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What England and Wales's Invasive Non-native Species Framework can learn from Scotland



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“ In Scotland it is an offence to plant a species in the wild outside its native range. ”

Invasive non-native species are widely recognised as a major driver of biodiversity loss. However, the regulatory framework in England and Wales remains largely reactive, frequently intervening only once ecological harm has occurred. Drawing on practical experience in ecological consultancy and habitat management, this article examines the increasing disconnect between ecological realities and legal responses. Ecologists are increasingly encountering invasive and aggressively spreading species across development sites, ancient woodlands, freshwater habitats and restoration projects while legislation struggles to keep pace with emerging evidence. In contrast, Scotland's broader precautionary approach to non-native species release provides a useful model for aligning regulation with ecological risk. At a time when ambitions for Biodiversity Net Gain and nature recovery are accelerating, a more preventative and joined-up approach to invasive species management is urgently needed.

Introduction

Invasive alien species are recognised as one of the five most important direct drivers of biodiversity loss worldwide (IPBES 2019) and have been a major contributing factor in 60% of recorded global animal and plant extinctions (IPBES 2023). In the UK, invasive

non-native species (INNS) threaten native ecosystems, disrupt ecological processes and generate substantial economic costs associated with control, management and infrastructure damage. *The Great Britain Invasive Non-Native Species Strategy 2023–2030* states that INNS cost the UK economy

nearly £1.9 billion annually (GB Non-Native Species Secretariat 2023), while Japanese knotweed (*Fallopia japonica*) alone is estimated to cost the British economy around £247 million per year (Eschen *et al.* 2023).

For ecological practitioners, an additional frustration is that species whose risks are increasingly evident in the field often remain commercially available and are not subject to precautionary restriction until sufficient evidence accumulates to justify formal listing. By the time regulation catches up, management burdens are already embedded within the landscapes that we are trying to restore.

Scotland offers a potentially insightful contrast. Under the Wildlife and Natural Environment (Scotland) Act 2011 it is an offence to plant, or cause to grow, a plant in the wild at a location outside its native range. This broader precautionary framing differs significantly from the non-native species-listing model under Schedule 9 of the Wildlife and Countryside Act 1981 used in England and Wales, whereby restrictions generally follow, rather than prevent, ecological harm.

A recent analysis by Environmental Standards Scotland (2026) suggests that legislative precaution alone is insufficient to meet the scale of ambition required to address the growing problem of INNS. This highlights that, while Scotland's legislation adopts a more preventative approach than that of England and Wales, effective management also requires complementary measures such as strengthened biosecurity, pathway management, early detection and rapid response, and coordinated long-term investment. This is reflected in the package of measures outlined in Scotland's 2026–2032 INNS Action Plan (NatureScot 2026).

What ecological lag looks like in practice

Many invasive plant impacts emerge only after substantial ecological lag periods, meaning today's horticultural decisions can shape management burdens for decades. Practitioners are increasingly encountering examples of this disconnect.

Development design

During review of a recent landscaping specification, an invasive-prone ornamental planting (*Rhododendron luteum*) was included in a biodiversity enhancement scheme. Although intended for an amenity setting, no consideration had been given to its potential spread into adjacent semi-natural habitats. This is not unusual. Many species selected because they are hardy, fast-growing and visually attractive also possess traits that enable ecological persistence and spread. Consequently, many ecological consultants informally advise against species whose invasive tendencies are poorly understood or absent from formal restriction.

Intervention costs

As a different example, dune restoration projects across the UK continue to invest heavily in removing *Montbretia* (*Crocsmia × crocosmiiflora*), cotoneaster (*Cotoneaster* spp.), Japanese rose (*Rosa rugosa*) and sea buckthorn (*Hippophae rhamnoides*), which threaten the integrity of these highly protected habitats. At a cost of over £3.8 million, two recent projects, Sands of LIFE and Dynamic Dunescape,



Figure 1. Mature sea buckthorn (*Hippophae rhamnoides*) removed from sand dune habitat at Kenfig National Nature reserve, Wales. Photo credit: Sands of LIFE.

together removed these invasive species from over 180 ha of sand dune habitats across England and Wales over 6 years to restore these habitats to a favourable condition and rejuvenate natural geomorphological processes.

These projects demonstrate that large-scale restoration is possible but expensive. Earlier preventative intervention could have reduced many of these long-term management costs.

Reduced biodiversity value

The species falling through England and Wales' regulatory net are rarely obscure. Hybridisation between Spanish bluebells (*Hyacinthoides hispanica*), introduced as garden plants, and native English bluebells (*Hyacinthoides non-scripta*) is well documented and reduces the genetic distinctiveness of native bluebells. Canadian goldenrod (*Solidago canadensis*), promoted by the Royal Horticultural Society as 'pollinator-friendly', forms dense stands capable of excluding native meadow flora. Bamboo (*Phyllostachys* spp. and other genera), increasingly used as 'natural' screening, readily spreads into neighbouring habitats via aggressive rhizomes.

These aforementioned species fall within Scotland's precautionary controls on non-native release outside of a native range. In contrast they are not subject to equivalent restrictions in England and Wales as they are not listed in Schedule 9. This precautionary approach is reinforced by the Scottish Government's non-native species code



Figure 2. Spanish bluebell (*Hyacinthoides hispanica*). Photo credit: Laura Grant.

of practice (Scottish Government 2012), which advises that 'If in doubt [whether a species is native] don't release or plant'. Whereas failure to comply with the Code is not itself an offence, compliance may be considered in legal proceedings. Table 1 illustrates how different amendments to the same legislative framework produce different levels of protection.

Why England and Wales' framework struggles to keep pace

England and Wales' species-by-species listing model requires sufficient evidence to justify formal restriction before legal controls apply. This creates an unavoidable ecological lag: by the time evidence is considered sufficient, species

Table 1. Species restricted in Scotland but not under EU regulation or England/Wales controls.

Common name	Scientific name	Scotland	England/ Wales	EU
Pirri-pirri bur	<i>Acaena</i> spp.	✓	✗	✗
Cape pondweed	<i>Aponogeton distachyos</i>	✓	✗	✗
Giant reed	<i>Arundo donax</i>	✓	✗	✗
Large-flowered waterweed	<i>Egeria densa</i>	✓	✗	✗
Brazilian giant rhubarb	<i>Gunnera manicata</i>	✓	✗	✗
Sea buckthorn*	<i>Hippophae rhamnoides</i>	✓	✗	✗
Spanish bluebell	<i>Hyacinthoides hispanica</i>	✓	✗	✗
Broad-leaved rush	<i>Juncus planifolius</i>	✓	✗	✗
Japanese honeysuckle	<i>Lonicera japonica</i>	✓	✗	✗
Fringed waterlily	<i>Nymphoides peltata</i>	✓	✗	✗
Himalayan knotweed	<i>Persicaria wallichii</i>	✓	✗	✗
Salmonberry	<i>Rubus spectabilis</i>	✓	✗	✗
Cord-grasses	<i>Spartina</i> spp.	✓	✗	✗
Water soldier	<i>Stratiotes aloides</i>	✓	✗	✗
Water chestnut	<i>Trapa natans</i>	✓	✗	✗
Dwarf eelgrass	<i>Zostera japonica</i>	✓	✗	✗

*Sea buckthorn is native to some coastal areas of south-east Scotland, but not throughout Scotland. Consequently, planting it outside its Scottish native range may engage Scotland's native range controls on releases and planting in the wild. Source: RHS Invasive non-native plants webpage; www.rhs.org.uk/prevention-protection/invasive-non-native-plants.



Figure 3. Invasive Canadian goldenrod (*Solidago canadensis*). Image courtesy of environmentcontrols.co.uk.

are often already widespread enough to require expensive long-term management rather than straightforward prevention.

Scotland's broader legislative wording avoids this delay by placing precaution at the level of non-native release itself rather than relying on retrospective designation. Although enforcement

challenges remain, the framework places greater emphasis on prevention than reaction.

Why this matters for development and Biodiversity Net Gain (BNG)

This regulatory lag has direct implications for planning and development.

Landscape schemes, sustainable urban drainage system features and habitat enhancement projects increasingly create new pathways for accidental introduction, persistence and spread. Examples regularly encountered in practice include:

- ornamental aquatic species introduced into mitigation ponds
- garden escape species spreading from housing developments into adjacent woodland and hedgerow habitats
- imported planting stock carrying novel pests and pathogens, such as ash dieback (*Hymenoscyphus fraxineus*) and oak processionary moth (*Thaumetopoea processionea*).

Nature recovery ambitions risk being undermined where habitat creation proceeds without equal attention to invasive species pathways and long-term biosecurity.

Ecologists are increasingly being asked to develop habitat management plans and restore habitats while the pathways driving ecological degradation remain active through fragmented regulation and inconsistent horticultural practice. Climate change is also expected to increase the risks posed by INNS by facilitating their establishment and spread (IUCN 2025), further increasing threats to biodiversity and ecosystems, placing additional pressure on the 30 year management period required for many BNG sites. Early detection, prevention and long-term biosecurity therefore need to become integral components of habitat creation and management.

What should change?

Move from a reactive list to a precautionary principle

Before a species can be added to Schedule 9, it must be assessed, evidence compiled, a review process completed and secondary legislation made, which can take years. In the meantime, a species continues to be sold, planted and spread, and by the time regulatory protection applies the introduction pathway may be well established and management costs substantially higher. In contrast, Scotland's prohibition on planting non-native species outside their native range removes much of the delay inherent in list-based systems, as a species does not need to be listed before

its introduction to the wild is unlawful. Although enforcement challenges remain, the approach demonstrates how legislation can prioritise prevention over retrospective control.

In this context, the GB INNS Strategy 2023–2030 identifies a horizon-scanning mechanism as a priority for identifying emerging threats and to accelerate their listing on Schedule 9 or to introduce interim guidance restricting their sale and specification while evidence is compiled. This mechanism is also identified as a preventative action in the Scottish Action Plan for INNS 2026–2032. Practitioners and CIEEM members are well placed to contribute to that process, drawing on field observations of new and emerging problem species.

Address the ‘listed species’ illusion

The existence of a defined INNS list can create the impression that unlisted species are ecologically acceptable.

In practice, many ecologically damaging species remain unlisted, which is because sufficient evidence has not yet accumulated, not because they pose little ecological risk.

Clearer guidance is needed for landscape architects, planning authorities, developers and contractors to emphasise that the absence of a Schedule 9 listing does not constitute ecological suitability. Professional bodies in landscape architecture and urban design are natural partners in this work. The planning system could provide a practical delivery mechanism by requiring INNS risk assessments as part of landscaping submissions, ensuring potential pathways are considered before planting occurs.

Scotland’s framework achieves this more directly by making professionals consider whether non-native planting within a scheme could spread into the wild, encouraging precaution at the point of introduction.

Shift the burden of responsibility

England and Wales’ current framework places the burden of managing INNS introduction on land managers, developers and conservation practitioners, despite many introduction

pathways originating elsewhere. A more preventative approach would place greater responsibility on those introducing and supplying non-native plants. Scotland’s framework establishes a clearer duty of care to prevent unmanaged spread, including from private gardens, illustrating how responsibility can sit closer to the point of introduction rather than solely with those managing its consequences.

Shifting the burden of responsibility would require retailers, growers and importers to assess and disclose the invasive potential of species offered for sale, for example through mandatory labelling or risk-based guidance to inform purchasing decisions.

Conclusion

England and Wales’ current invasive species framework remains predominantly reactive, with legal restriction generally following, rather than preventing, ecological harm. At a time when investment in habitat restoration and BNG is increasing, this approach risks embedding avoidable ecological damage and management burdens into the very landscapes we are trying to improve.

Ecologists are increasingly being asked to restore habitats while the pathways driving degradation remain active through horticultural trade and delayed legislative response.

Prevention is rarely as visible as restoration, but it is almost always cheaper, more effective and more ecologically defensible. Until England and Wales’ regulatory framework better reflects that principle, ecological practice will remain focused on managing consequences that policy could have helped to prevent.



Figure 4. Substantial Montbretia (*Crocodymia × crocosmiiflora*) clearance works at Tywyn Aberffraw, Wales. Photo credit: Sands of LIFE.

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