would cost £405k extra and including the high priority (communications) would increase this to £525k.

<table>
<thead>
<tr>
<th>Priority</th>
<th>Key Areas for increased investment</th>
<th>Extra funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest</td>
<td>Alert system</td>
<td>£20k</td>
</tr>
<tr>
<td>Highest</td>
<td>Specialist capacity for rapid response</td>
<td>£175k</td>
</tr>
<tr>
<td>Highest</td>
<td>Additional rapid response funding</td>
<td>£210k</td>
</tr>
<tr>
<td>High</td>
<td>Communications</td>
<td>£120k (depending on external contributions)</td>
</tr>
<tr>
<td>Medium</td>
<td>Local Action</td>
<td>£340</td>
</tr>
<tr>
<td>Supporting</td>
<td>Coordination</td>
<td>£60k</td>
</tr>
<tr>
<td>Supporting</td>
<td>Research</td>
<td>£200k</td>
</tr>
</tbody>
</table>

106. The Government has shown that it can effectively coordinate action on tackling certain invasive species, notably in its approach to the Asian hornet. It is vital that the public are aware of the key species that need a rapid response and where alert systems exist, so they can contribute to the process. The main blocker to effective rapid response and eradication of invasive species is funding and as part of this, expert capacity. Invasive species receive a fraction of the budget that other plant and animal health regimes do, despite their high environmental cost.

107. For widespread invasive species, we support the Government meeting the requirements of the EU Regulations, but it must take a risk based approach, taking into account the costs and benefits of action and the balance of funding should fall to prevention and rapid response.

108. Funding to the Non Native Species Secretariat must be increased to at least £3 million a year to meet its key priorities. This would ensure that rapid responses to threats are undertaken with the specialist capacity required, saving on long term management costs. The Government should also establish an emergency fund for rapid responses where agencies need short term funding to tackle a threat.

109. We welcome the valuable contribution made by volunteers in Local Action Groups, which is a good model akin to the New Zealand approach. Yet the Government should take a more strategic, coordinated and resourced approach. We regret that one third of the Local Action Groups established by DEFRA no longer exist. The Government
should fund Local Action Groups on a long term (five yearly basis) and coordinate them through the Non Native Species Secretariat. It should also undertake a review of Local Action Groups to identify where best practice can be replicated and rolled out across the country.
4 UK Overseas Territories

110. The UK has specific constitutional and legal responsibility for 14 Overseas Territories (OTs) including ensuring their security and good governance. With the exception of Antarctica, they are all islands or groups of islands (figure 6). The UKOTs are home to over 94 per cent of the UK’s marine and terrestrial biodiversity and they are fundamental to regional and international marine conservation. Some of their species and habitats are found nowhere else on earth.

111. As islands, UKOTs are particularly vulnerable to INNS which have been recognised as the biggest threat to island biodiversity, as well as to food security and sustainable development. Part of their vulnerability stems from them being home to species that have evolved over thousands of years without many predators, competitors and disease. Some of these are rare and found nowhere else on earth. The St Helena olive, Ascension crake and various other species, have already gone extinct while others, like the critically

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237 Marine Management Organisation and Centre for Environment Fisheries and Aquaculture Science. Blue Belt Programme annual update 2017/18. See also Defra call for evidence
238 94 per cent of British endemic species are found within the Territories. 28,000 native species and 85 per cent of the Critically Endangered species (for which the UK Government is responsible) are within the Territories.
239 Location of the British Overseas Territories, courtesy of Wikimedia Commons Geord0
240 Key and Moore. 2017. Tackling invasive non-native species in UK Overseas Territories. Proceedings of the international conference on island invasives. See also Professor Chris D Thomas (INV0114)
241 British Ecological Society (INV0054); UK Overseas Territories Conservation Forum (INV0019)
endangered Tristan albatross and Turks and Caicos rock iguana, are under direct threat from invasive species. Catherine Wensink from the UK Overseas Territories Conservation Forum highlighted some of the key challenges UKOTs face:

Most of the territories are small islands with small populations and small economies, which often lack the technical expertise to make decisions on forward planning in terms of invasive species. There are also resource issues with funding.

**Introduction of invasive species**

112. The UK Government funds a range of projects and programmes in the OTs, including infrastructure developments to improve their accessibility and increase tourism. Not only does the increased accessibility increase the risk of introducing invasive species, but the construction of these developments can, and has, resulted in the introduction of invasive species. Catherine Wensink told us about the new airport in Monserrat which introduced fire ants from Antigua, and DFID’s St Helena airport project is believed to have accidentally introduced two to three plant species to that island. When asked how species are introduced, Jonathan Hall from the RSPB explained:

Equipment is one of the most common methods—bringing in diggers or JCBs. Tyres are famous transporters of mosquitoes with little areas of water in them. […] In 2016, an assessment of US cargo being brought into the US base on Ascension found that over 50% of the containers inspected contained live invertebrates; there were also live geckos and dead frogs by the time they were found. One of the key links for Ascension on risk is from the US resupplies coming from Florida, so much more of a similar environmental context than bringing in something from the Falklands over to the UK.

Ascension Island is due to undergo an airport resurfacing project which is being led by the US Government but with Ministry of Defence funding and partial oversight.

113. Jonathan Hall from the RSPB told us that most OTs either lack any biosecurity legislation or have very old legislation that was developed for agricultural and health reasons over 50 years ago. He told us biosecurity officers are “not backed up by legislation or any enforcement powers or preventive measures that they can legally take”. Even in territories with reasonable biosecurity legislation such as South Georgia and the South Sandwich Islands there are challenges associated with limited staff and the need to rely on external assistance. Dr Mark Belchier from the South Georgia Government told us:

The South Georgia Government probably has a maximum of eight people who do not necessarily have the specialist skills to be experts across all facets of biosecurity. We are very lucky in having close partnerships with
the British Antarctic Survey to draw on that expertise, but that access probably is not available to other OTs to draw on similar experience based elsewhere.\textsuperscript{251}

114. The GBNNSS has been running a four-year FCO Conflict, Stability and Security Fund (CSSF)-funded programme to strengthen biosecurity across the Territories.\textsuperscript{252} A gap analysis found that Territories with the highest capacity were the sub-Antarctic territories of South Georgia and South Sandwich Islands, the British Antarctic Territory and St Helena. A group of nine had the lowest capacity which were Turks and Caicos Islands, British Indian Ocean Territory, Cyprus Sovereign Base Areas, Montserrat, Ascension Island, Anguilla, Bermuda, Tristan da Cunha and Pitcairn.\textsuperscript{253} Prevention was the largest gap.

115. Dr Moore from DEFRA has been visiting the Overseas Territories, advising on biosecurity.\textsuperscript{254} He told us that, following the gap analysis, the key pathways for each territory were analysed and an extensive horizon-scanning exercise for each territory undertaken to identify what species were likely to arrive. He is now working with the territories to develop pathway action plans for each territory and developing biosecurity legislation.\textsuperscript{255} We asked how long it would take for the work to be completed:

Dr Moore: It does take quite a while because usually the attorney-generals’ offices in the territories are quite small and hard-pressed and they have lots of other priorities as well. If we have the model legislation and we have the drafter to go with them, to take them through and even in some cases to visit the territories, this will really facilitate it. It is happening now with St Helena, Ascension and Tristan de Cunha, possibly with the Falklands, and maybe with Turks and Caicos and with Montserrat.\textsuperscript{256}

Large scale eradication projects

116. A primary cause of species loss on island ecosystems is the introduction of INNS such as cats, rats and mice–because native animals (especially birds and reptiles) have not evolved to deal with predators.\textsuperscript{257} For example, the British Indian Oceans Territory (BIOT) has been plagued by black rats since they were accidentally introduced in the 1700s when the archipelago was settled by the French and British, threatening seabirds, turtles and crabs.

117. Large scale eradication programmes can be of particular conservation benefit often to numerous native species (see box). Research into which of the world’s islands should prioritise invasive mammal removal to provide the biggest benefits to biodiversity

\begin{thebibliography}{9}
\bibitem{Q103} [Dr Belchier]
\bibitem{RSPB} (INV0043)
\bibitem{GBNNSS.} UK Overseas Territories Gap Analysis of Biosecurity Capacity [Accessed 05/06/2019]
\bibitem{Q493} 0493
\bibitem{Q499} 0499
\bibitem{0500} 0500
\bibitem{INV0033} Government of South Georgia and the South Sandwich Islands (INV0033); Turks & Caicos Reef Fund (INV0002)
\end{thebibliography}
Invasive species conservation showed that 20 UKOTs islands are in the top 300 islands.258 This includes the third ranked island in the world: Gough Island home to more than eight million birds from at least 24 different species.259

South Georgia and the South Sandwich Islands eradication programmes

South Georgia and the South Sandwich Islands (SGSSI) are of global significance as relatively pristine and rich environments which sustain major populations of seabirds and marine mammals including globally threatened species, like the iconic wandering albatross. Large scale and unsustainable shore-based industrial sealing and whaling activity from the late 18th century to the mid-20th century led to the introduction of substantial numbers of non-native terrestrial species ranging from mammals to plants.260

In the last decade, habitat restoration programmes have successfully removed invasive mammals from South Georgia. The South Georgia Heritage Trust programme to eradicate rats and mice, using aerial distribution of bait from helicopters was the largest project of its type ever attempted at a cost of approx. £10m. This was preceded by the eradication of reindeer from South Georgia by the Government of South Georgia and the South Sandwich Islands.261 The RSPB described the results as “spectacular”, with the endemic South Georgia pipit successfully breeding on mainland South Georgia for first time in living memory. The project was largely funded by a private individual with the UK Government providing £800,000.262

118. Given the success of the South Georgia rodent eradication, we asked if the same methods for eradicating rats could be used on Scottish islands. Dr Paul Walton, head of habitat and species at RSPB Scotland said:

On the specific question of can you helicopter-drop very poisonous rodenticide on to Scottish islands, it is not legal to do so and I don’t think it should be. It is more expensive, but on islands in the UK countries we have to use bait traps that are secured so that livestock or people can’t get access to them. I am afraid the restrictions are different in different parts of the world.263

He told us about the forthcoming RSPB project on Gough Island (Part of the UK Overseas Territory of Tristan da Cunha) to eradicate mice that were accidentally introduced by sailors during the 19th Century. They now destroy an estimated two million chicks and eggs each year, driving the critically endangered Tristan Albatross and Gough Bunting to extinction. The Tristan da Cunha Government and RSPB plan to eradicate mice in 2020 at a cost of £9.5m. Defra told us the Government has committed £2.1million to the project, with the rest coming from private sources.264 A further £3.5m is still needed to fund the project.

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260 Government of South Georgia and the South Sandwich Islands (INV0033);
261 Government of South Georgia and the South Sandwich Islands (INV0033)
262 Q496
263 Q21
264 Defra (INV0035)
119. We asked Lord Gardiner how the Gough Island project would proceed without more Government funds. He responded:

We are working with the RSPB. I have had several meetings with the RSPB. It is raising with other sources £6 million and needs another £2 million or so. It is proceeding well. Candidly, if someone is generous and wants to help, as definitely happened in South Georgia and as will happen in Gough Island, I have no complications with very rich people who have funds or territories that have funds. This is all about a mixed funding model. It was confirmed by the RSPB that having the Government’s backing to this is very helpful to them. The mixed funding model worked very well. 265

**Overseas Territories’ funding**

120. Large scale eradications are among the most impactful and cost-effective conservation interventions possible, yet they are expensive. 266 Jonathan Hall explained that Darwin Plus funding “has been fantastic for the territories, it but is basically capped at projects around £300,000 in size” so is unable to fund these large scale projects. 267 Catherine Wensink told us that “the Overseas Territories are not able to access many funding streams because of their unique relationship with the UK, so they have very few funds to access. Big projects involved in invasive species cost a lot of money”. 268

121. We heard that given their unique status, the OTs have relied heavily on EU funds. 269 EU LIFE funding provides a “significant contribution” to reducing the threat of invasive species in OTs. 270 EU BEST is another funding stream for environment projects in the OTs, which operates on a competitive bidding basis. 271 Catherine Wensink was concerned that it “has a question mark over it now”. 272 Jonathan Hall from the RSPB was also worried that funding could be lost in the event the UK leaves the EU:

… I would say there is very significant reliance on EU funding as one of the very few other areas for support. The territories are ineligible for most UK domestic sources. They are ineligible for most international funding sources. 273

[...] there is that need for an equivalent of the LIFE-scale funding as well as the smaller BEST project funding. 274

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265 Q497
266 RSPB (INV0043); Q86
267 Q100; Darwin Plus is also known as The Overseas Territories Environment and Climate Fund. Since 2012, Darwin Plus has funded 100 projects worth £17.5 million.
268 Q86; see also Q100
269 Q99
270 Wildlife and Countryside Link (INV0020); The LIFE programme is the EU’s funding instrument for the environment and climate action created in 1992. The current funding period 2014–2020 has a budget of €3.4 billion https://ec.europa.eu/easme/en/life
271 EU BEST has provided support of €10m to projects in the Overseas Territories between 2014 and 2019. It aims to promote conservation and sustainable use of ecosystem services, including ecosystem-based approaches to climate change adaptation and mitigation.
272 Q98
273 Q99
274 Q100
122. We asked Lord Gardiner whether the Government will replace EU funds for the Overseas Territories:

**Lord Gardiner of Kimble**: On the Overseas Territories, we are already funding quite a lot of work. £2.1 million is going to Gough Island. £800,000 went to South Georgia. On Gough Island, it is about 25% of the funding of that mouse eradication proposal, which will be implemented in 2020. With 90% of our UK biodiversity being in the Overseas Territories, we place great importance on that.\(^{275}\)

123. **The UK Overseas Territories are home to 90 per cent of the UK’s biodiversity and most are at a heightened risk from invasive species since their wildlife has evolved over thousands of years without many predators, competitors and disease. The greatest gap in biosecurity has been found to be preventing species arriving, which is exacerbated by new infrastructure projects introducing invasive species and lack of biosecurity legislation and enforcement. We welcome the work carried out by the GB Non Native Species Secretariat supporting the OTs with pathway analysis and biosecurity legislation. This must be scaled up and fully resourced to ensure that each OT has up to date biosecurity legislation and adequate powers of enforcement and resources and expertise to carry it out by the end of 2020.**

124. **Large scale eradication projects present huge opportunities to protect and restore rare, unique and critically endangered wildlife in the UK Overseas Territories. Yet they fall between two stools, being ineligible for many domestic funding opportunities and also being exempt from any international funds. EU funding has played an important role in funding environment and conversation work in the UKOTs and we expect the Government to ensure that these vital projects continue to be funded in the event that the UK leaves the EU. The Government must commit to at least replacing EU funding to the Overseas Territories in the event of leaving the EU. The Government should also consider implementing a system to match-fund contributions from private partners for large scale eradication projects.**
Conclusions and recommendations

Introduction

1. The Government has missed its legal targets on invasive species, and we are concerned that they are not receiving the same priority and funding as animal and plant health regimes. We welcome the Government coordinating work on invasive species across England, Wales and Scotland. We recommend it should review whether this should be extended to include Northern Ireland given its lack of executive. (Paragraph 16)

Prevention and biosecurity

2. DEFRA estimates that between 36 and 48 new invasive species will become established in the next 20 years in Great Britain. Slowing the rate of arrival of invasive species is the first priority to prevent their establishment and we heard that even the smallest biosecurity measures are worth taking. (Paragraph 22)

3. We welcome the publication of the Government’s comprehensive pathway analysis and recommend that it completes pathway action plans for all ten of its listed priorities by the end of 2020. (Paragraph 23)

4. Despite 80 other countries implementing the Ballast Water Management Convention the Government has further delayed its implementation to 2020, six years after it was first recommended. We echo Lord Gardiner’s concerns that invasive species are arriving on ships to our island nation at an alarming rate and consider this would prove to be a simple measure to limit the arrival of new species. The Government must urgently accede to the Ballast Water Management Convention at the earliest possible opportunity. The Government must urgently accede to the Ballast Water Management Convention at the earliest possible opportunity (Paragraph 32)

5. The import of trees and plants represents a significant pathway for the introduction of invasive species and invasive plant pathogens. We have been disappointed with a lack of engagement from the horticultural trade sector during our inquiry, with limited evidence being presented on what measures the industry is putting in place to prevent outbreaks. The example of the oak processionary moth invasion highlights the importance of swift biosecurity and trade restrictions and better coordination across Government Departments. The Government’s new regulations are welcome, but they are too little, too late. It must be ready to legislate for other risks as soon as they are identified. (Paragraph 42)

6. We welcome the introduction of DEFRA’s monthly biosecurity meetings, but, given the risks and based on past performance, the Government needs to ensure that these result in action with problem species identified and banned from import before they present a risk to the UK. It should also work to support the UK horticulture industry to ensure that it relies less on imports. Given the Government’s intention to plant more trees, for example the northern forest, it should produce guidance for the public sector in its procurement of trees and mandate a biosecurity assurance scheme. (Paragraph 43)
7. There is a risk that changing trade routes if we leave the EU could allow more invasive species to arrive from South America and Asia. Online trade is a new and significant risk for introducing invasive species and although regulations are in place, there is an enforcement and penalty gap. We welcome DEFRA’s consideration of establishing of a dedicated INNS inspectorate. We recommend this is established by the end of 2020 with similar resourcing to other inspectorates, to improve biosecurity at the UK’s borders and tackle the risks from increased online trade and new trade routes. Should the Government engage in new bilateral trade deals, invasive species must be factored into risk assessments and enhanced biosecurity measures introduced at points of entry, where risks are identified. (Paragraph 48)

8. Many of the key pathways for INNS involve the general public and specific user groups such as anglers and boaters. It is vital therefore that they are aware of the risks and how to minimise them. In light of the increased resourcing provided to DEFRA at the 2019 Spending Review, we recommend that it revives its public awareness campaigns on invasive species and broadens them further than their present focus on aquatic plants. We recommend that a baseline survey is also conducted to determine the effectiveness of campaigns. (Paragraph 61)

9. We have been impressed by New Zealand’s approach to train 150,000 people in biosecurity by 2025. The same approach in the UK would equate to two million trained members of the public which would add a significant biosecurity resilience resource. The Government should significantly expand its approach to public engagement to reach a minimum of two per cent of the population (1.3 million) to help identify invasive species and respond to biosecurity outbreaks. This ‘biosecurity citizens’ army’ would be a huge boost to the country’s resilience to climate change and add significant human resources to the fight to eradicate priority species. (Paragraph 62)

10. We support Water Resources in the South East’s demand for clear guidelines on water transfers, and call on Government to work with water companies to develop guidance and standards to manage the risks involved. The starting point should be that the transferring company should be certified as INNS free before a transfer takes place. (Paragraph 63)

11. The UK is very good at horizon scanning for new invasive species, but is poor at taking action as a result. The Government needs to be more proactive, using its horizon scans to inform border authorities and inspectorates of new threats before they arrive. (Paragraph 69)

12. The UK will need to replace the European Commission’s invasive species functions in the event we leave the EU. We are satisfied that the expertise for this exists, but question whether extra funding may be needed to replace its role. The Government must ensure that there is ongoing collaboration with the EU on research and the list of species of Union concern to counter new risks. (Paragraph 70)
Tackling invasive species

13. We welcome the Government funding biological controls for invasive plants and we are reassured that the risks are being thoroughly assessed prior to their release into the natural environment. The Government should look to rapidly expand support for biocontrol research in the future. (Paragraph 85)

14. In law, landowners have the responsibility for invasive species, yet there is no enforcement method for Agencies to compel them to tackle invasive species or provide funding for them to act or to act on their behalf. The management of invasive species should feature as one of the public benefits in the Government’s new environmental land management scheme that is to be developed under its Agriculture Bill. We regret the delay to this important piece of legislation and urge the Government to introduce it early in this new Parliamentary session. (Paragraph 90)

15. We consider there needs to be a more joined up policy approach with pathogens included in the scope of the GB Non Native Species Secretariat and Strategy, particularly diseases affecting wildlife. We recommend that the next Invasive Non Native Species Strategy includes invasive pathogens given the large threat they pose to the environment and economy and since their methods of prevention and control are broadly similar. (Paragraph 95)

16. The Government has shown that it can effectively coordinate action on tackling certain invasive species, notably in its approach to the Asian hornet. It is vital that the public are aware of the key species that need a rapid response and where alert systems exist, so they can contribute to the process. The main blocker to effective rapid response and eradication of invasive species is funding and as part of this, expert capacity. Invasive species receive a fraction of the budget that other plant and animal health regimes do, despite their high environmental cost. (Paragraph 106)

17. For widespread invasive species, we support the Government meeting the requirements of the EU Regulations, but it must take a risk based approach, taking into account the costs and benefits of action and the balance of funding should fall to prevention and rapid response. (Paragraph 107)

18. Funding to the Non Native Species Secretariat must be increased to at least £3 million a year to meet its key priorities. This would ensure that rapid responses to threats are undertaken with the specialist capacity required, saving on long term management costs. The Government should also establish an emergency fund for rapid responses where agencies need short term funding to tackle a threat. (Paragraph 108)

19. We welcome the valuable contribution made by volunteers in Local Action Groups, which is a good model akin to the New Zealand approach. Yet the Government should take a more strategic, coordinated and resourced approach. We regret that one third of the Local Action Groups established by DEFRA no longer exist. The Government should fund Local Action Groups on a long term (five yearly basis) and coordinate them through the Non Native Species Secretariat. It should also undertake a review of Local Action Groups to identify where best practice can be replicated and rolled out across the country. (Paragraph 109)
UK Overseas Territories

20. The UK Overseas Territories are home to 90 per cent of the UK’s biodiversity and most are at a heightened risk from invasive species since their wildlife has evolved over thousands of years without many predators, competitors and disease. The greatest gap in biosecurity has been found to be preventing species arriving, which is exacerbated by new infrastructure projects introducing invasive species and lack of biosecurity legislation and enforcement. We welcome the work carried out by the GB Non Native Species Secretariat supporting the OTs with pathway analysis and biosecurity legislation. This must be scaled up and fully resourced to ensure that each OT has up to date biosecurity legislation and adequate powers of enforcement and resources and expertise to carry it out by the end of 2020. (Paragraph 123)

21. Large scale eradication projects present huge opportunities to protect and restore rare, unique and critically endangered wildlife in the UK Overseas Territories. Yet they fall between two stools, being ineligible for many domestic funding opportunities and also being exempt from any international funds. EU funding has played an important role in funding environment and conversation work in the UKOTs and we expect the Government to ensure that these vital projects continue to be funded in the event that the UK leaves the EU. The Government must commit to at least replacing EU funding to the Overseas Territories in the event of leaving the EU. The Government should also consider implementing a system to match-fund contributions from private partners for large scale eradication projects. (Paragraph 124)
### Annex

#### Species on the Union list of concern

**Plants**

<table>
<thead>
<tr>
<th>Scientific name</th>
<th>English name</th>
<th>Entry into force</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Acacia saligna</em> (Acacia cyanophylla)</td>
<td>Golden wreath wattle</td>
<td>15 August 2019</td>
</tr>
<tr>
<td><em>Ailanthus altissima</em></td>
<td>Tree of heaven</td>
<td>15 August 2019</td>
</tr>
<tr>
<td><em>Alternanthera philoxeroides</em></td>
<td>Alligator weed</td>
<td>2 August 2017</td>
</tr>
<tr>
<td><em>Andropogon virginicus</em></td>
<td>Broomsedge bluestem</td>
<td>15 August 2019</td>
</tr>
<tr>
<td><em>Asclepias syriaca</em></td>
<td>Common milkweed</td>
<td>2 August 2017</td>
</tr>
<tr>
<td><em>Baccharis halimifolia</em></td>
<td>Eastern baccharis</td>
<td>3 August 2016</td>
</tr>
<tr>
<td><em>Cabomba caroliniana</em></td>
<td>Fanwort</td>
<td>3 August 2016</td>
</tr>
<tr>
<td><em>Cardiospermum grandiflorum</em></td>
<td>Balloon vine</td>
<td>15 August 2019</td>
</tr>
<tr>
<td><em>Cortaderia jubata</em></td>
<td>Purple pampas grass</td>
<td>15 August 2019</td>
</tr>
<tr>
<td><em>Eichhornia crassipes</em></td>
<td>Water hyacinth</td>
<td>3 August 2016</td>
</tr>
<tr>
<td><em>Elodea nuttallii</em></td>
<td>Nuttall’s waterweed</td>
<td>2 August 2017</td>
</tr>
<tr>
<td><em>Ehrharta calycina</em></td>
<td>Perrenial veldt grass</td>
<td>15 August 2019</td>
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<td><em>Gunnera tinctoria</em></td>
<td>Chilean rhubarb</td>
<td>2 August 2017</td>
</tr>
<tr>
<td><em>Gymnocoronis spilanthoides</em></td>
<td>Senegal tea plant</td>
<td>15 August 2019</td>
</tr>
<tr>
<td><em>Heracleum mantegazzianum</em></td>
<td>Giant hogweed</td>
<td>2 August 2017</td>
</tr>
<tr>
<td><em>Heracleum persicum</em></td>
<td>Persian hogweed</td>
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<tr>
<td><em>Hydrocotyle ranunculoides</em></td>
<td>Floating pennywort</td>
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<td><em>Impatiens glandulifera</em></td>
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<td><em>Lagarosiphon major</em></td>
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<td>Lespedeza cuneata (Lespedeza juncea var. sericea)</td>
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<td>Ludwigia grandiflora</td>
<td>Water-primrose</td>
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<td>Ludwigia peploides</td>
<td>Floating primrose-willow</td>
<td>3 August 2016</td>
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<tr>
<td>Lygodium japonicum</td>
<td>Vine-like fern</td>
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<td>Lysichiton americanus</td>
<td>American skunk cabbage</td>
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<td>Ludwigia grandiiflora</td>
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<td>Lysichiton americanus</td>
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<td>3 August 2016</td>
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<td>Myriophyllum aquaticum</td>
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<td>Myriophyllum heterophyllum</td>
<td>Broadleaf watermilfoil</td>
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<td>Parthenium hysterophorus</td>
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<td>Pennisetum setaceum</td>
<td>Crimson fountaingrass</td>
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<td>Persicaria perfoliata</td>
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<td>Prosopis juliflora</td>
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<td>Pueraria lobata</td>
<td>Kudzu vine</td>
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<td>Salvinia molesta (Salvinia adnata)</td>
<td>Salvinia moss</td>
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<td>Triadica sebifera (Sapium sebiferum)</td>
<td>Chinese tallow</td>
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**Animals**

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<td>Arthurdendyus triangulates</td>
<td>New Zealand flatworm</td>
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<td>Callosciurus erythraeus</td>
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<td>Corvus splendens</td>
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<td>Eriocheir sinensis</td>
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<td>Herpestes javanicus</td>
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<td>Nyctereutes procyonoides</td>
<td>Raccoon dog</td>
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<td>Ondatra zibethicus</td>
<td>Muskrat</td>
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<td>Orconectes limosus</td>
<td>Spiny-cheek crayfish</td>
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<td>Orconectes virilis</td>
<td>Virile crayfish</td>
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<td>Oxyura jamaicensis</td>
<td>Ruddy duck</td>
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<td>Pacifastacus leniusculus</td>
<td>Signal crayfish</td>
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<td>Percottus glenii</td>
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<td>Plotosus lineatus</td>
<td>Striped eel catfish</td>
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<td>Procambarus clarkii</td>
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<td>Procambarus fallax f. virginalis</td>
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<td>Procyon lotor</td>
<td>Raccoon</td>
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<td>Pseudorasbora parva</td>
<td>Stone moroko</td>
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<td>Sciurus carolinensis</td>
<td>Grey squirrel</td>
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<td>Sciurus niger</td>
<td>Fox squirrel</td>
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<td>Tamias sibiricus</td>
<td>Siberian chipmunk</td>
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<td>Threskiornis aethiopicus</td>
<td>Sacred ibis</td>
<td>3 August 2016</td>
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<td>Trachemys scripta</td>
<td>Red-eared, yellow-bellied and Cumberland sliders</td>
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<tr>
<td>Vespa velutina nigrithorax</td>
<td>Asian hornet</td>
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Photographs

Asian tiger mosquito\textsuperscript{276}  
Asian hornet\textsuperscript{277}  

Asian long horned beetle\textsuperscript{278}  
Signal crayfish\textsuperscript{279}  

Killer shrimp\textsuperscript{280}  
Monk parakeet\textsuperscript{281}  

\textsuperscript{276} James Gathany, CDC [Public domain]  
\textsuperscript{277} Gilles San Martin from Namur, Belgium [CC BY-SA 2.0]  
\textsuperscript{278} David J. Barber [CC BY-SA 3.0]  
\textsuperscript{279} Courtesy of the GBNNSS, photo by Trevor Renals  
\textsuperscript{280} Courtesy of the GBNNSS and Environment Agency  
\textsuperscript{281} Courtesy Becky Matsubara from El Sobrante, California [CC BY 2.0]
Invasive species

Topmouth gudgeon

Grey squirrel

Muntjac deer

Gulf wedge clam

Zebra mussels

Ash die back (Chalara)

282 Seotaro, (cleaned up and denoised by Estrilda, and edited by Laitche) [CC BY-SA 3.0]
283 Diliff [CC BY-SA 3.0]
284 Courtesy of the GRNNSS
285 Courtesy of the GRNNSS
286 Courtesy of the GRNNSS / Paul Beckwith
287 Sarang [Public domain] Wikimedia commons
Invasive species

Giant hogweed\textsuperscript{288}  
Himalayan balsam\textsuperscript{289}

![Giant hogweed](image1)  
![Himalayan balsam](image2)

Water fern\textsuperscript{290} (Azolla filiculoides)  
Parrot’s feather\textsuperscript{291} (Myriophyllum aquaticum)

![Water fern](image3)  
![Parrot’s feather](image4)

Floating pennywort\textsuperscript{292}  
Japanese knotweed\textsuperscript{293}

![Floating pennywort](image5)  
![Japanese knotweed](image6)

\textsuperscript{288} Courtesy of Thames Water  
\textsuperscript{289} Courtesy of the GBNNSS  
\textsuperscript{290} Courtesy of the GBNNSS  
\textsuperscript{291} Courtesy of the GBNNSS  
\textsuperscript{292} Courtesy of the GBNNSS  
\textsuperscript{293} CC BY-SA 3.0
Invasive species

Water primrose\textsuperscript{294} \hspace{1cm} Crassula helmsii, known as Swamp stonecrop or New Zealand pigmyweed\textsuperscript{295}

\begin{figure}[h]
\centering
\includegraphics[width=0.4\textwidth]{water_primrose}
\includegraphics[width=0.4\textwidth]{crassula_helmsii}
\end{figure}

List of active Local Action groups

BEACON Local Action Group
Cheshire Region Invasive Species Initiative
Cornwall Knotweed Forum
Cumbria Freshwater Invasive Non-Native Species Initiative
ERCCIS and Cornwall Wildlife Trust LAG
Isle of Wight Non-Native Plants Project
Lancashire Invasive Species Project
Medway Valley Countryside Partnership
New Forest Non-Native Plants Project
Norfolk Non-native Species Initiative
River South Esk Catchment Partnership
Rivers and Fisheries Trusts Scotland (RAFTS)
Source to Sea
South Yorkshire Biodiversity Research Group and Network SYBRG
Staffordshire Wildlife Trust Local Action Groups
Student Invasive Non-Native Group (SINNG)
Tweed Forum Invasives Project
Yorkshire Invasive Species Forum

\textsuperscript{294} Courtesy of the GBNNSS
\textsuperscript{295} Courtesy of the GBNNSS
Formal minutes

Tuesday 15 October 2019

Members Present

Mary Creagh, in the Chair

Philip Dunne       Anna McMorrin
Ruth Jones         John McNally
Caroline Lucas     Matthew Offord
Kerry McCarthy     Derek Thomas

Draft Report (Invasive species), proposed by the Chair, brought up and read.
Paragraphs 1 to 124 read and agreed to.
Annex agreed to.
Summary agreed to.

Resolved, That the Report be the First Report of the Committee to the House.

Ordered, That the Chair make the Report to the House.

Ordered, That embargoed copies of the Report be made available, in accordance with the provisions of Standing Order No. 134.

[The Committee adjourned]
Witnesses

The following witnesses gave evidence. Transcripts can be viewed on the inquiry publications page of the Committee’s website.

Tuesday 21 May 2019

Professor Helen Roy MBE, Ecologist, NERC Centre for Ecology and Hydrology, Dr Paul Walton, Chair of the Invasive Non Native Species Group, Wildlife and Countryside Link and Head of Species and Habitats for RSPB Scotland, Kathryn Brown, Head of Adaptation, Committee on Climate Change Adaptation Sub-Committee, Professor Peter Robertson, Professor of Practice - Wildlife Management, University of Newcastle

Professor Chris Thomas FRS, Director of the transdisciplinary Leverhulme Centre for Anthropocene Biodiversity, University of York, Dr Wayne Dawson, Assistant Professor in the Department of Biosciences, University of Durham, Professor Elizabeth Cottier-Cook, Marine Biologist, University of the Highlands and Islands and Scottish Association for Marine Science (SAMS), Dr Alison Dunn, Reader in Evolutionary Ecology, University of Leeds

Tuesday 11 June 2019

Catherine Wensink, Executive Director, UK Overseas Territories Conservation Forum, Jonathan Hall, Head of UK Overseas Territories, RSPB, Dr Kevin Hughes, Environmental Research and Monitoring Manager, British Antarctic Survey, Dr Mark Belchier, Director of Fisheries and Environment, Government of South Georgia and South Sandwich Islands

Dr David Aldridge, Senior Lecturer in Aquatic Biology, Fellow, St Catharine’s College, Cambridge, Rob Quest, Assistant Director (Animal Health and Welfare), City of London Corporation, Dr Tracey King, Assistant Chief Executive, Ornamental Aquatic Trade Association

Tuesday 25 June 2019

Dr Emily Smith, Environment Manager, Angling Trust, Richard Atkinson, Waterways and Environment Policy Officer, British Canoeing, Kate Hills, Biosecurity and Invasives Manager, South West Water, Phil Brewin, Senior Environmental Officer, Somerset Consortium of Internal Drainage Boards representing the Association of Drainage Authorities (ADA)

Dr Kevin Austin, Deputy Director, Agriculture, Fisheries and Natural Environment, Environment Agency, Dr Richard Shaw, Country Director, Centre for Agriculture and Bioscience International (CABI), Sara Redstone, Plant Health Officer, Royal Botanic Gardens, Kew, Dr Anna Brown, Head of Tree Health and Contingency, Forestry Commission
Tuesday 9 July 2019

Lord Gardiner, Parliamentary Under Secretary of State for Rural Affairs and Biosecurity, Professor Nicola Spence, Chief Plant Health Officer, and Dr Niall Moore, Chief Non-Native Species Officer, Defra

Q364–542
Published written evidence

The following written evidence was received and can be viewed on the inquiry publications page of the Committee’s website.

INV numbers are generated by the evidence processing system and so may not be complete.

1. Adams, Marcus (INV0115)
2. Advanced Invasives Limited (INV0038)
3. Anglian Water Services (INV0050)
4. Anglican Society for the Welfare of Animals (INV0080)
5. Angling Trust (INV0118)
6. Animal Aid (INV0098)
7. ARC Marine Ltd. (INV0013)
8. Ascroft, Mr Roland (INV0091)
9. Attfield, Reginald (INV0084)
10. Battensby, Tracy (INV0099)
11. Biosecurity Research Initiative at St Catharine’s (BioRISC) (INV0039)
12. British Antarctic Survey (INV0022)
13. The British Association for Shooting and Conservation (INV0048)
14. British Association of Landscape Industries (INV0025)
15. British Canoeing (INV0125)
16. British Ecological Society (INV0054)
17. CABI (INV0053)
18. CABI (INV0116)
19. Carr, Betty (INV0088)
20. Carr, Sally (INV0082)
21. Cayman Islands Department of Environment (INV0015)
22. Central Caribbean Marine Institute (INV0031)
23. Centre for Ecology & Hydrology (INV0027)
24. Chagos Conservation Trust (INV0016)
25. Chartered Institute of Ecology and Environmental Management (INV0026)
26. City of London Corporation (INV0055)
27. City of London Corporation (INV0124)
28. CIWEM (INV0024)
29. CLA (INV0029)
30. Cluer, Mr & Mrs R J & J (INV0111)
31. Coleman, Mr Pete (INV0078)
32. Colledge, Miss Louise (INV0071)
33. Collins, Bernadette (INV0060)
34 Committee on Climate Change, Adaptation Sub-Committee (INV0049)
35 Confor (INV0012)
36 Crocker, Ms Liz (INV0105)
37 Cunningham, Professor Andrew (INV0126)
38 D Thomas, Professor Chris (INV0114)
39 Dance, Miss Marilyn (INV0087)
40 Daniels, Mrs Laura (INV0075)
41 Davies, Mrs Fiona (INV0090)
42 Defra (INV0035)
43 DEFRA (INV0127)
44 Dulley, Helen (INV0065)
45 Environment Agency (INV0119)
46 European Squirrel Initiative (INV0023)
47 Falkland Islands Government (INV0058)
48 Fields, Mrs Gaynor (INV0061)
49 Filipkowski, Kacper (INV0086)
50 Fishy Filaments Ltd (INV0103)
51 Frasca, Alan (INV0108)
52 Fraser, Mrs Shona (INV0062)
53 Galil, Dr Bella (INV0011)
54 Government of South Georgia and the South Sandwich Islands (INV0033)
55 Greater Lincolnshire Nature Partnership (INV0006)
56 Hajduczenia, Agnieszka (INV0085)
57 Harper, Ms Carol (INV0093)
58 High, Pamela (INV0089)
59 Hilford, Mrs Joan (INV0081)
60 Holt, Stuart (INV0069)
61 Hughes, Dr B. John (INV0005)
62 Institute of Marine Engineering, Science & Technology (IMarEST) (INV0052)
63 IUCN SSC Invasive Species Specialist Group (INV0057)
64 Jones, Caitlyn (INV0073)
65 Komarowska, Dr Izabela (INV0097)
66 Manco, Bryan (INV0004)
67 Mander, Gill (INV0096)
68 McGuire, Ms Alison (INV0095)
69 N, Sharon (INV0120)
70 National Farmers Union (NFU) (INV0028)
71 National Trust (INV0056)
72 National Trust for the Cayman Islands (INV0034)
73 Norfolk Non-Native Species Initiative (INV0021)
74 Oades, Stephen (INV0079)
75 Ornamental Aquatic Trade Association (INV0008)
76 Ornamental Aquatic Trade Association (INV0117)
77 Pan Orthodox Concern for Animals (INV0112)
78 PML Applications Ltd (INV0037)
79 Property Care Association (INV0110)
80 Public Health England (INV0083)
81 Pulsford, Mrs Karen (INV0064)
82 Red Squirrels United (INV0045)
83 Richards, Dr Iain (INV0009)
84 River Ythan Trust/Ythan Biodiversity Volunteers (INV0007)
85 Roberts, Dr Amelia (INV0109)
86 Robertson, Professor Peter (INV0042)
87 Royal Yachting Association (INV0017)
88 RSPB (INV0043)
89 RSPCA (INV0001)
90 Rugina, Anca (INV0067)
91 Saxby, Mr David (INV0100)
92 Secret World Wildlife Rescue (INV0059)
93 South West Water (INV0040)
94 St Helena Government (INV0107)
95 Stevens, Mr Chris (INV0070)
96 Stevenson, Mr Michael (INV0092)
97 Thames Water (INV0018)
98 Thomas, Ms R (INV0106)
99 Tiggywinkles Wildlife Hospital (INV0104)
100 Turks & Caicos Is Government Department of Environment and Coastal Resources (INV0051)
101 Turks & Caicos Reef Fund (INV0002)
102 Turks and Caicos Islands Government Department of Environment and Coastal Resources (INV0036)
103 UK Overseas Territories Conservation Forum (INV0019)
104 UK Squirrel Accord (INV0047)
105 Urban Squirrels (INV0072)
106 Vajda, Miss Barbara (INV0123)
107 Water Resources South East (INV0044)
108 Whittaker, Elizabeth (INV0076)
109  Whittaker, Jane (INV0074)
110  The Wildlife Aid Foundation (INV0102)
111  Wildlife and Countryside Link (INV0020)
112  Willis, Mr Dennis (INV0003)
113  Woodland Trust (INV0121)
114  Wooler Red Squirrel Group (INV0094)
115  www.grey-squirrel.org.uk (INV0077)
116  Yorkshire Integrated Catchment Solutions Programme (iCAS) (INV0010)
117  Yorkshire Invasive Species Forum (YISF) (INV0032)
118  Yorkshire Water Services (INV0030)
## List of Reports from the Committee during the current Parliament

All publications from the Committee are available on the publications page of the Committee’s website. The reference number of the Government’s response to each Report is printed in brackets after the HC printing number.

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<td>Thirteenth Special Report</td>
<td>UK Progress on Reducing Nitrate Pollution: Government Response to the Committee’s Eleventh Report</td>
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