



# Invasive Non-Native Species as a threat to rivers - submission for the Independent Water Commission

April 2025

This briefing is on behalf of nature and animal welfare coalition Wildlife and Countryside Link ([Link](#)) and provides evidence of the threat of invasive non-native species to the freshwater environment and offers recommendations to reduce the spread.

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## Threat of INNS to the freshwater environment

Invasive non-native species (INNS) are animals, plants or pathogens that have been introduced to an area outside their natural range as a result of human activities and not part of the natural spread of species, and cause a negative effect on the environment, population and/or economy.

INNS are a significant threat to the health of the water environment and cost the UK billions of pounds each year. Wildlife and Countryside Link is therefore concerned that the threat of invasive species has not been explicitly acknowledged in the call for evidence. For the reasons below, Link are highly concerned that invasive species were not a specific interest in this call for evidence. We summarise the issues below and provide some recommendations for regulators of the water environment to reduce the threat of INNS. We would be pleased to answer any questions and would welcome further discussion on this topic.

### **Impact on biodiversity**

INNS play a key role in 60% of recorded global species extinctions and are the sole factor responsible for 16% of documented global animal and plant extinctions<sup>1</sup>, driving losses of native species through impacts such as predation, competition, introducing diseases and altering habitats.<sup>2</sup> The effects of INNS are notorious across every habitat in the UK, but aquatic habitats are some of the most impacted environments, with the greatest number of invasive species (plants, invertebrates and animals) affecting this habitat. They are often challenging to detect until the species are already well established and are already causing harm, for example by deteriorating fish stocks, and replacing native species of plant and animal life. The Environment Agency estimates that more than 70% of water bodies across

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<sup>1</sup> Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) Invasive Alien Species Assessment: Summary for Policymakers <https://zenodo.org/records/10521002>

<sup>2</sup> <https://researchbriefings.files.parliament.uk/documents/POST-PN-0673/POST-PN-0673.pdf>



all surface water categories in England are at risk of deterioration because of invasive non-native species (lakes 85%, rivers and transitional waters 71% and coastal waters 56%).<sup>3</sup> INNS are one of the significant pressures preventing waterbodies from meeting environmental objectives under the Water Framework Directive, to achieve good ecological status.

Even small freshwater bodies such as ponds are at risk from invasives; in 2008 a national Survey of *Batrachochytrium dendrobatidis* (Bd) a fungal disease known to cause extinction and decline in global amphibian populations found that the Bd fungus was present at 16% of amphibian sites and that there was a strong association between non-native amphibian species and Bd infection<sup>4</sup>, with invasive amphibians known to be disease vectors and predators of native species.<sup>5 6</sup>

One example of a harmful freshwater invasive species is the American signal crayfish. This species is a carrier of the crayfish plague, which is deadly for the native white-clawed crayfish; an endangered species which plays a vital role in keeping waterways clean through its feeding habitats, and is now a rare sight.<sup>7</sup> Human activity can easily spread crayfish plague spores from one part of a river to another or between river catchments. Advice issued by Government this month is to prevent the spread by following the 'check, clean and dry' advice for clothing and equipment used in any water body.<sup>8</sup> Preventative action is extremely important for all invasive species, particularly in water environments as other invertebrates like killer shrimp or tiny plant fragments of species such as New Zealand pigmyweed are easily transported.<sup>9</sup>

### **Cost to industry and to manage the impacts**

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[https://consult.environment-agency.gov.uk/++preview++/environment-and-business/challenges-and-choices/user\\_uploads/inns-challenge-rbmp-2021-1.pdf](https://consult.environment-agency.gov.uk/++preview++/environment-and-business/challenges-and-choices/user_uploads/inns-challenge-rbmp-2021-1.pdf)

<sup>4</sup> Cunningham AA, Minting P (2008) National survey of *Batrachochytrium dendrobatidis* infection in UK amphibians. Institute of Zoology, London.

<sup>5</sup> Pille, F., Pinto, L. and Denoël, M., 2021. Predation pressure of invasive marsh frogs: a threat to native amphibians?. *Diversity*, 13(11), p.595 <https://doi.org/10.3390/d13110595>

<sup>6</sup> Wilkinson, J.W. and Buckley, J., 2012. Amphibian conservation in Britain. *FrogLog*, 101, pp.12-13. <https://www.amphibians.org/wp-content/uploads/sites/3/2018/12/FrogLog101.pdf#page=12>

<sup>7</sup> [https://www.wwt.org.uk/uploads/documents/1341561564\\_RWDM4DiseaseFactsheetsCrayfishplague.pdf](https://www.wwt.org.uk/uploads/documents/1341561564_RWDM4DiseaseFactsheetsCrayfishplague.pdf)

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<https://www.gov.uk/government/news/monitoring-continues-after-disease-threatens-native-species#:~:text=Crayfish%20plague%2C%20which%20is%20normally,since%20been%20monitoring%20the%20spread.>

<sup>9</sup> <https://www.nonnativespecies.org/what-can-i-do/check-clean-dry>



INNS cost the UK up to £4 billion each year.<sup>10</sup> The cost of INNS to Wales has been estimated to be at least £125 million per year.<sup>11</sup> As INNS occur in all types of water body and all areas of England, the water industry is one of the sectors most impacted. Invasive zebra and quagga mussels clog water pipes, costing water companies over £8 million each year and disrupting the water supply.<sup>12</sup> Riverbanks are littered with invasive plant species like Japanese knotweed which die back in autumn and expose the bank to greater sediment erosion over winter, which can increase nutrient loads and choke fish spawning areas downstream.<sup>13</sup> Himalayan balsam is one of the most prolific plant species in riparian habitats which can impede water flow.<sup>14</sup>

Flooding both affects and is affected by INNS. Invasive species simultaneously increase the risk of flooding events<sup>15</sup> and spread to new areas in flood water.<sup>16</sup> For example, invasive freshwater plant species such as floating pennywort by forming thick mats behind weirs and dams and obstructing sediment flow, and invasive animal species such as Chinese mitten crabs by burrowing into riverbanks.<sup>17</sup>

### Insufficient protection

The rate of INNS establishment in the UK has continued to increase since 1960 with no indication that trends are changing.<sup>18</sup> A significant factor of this is that actions on INNS is not treated as a priority within Government and timelines have been significantly delayed, despite an internationally agreed target to ‘prevent the introduction and establishment of priority invasive alien species and reduce the rates of introduction and establishment of

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<sup>10</sup> 3 René Eschen et al (2023) ‘An updated assessment of the direct costs of invasive non-native species to the United Kingdom,’ 6 July, Biological Invasions. Available here: <https://link.springer.com/article/10.1007/s10530-023-03107-2> The annual cost of invasive species in the UK is £4 billion. Excluding fungi it is closer to £2 billion.

<sup>11</sup> <https://storymaps.arcgis.com/stories/3ad6560d23d243c29f4fabd99a42eaa9>

<sup>12</sup> <https://www.cam.ac.uk/stories/biobullets-protect-uk-water>

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<https://www.innsa.org/japanese-knotweed-riverbank-erosion/#:~:text=Japanese%20knotweed%20was%20historically%20planted%20for%20the%20purpose,to%20be%20affected%20by%20both%20run-off%20and%20landslip>

<sup>14</sup> <https://wildfish.org/latest-news/invasive-species/>

<sup>15</sup> Gallardo, B., Bacher, S., Barbosa, A.M. et al. Risks posed by invasive species to the provision of ecosystem services in Europe. Nat Commun 15, 2631 (2024). <https://doi.org/10.1038/s41467-024-46818-3>

<sup>16</sup> <https://www.wcl.org.uk/docs/Stemming%20the%20Flood%20of%20Invasive%20Non-Native%20Species.pdf>

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<https://www.gov.uk/government/publications/invasive-non-native-species-challenges-for-the-water-environment>

<sup>18</sup>

<https://www.theoep.org.uk/report/government-remains-largely-track-meet-its-environmental-ambitions-finds-oep-annual-progress>



other known or potential invasive alien species by at least 50 per cent, by 2030.<sup>19</sup> The majority of the recommendations made by the Environmental Audit Committee in 2019 for INNS management are still not securely in place.<sup>20</sup>

Pathway Action Plans intended to address pathways of introduction and spread of non-native species in Great Britain are a requirement under the Retained EU Invasive Alien Species (IAS) Regulation but consultations on these plans have been repeatedly delayed. Drafts of the plans have been created as far back as 2020, meaning that some of the actions within the plans are now already out of date before they have been consulted on and approved. Draft plans for pathways recognised as significant for the water environment include the Angling PAP, Recreational Boating PAP and Pet PAP, with a plan for Ballast water to follow in an unidentified future timeline.

Funding available for invasive species management is limited and vulnerable year on year, despite the overwhelming economic benefits of prioritising prevention and mitigation of the spread of species. There is also a general lack of awareness of the considerable risk of invasive species within industry and water users, although many organisations work very hard to improve this. There is a need for water companies to consider long-term invasive species planning and control beyond the 5 year cycles. Monitoring of sites should also be embedded into water company invasive species plans which may extend between price review cycles to account for viable seed banks and the reestablishment of populations following treatment.

Water companies can spread INNS by a number of routine activities. Any equipment, clothing, and vehicles used within proximity to a waterbody can introduce species to a new area. Water transfers present a significant risk of moving invasive species. New research has identified this pathway as an underrepresented threat, stating “*the scale of this pathway is currently underestimated globally, and it remains largely unheard of within the wider fields of freshwater ecology and environmental policy*”.<sup>21</sup> There are approximately 162 major raw water transfers in England and Wales which move upwards of 45 million litres/day, many of which cross Water Framework Directive management catchments and river basin boundaries, and in some cases political borders.<sup>22</sup> The Environment Agency are aware of this pathway and stated in 2021 that they are working to make sure that new water transfers do

<sup>19</sup> <https://www.cbd.int/gbf/targets/6>

<sup>20</sup> <https://publications.parliament.uk/pa/cm201919/cmselect/cmenvaud/88/88.pdf>

<sup>21</sup> Waive, A., Robertson, P. & Pattison, Z. Raw water transfers: why a global freshwater invasion pathway has been overlooked. *Hydrobiologia* 851, 1091–1094 (2024). <https://doi.org/10.1007/s10750-023-05373-6>

<sup>22</sup> Waive A, Robertson P, Pattison Z (2025) Integrated management of the raw water transfer invasion pathway. *Management of Biological Invasions* 16(1): 227–246, <https://doi.org/10.3391/mbi.2025.16.1.14>



not increase spread of INNS<sup>23</sup>, but there is little transparency in how this threat is being minimised and mitigated in practice.

In line with the water industry strategic environmental requirements (WISER)<sup>24</sup>, water companies have statutory expectations to:

- prevent deterioration by reducing the risk of spreading INNS and reducing the impact of INNS
- reduce the impact of INNS, where INNS is a reason for not achieving conservation objectives or good status
- reduce pathways for the introduction and spread of INNS

However, progress on this is not considered in the annual Environment Agency ‘Water and sewerage companies in England: environmental performance report’. Inclusion of progress to tackle INNS within annual reporting will increase transparency, and therefore enable greater scrutiny, accountability, and tracking of progress. Considering the scale of the risk that INNS present to biodiversity and the economy, this is essential.

### **Specific invasive species targets**

Under the Kunming-Montreal Global Biodiversity Framework, the UK is obligated to reduce the introduction and establishment of invasive species by at least 50% by 2030. This has been embedded into the Environment Act, and targets on biosecurity were embedded into the EIP (currently under review). In order to meet these targets, it is crucial that biosecurity and invasive species management is embedded into water companies’ practices and processes to ensure strategic joined up management of invasive species at the right spatial and temporal scale. This will support the delivery of environmental outcomes and effective implementation of biosecurity to protect assets and minimise spread between catchments and regions.

### **Recommendations**

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[https://consult.environment-agency.gov.uk/++preview++/environment-and-business/challenges-and-choices/user\\_uploads/inns-challenge-rbmp-2021-1.pdf](https://consult.environment-agency.gov.uk/++preview++/environment-and-business/challenges-and-choices/user_uploads/inns-challenge-rbmp-2021-1.pdf)

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<https://www.gov.uk/government/publications/developing-the-environmental-resilience-and-flood-risk-actions-for-the-price-review-2024/water-industry-strategic-environmental-requirements-wiser-technical-document#:~:text=Water%20companies%20should%20understand%20the,water%20company%20assets%20and%20activitie>



Prevention and preparedness are the best and most cost-effective approaches to managing INNS. Water companies must take a holistic pathway approach to management by integrating robust biosecurity policies across all activity and employing staff with INNS expertise and providing training for all staff who visit water sites. Appropriate biosecurity facilities must be available at all sites, including washdown facilities for recreational users and staff. CIWEM submitted valuable evidence on this issue in 2019<sup>25</sup>, and while some improvements have been made in this time, there is no concise record of INNS behaviour across all water companies. There is also a need for water companies to consider biosecurity needs not just on their assets, but also looking across the catchment and region to minimise the spread of invasive species between water bodies.

Link agree with the Environment Agency when stating that “INNS can only be addressed by working in partnership with others and at catchment and national scales.”<sup>26</sup> To do this, the threat and management of INNS must be included within catchment management plans and regional water plans and partnerships. This should include setting targets for INNS management and eradication at catchment scale, where appropriate. It is particularly important that this is done proactively, especially as the Pathway Actions Plans from the GB Non-Native Species Secretariat are considerably delayed and are not legislative. The work of the Waterlife Recovery Trust is an example of how working at catchment and wider scales with large numbers of partners has had enormous success eradicating American Mink in parts of the UK for the first time.<sup>27</sup>

Government must commit to continuing the Water Restoration Fund (WRF) to fund action for local projects to manage INNS. A long-term and reliable funding source is absolutely essential for INNS management to continue, as well as for the wider restoration of the water environment. INNS management in water environments relies on strategic and ongoing funding to achieve success across a stretch of water and increasingly so for a catchment. When funding for management is unreliable and discontinued it undermines all progress made to remove that species to date, and risks all efforts being wasted.<sup>28</sup> For example, in support of the Floating Pennywort Strategy, Angling Trust and Paddle UK have worked in collaboration with other partners to try to deliver effective strategic control of the invasive

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<sup>25</sup> <https://committees.parliament.uk/writtenevidence/102347/html/>

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[https://consult.environment-agency.gov.uk/++preview++/environment-and-business/challenges-and-choices/user\\_uploads/inns-challenge-rbmp-2021-1.pdf](https://consult.environment-agency.gov.uk/++preview++/environment-and-business/challenges-and-choices/user_uploads/inns-challenge-rbmp-2021-1.pdf)

<sup>27</sup> <https://www.waterliferecoverytrust.org.uk/wrt-news/thames-to-lincolnshire-project-from-inception-to-now/>

<sup>28</sup> Mill, A.C., Crowley, S.L., Lambin, X., McKinney, C., Maggs, G., Robertson, P., Robinson, N.J., Ward, A.I. and Marzano, M. (2020), ‘The challenges of long-term invasive mammal management: lessons from the UK.’ *Mam Rev*, 50: 136-146. <https://doi.org/10.1111/mam.12186>



aquatic plant, Floating Pennywort. However, the one year funding cycles have impeded progress, leaving uncertainty in the continuation of projects and risking the loss of the experienced staff delivering these control programmes. Furthermore the limited funding restricts the ability to work strategically and at the scale needed, and can be limited to certain areas which do not does not facilitate an upstream-to-downstream management approach. The WRF must continue by legally ringfencing specific environmental fines for use by Defra to support water restoration projects, as was originally proposed and received cross-party support.<sup>29</sup>

As the WRF intended, the polluter pays principle should be enacted when water bodies are contaminated with INNS through water company actions, diverting funding into the management of invasive species and the restoration of that waterbody.

Water companies must continue to invest into the Aquatic Biosecurity Partnership which has had investments from water companies of £125k per year for five years from 2020-2025 to tackle aquatic invasive species in England through an enhanced aquatic biosecurity programme. With this fund ending this year, all water companies in England should be compelled to sign up to continue this Partnership and to demonstrate evidence for the implementation of the actions.

The solution to water scarcity threats is not to import water from overseas, and water companies must not be permitted to resort to such measures. Southern Water recently identified the option of importing 45 million litres of water per day from Norway via sea tankers.<sup>30</sup> Not only would this be a poor use of resources, but it would present a significant invasive species threat too. There are numerous species knocking on the door to be introduced into the UK, including the ectoparasite salmon fluke *Gyrodactylus salaris*, which has had a devastating impact on salmon populations, with a reduction by as much as 98% in invaded catchments. There is no treatment available for *Gyrodactylus*, with control resulting in the application of the biocide rotenone to eradicate the entire infected population which also impacts non-target wildlife throughout the application area.

As domestic water transfers are required at consistently high levels, improvements must be made to prevent the spread of INNS through this method. Further to this, water companies must ensure that they are making full use of all water demand management measures,

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<sup>29</sup> [https://www.wcl.org.uk/docs/saving\\_water\\_restoration\\_fund.pdf](https://www.wcl.org.uk/docs/saving_water_restoration_fund.pdf)

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<https://waterresources.southernwater.co.uk/wp-content/uploads/2024/09/01-WRMP-Consultation-Summary-1.pdf>



including engagement with customers to increase water efficiency, and must take action to address current unacceptable levels of leakage, in order to limit the call upon new water transfers in future, given the risk that these pose of increasing the spread of INNS.

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Wildlife and Countryside Link (Link) is the largest nature coalition in England, bringing together 86 organisations to campaign for nature, climate, animal welfare and a healthy environment for everyone. Wildlife and Countryside Link is a registered charity number 1107460 and a company limited by guarantee registered in England and Wales number 3889519.

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The following organisations have inputted into this briefing and support increased action against INNS.

People’s Trust for Endangered Species

Angling Trust

Froglife

Amphibian and Reptile Conservation

The Wildlife Trusts