Dún Laoghaire-Rathdown

Invasive Alien Species Action Plan

dlr

Comhairle Contae County Council

This Plan has been prepared by the Biodiversity Section of Dún Laoghaire-Rathdown County Council under the Actions of the DLR Biodiversity Plan 2021-2025.

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Appropriate Assessment: The SEA Screening for this DLR IAS Action Plan has been carried out and is consistent with the process as recommended by the Department of Environment, Heritage and Local Government guidance document entitled I*mplementation of SEA Directive 2001/42/EC Assessment of the Effects of Certain Plans and Programmes on the Environment November 2004*, in line with Schedule 1 of SI435, and uses the criteria for SEA screening criteria set out in the SEA Directive. An Appropriate Assessment Screening Report has been prepared in line with Article 6(3) of the EU Habitats Directive (92/43/EEC). The SEA Screening Report and Determination along with the AA Screening report are provided on our website with this DLR IAS Action Plan.

Acknowledgements

DLR wish to thank Envirico Ltd. for their professional advice and input to the Plan, the National Biodiversity Data Centre, Juanita Browne, and also all our DLR staff for providing input to the Plan through a series of workshops held in 2019.

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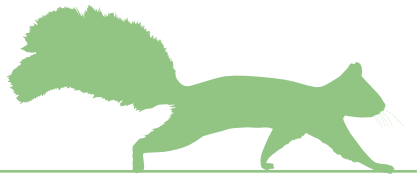


Appendices

1 Introduction

Invasive Alien Species (IAS) cause a wide variety of problems for the biodiversity, ecosystems, and economies of the countries to which they are introduced. This DLR Invasive Alien Species Action Plan is published in response to the threats posed by invasive alien species at county and local level.

To fully understand how and why IAS cause these issues, we must first understand the difference between *alien* and *native*, and *invasive* and *non-invasive* species.

Alien species are those that have been introduced by humans (either intentionally or accidentally) into a country that wasn't part of their past distribution.[1] They may also be referred to as *introduced* or *non-native species*. Many alien species have had positive impacts on our biodiversity and economy. For example, some of our most important crops, such as potato and wheat, are not native species, but originate from Peru and the Middle East, respectively. However, while approximately 85% of alien species have either beneficial or no negative impacts in their new environments, an estimated 15% of alien species in Europe cause damage and are classified as invasive[2].

The negative impacts of IAS in Ireland and throughout the globe are varied and far-reaching. In fact, after habitat loss, invasive species are the second biggest threat to biodiversity worldwide[3].

Therefore, it is critical that we attempt to halt their spread and eradicate invasive species, wherever possible, in order to preserve our biodiversity and prevent negative impacts on our economy.

After habitat loss, invasive species are the second biggest threat to biodiversity worldwide.

Dún Laoghaire-Rathdown County Council recognise that the significant threats posed by IAS require a structured and coordinated approach to minimise their impact and to prevent further introductions and spread. This requires a comprehensive county-wide strategy, and establishment of links with other counties and agencies.

1 Convention on Biological Diversity (1993)

2 European Environment Agency (2013)

3 https://invasivespeciesireland.com

Native Species

A *native species* is one that is found in a certain ecosystem due to natural processes, such as natural distribution and evolution. No human intervention brought a native species to the area or influenced its spread to that area.

Alien Species

Alien Species are also known as *non-native* species or *introduced* species. These are species that occur in an area where they are not native but were brought there through human influence – either purposefully or accidentally.

Invasive Alien Species (IAS)

When an alien species becomes too pervasive in an environment, it is said to be *invasive*. Invasive Alien Species tend to have a number of traits in common:

- They grow and/or reproduce more quickly or earlier than native species, thus establishing more successfully.
- They are tolerant of a wide range of environmental conditions, and so adapt easily to new environments.
- IAS typically have a high dispersal rate, allowing them to quickly colonise new areas.
- Invasive animals are usually generalists – that is, they eat a wide variety of food types, and when present in large numbers, they can deplete the food supply of specialist animals or less successful generalist species.

Noxious Weeds

Noxious weeds are not invasive alien species. Most are native plants of disturbed ground, which can impact adversely on agriculture for crops or farm animals. It is important to note that, as native species, noxious weeds are part of our natural biodiversity and are utilised by a range of invertebrate and bird species. The natural habitat of these plants is disturbed ground, making them prime opportunist colonisers of over-grazed or cultivated land. The loss of such species will also result in the loss of species that depend on them as a food source.

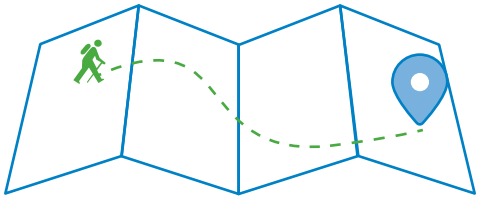
Creeping Thistle, for example, is a food plant for over 20 species of butterfly and moth, with four species of moth depending on the genus Cirsium as their sole food pant. Thistle seed is also an important food resource for Goldfinch. Ragwort has four species of dependent moths, including the day-flying Cinnabar Moth.

This Action Plan lays out clear objectives for Dún Laoghaire-Rathdown County Council and has identified a set of goals, each with its own specific actions (Chapter 6), which will further the accomplishment of these objectives.

The objectives of the Invasive Alien Species Action Plan:

1. To develop a record of invasive species within the county
2. To prevent new introductions of IAS into Dún Laoghaire-Rathdown
3. To prevent further spread of IAS within the county
4. To effectively treat IAS currently present in the county
5. To create awareness of IAS and the threats they pose, and to provide training and education for the public
6. To minimise the impacts of IAS and restore damaged ecosystems to their previous state
7. To create ties and cooperative relationships with other counties and agencies in order to effectively tackle IAS
8. To consider the impact of Climate Change in relation to IAS

The overall aim of this Action Plan is to provide a roadmap for invasive species to be ***eradicated*** from Dún Laoghaire-Rathdown when possible; ***controlled*** when eradication is not possible; for new introductions to be ***prevented***; and for damaged habitats to be ***restored***.

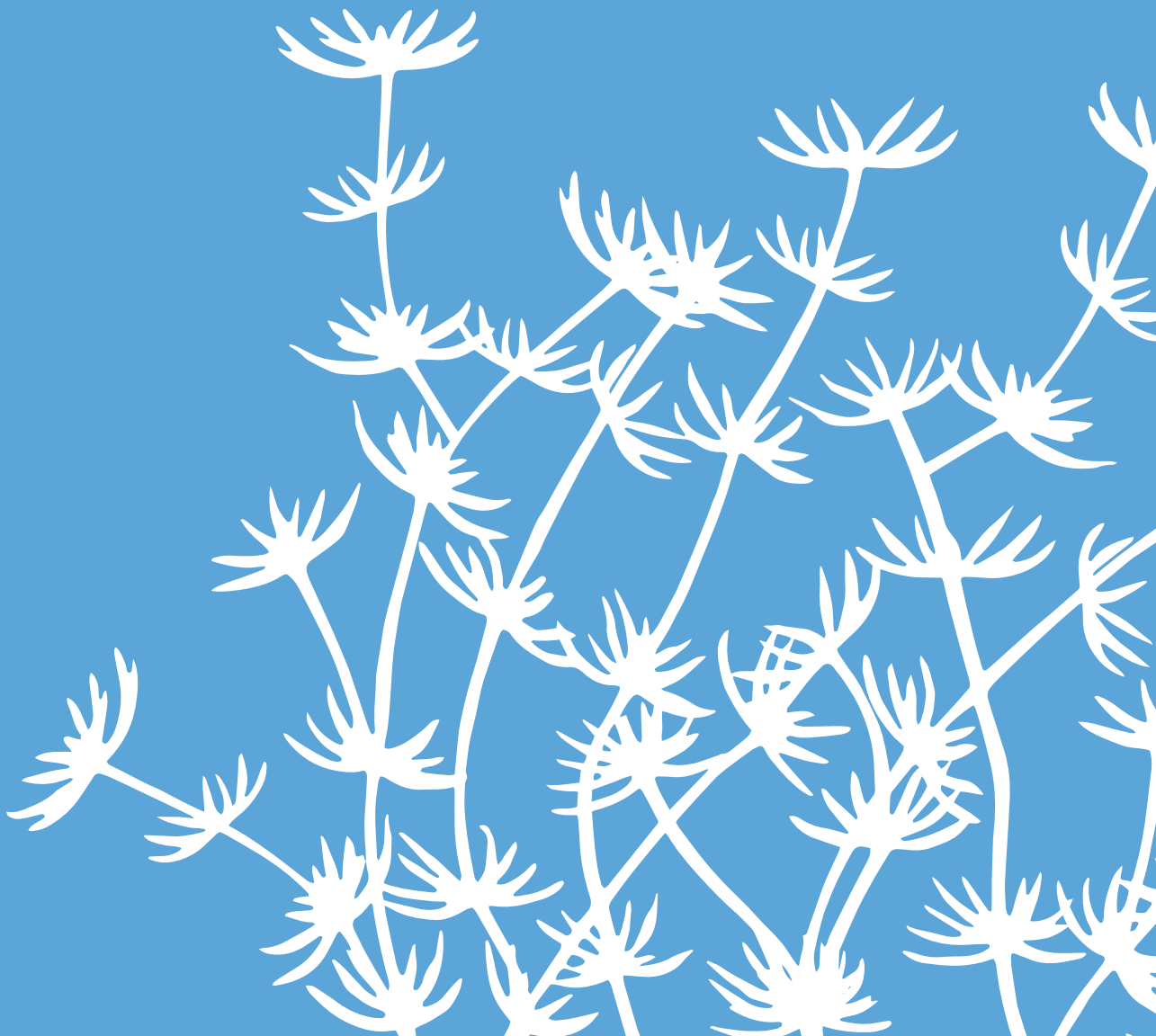


There are significant benefits to Dún Laoghaire-Rathdown if the objectives of this Action Plan are achieved. Removal of invasive species will result in a wide range of benefits. Recreation areas, such as riversides and woodlands, will benefit from improved safety from threats from species such as Giant Hogweed, which can cause severe skin burns. [Giant Hogweed sap contains a chemical that sensitises the skin, which leads to severe blistering when exposed to sunlight, and may recur for several years after initial exposure. The intensity of the reaction varies with individual sensitivity].

Fishing will improve due to enhanced water quality and increased prevalence of native aquatic species. There will be a greater variety of species populating our woodlands, leading to more engaging walks and nature encounters with our native species such as Red Squirrel, which will have a chance to recover from the competition from Grey Squirrel (an invasive alien species). The already significant negative economic impacts from species such as Japanese Knotweed will be decreased. The likelihood of new introductions becoming established will be vastly reduced, curtailing the potential economic threat from new IAS entering Dún Laoghaire-Rathdown.

Giant Hogweed

2 Impacts of Invasive Species



Invasive alien species frequently have negative impacts on our native biodiversity, our social and amenity enjoyment, ecosystem services, the economy, and even human health. These impacts are discussed here.

Biodiversity

The introduction of an IAS to a balanced ecosystem can be devastating and, in some cases, irreversible. IAS tend to grow and reproduce extremely quickly, thus they often outcompete our native species. Plants that grow earlier or more quickly may shade out other plant species. Larger animals, or those capable of producing large numbers of young, may deplete food sources on which native species rely. For example, the introduction of the Eastern Grey Squirrel (*Sciurus carolinensis*) into Ireland in 1911 has had a direct negative impact on the native Red Squirrel (*Sciurus vulgaris*) population. Eastern Grey Squirrels are larger than Red Squirrels and outcompete them for food, and they also carry the parapox virus, which is fatal to Red Squirrels, but not to Greys. Currently, the Red Squirrel is largely absent from areas where Grey Squirrels have invaded.[4]

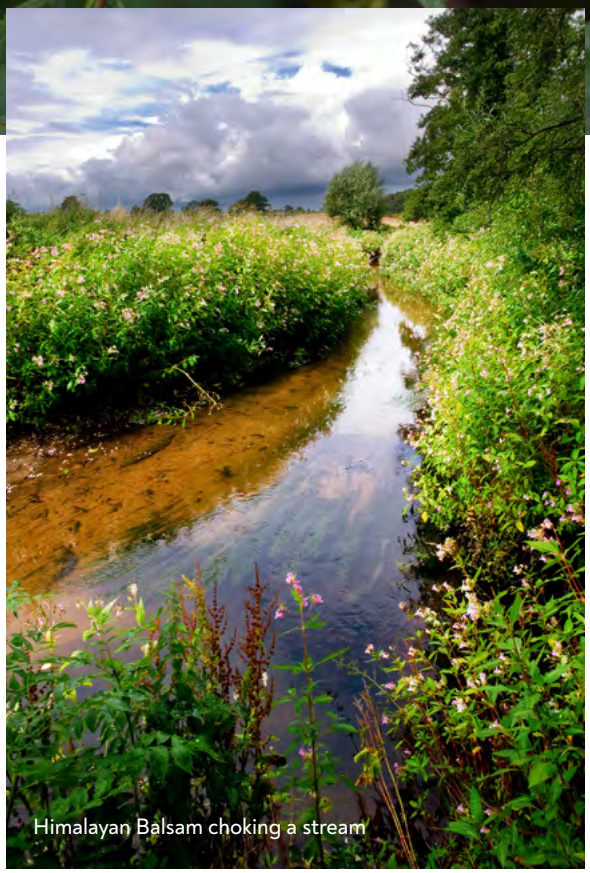
In some instances, invasive species prey directly on our native species, as well as competing for resources. Research has shown that Harlequin Ladybird (*Harmonia axyridis*) contributes to a reduction in biodiversity by directly competing with other invertebrates for food and habitats. It feeds on moths, aphids, and the eggs and larvae of butterflies and other scale insects. When food sources are scarce, the Harlequin Ladybird hunts our native ladybirds, in particular the smaller Two-spot Ladybird. Harlequin Ladybird is also a pest species in homes, as they enter houses during winter and form large aggregations, due to their inability to survive in cold climates outdoors (Labrie *et al.*, 2008).

The Harlequin Ladybird

Of particular concern in Dún Laoghaire Rathdown is the Eastern Grey Squirrel (*Sciurus carolinensis*), which displaces the much smaller, native Red Squirrel (*Sciurus vulgaris*).

[4] National Parks and Wildlife Service (2012). Irish Squirrel Survey. Irish Wildlife Manuals No. 89.

Himalayan Balsam



Himalayan Balsam choking a stream

There may also be indirect impacts on how well native species can compete with IAS. The IAS Himalayan Balsam (*Impatiens glandulifera*) has brightly coloured pink or purple, bonnet-shaped flowers that have an exceptionally large store of nectar. During the summer, bees may preferentially visit balsam flowers over those of native flowering species. This 'pollinator robbing' means that native species may not be frequented by bees, which would in turn affect the amount of seed they set and impact on their ability to reproduce successfully [5]. This species also has the direct impact of shading out other plants by growing very quickly and early in the season, thereby blocking sunlight needed by native plant species. When present in large numbers, Himalayan Balsam reduces native biodiversity by up to 25%.[6]

[5] Chittka, L. & Schürkens, S. (2001). Successful invasion of a floral market. *Nature (London), 411(6838):653.*

[6] Hulme, P.E. & Bremner, E.T. (2005). Assessing the impact of *Impatiens glandulifera* on riparian habitats: partitioning diversity components following species removal. *Journal of Applied Ecology*, 43:43-50.

Social and Amenity

The presence of IAS in amenity areas can restrict or prevent the use of these areas. Large swathes of dense growth at watersides, in ponds and woodland locations, can make access difficult. Thick rafts of waterweeds can make waterbodies inaccessible for water sports or fishing. Tourism may be negatively affected. Fishing may disappear from some areas due to a reduction in preferred species or a lack of access to traditional fishing spots.

Invasive species may also have direct negative effects on our waterways by increasing flood risk and siltation of water. Being choked by an invasive species can vastly reduce the carrying capacity of a small stream. The presence of large infestations at the water's edge, such as Himalayan Balsam or Japanese Knotweed, exposes riverbanks to erosion when the plants die back in winter, leaving bare ground.

Japanese Knotweed takes over riverbanks and causes not only loss of native species, but also bank erosion and flooding issues.

Floating pennywort

Ecosystem Services

Ecosystem services are services provided by our natural environment. There are four main categories of ecosystem services[7]:

1	Provisioning services, e.g. water and food
2	Regulating services, e.g. disease control and climate change regulation
3	Supporting services, e.g. pollination and nutrient recycling
4	Cultural services, such as recreational amenities

Provisioning services are products obtained from ecosystems, such as water, food, genetic resources, wood, clothing, and medicines. **Regulating services** are defined as benefits obtained from the regulation of ecosystem processes such as climate stability, natural hazard regulation (flood control), water purification and waste management, or pest control.

Supporting (habitat) services highlight the importance of ecosystems to ensure soil formation, crop pollination, and nutrient cycling, but also to provide habitat for migratory species, and to maintain the viability of gene pools. **Cultural services** include recreational, religious, spiritual and intellectual enrichment, and other non-material benefits people obtain from ecosystems.

The natural environment contained within Dún Laoghaire-Rathdown provides many different ecosystem services to the area, including many opportunities for recreation, such as fishing, safe swimming areas, and woodland walks. Invasive alien species have a detrimental impact on the natural functions of the environment, with potential impacts which include: outcompeting our native species for resources; altering habitat function leading to flooding; and hybridization with our native species.

[7] Invasive Species Ireland (2018)

Human Health and Safety

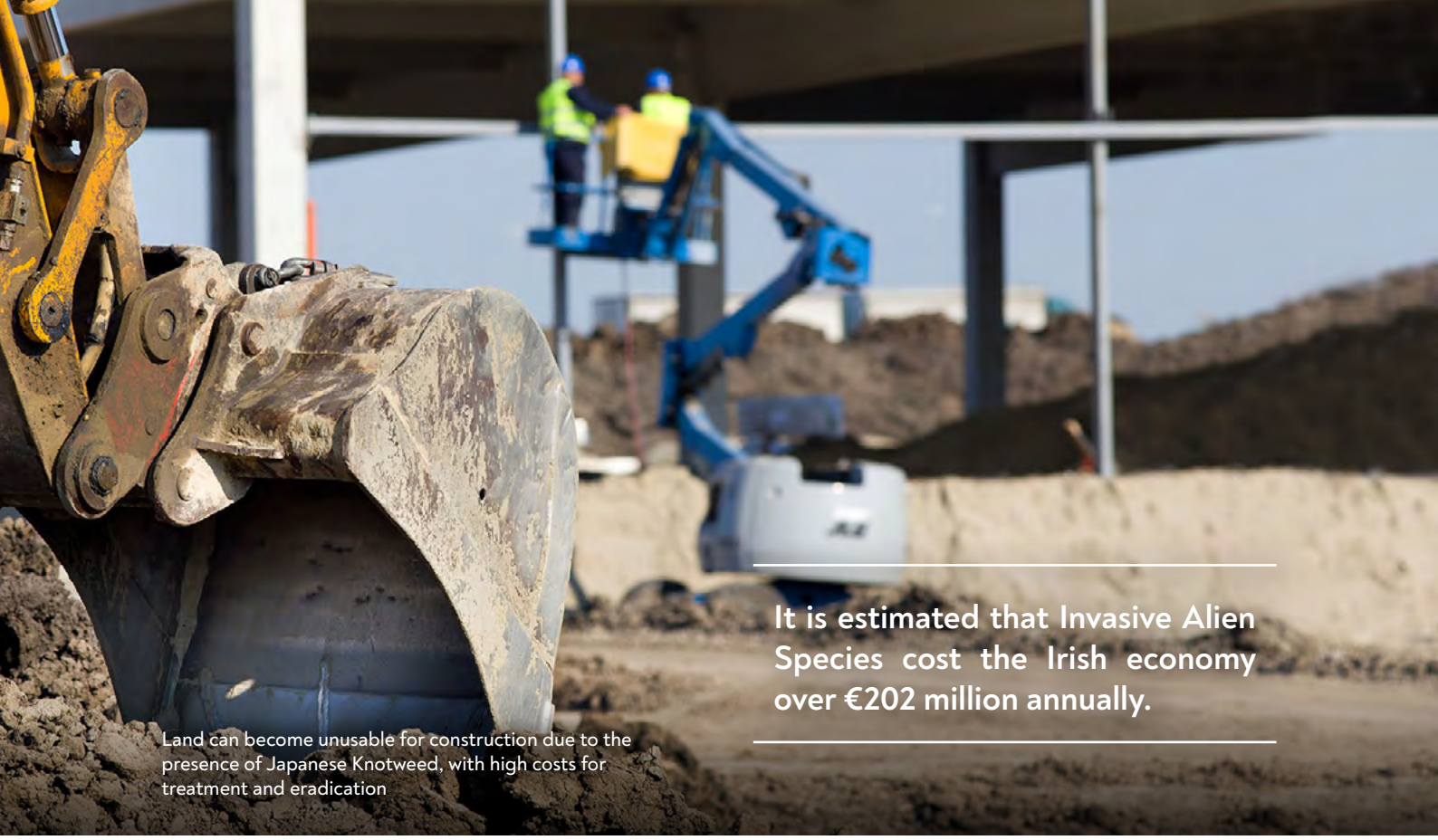
Some IAS present in Ireland pose a significant threat to human health and safety, including some present in Dún Laoghaire-Rathdown. It is well established that IAS can have a prominent impact on human health, by being specific disease vectors or by posing a direct health threat.

For example, the sap of Giant Hogweed (*Heracleum mantegazzianum*) causes severe blistering of the skin when exposed to ultraviolet light. The blisters from Giant Hogweed sap can recur whenever the skin is exposed to UV light for up to seven years. Permanent blindness can result if there is contact with the eyes. Children are particularly vulnerable.

There are also disease risks associated with some IAS, for example the Brown Rat (*Rattus norvegicus*) is a carrier of Weil's Disease (*Leptospirosis*), which can cause kidney failure and death.

Aquatic weeds such as Least Duckweed (*Lemna minuta*) can form smooth, dense, green mats on the surface of water, which can be mistaken for land by small children and animals.

The blisters from Giant Hogweed sap can recur whenever the skin is exposed to UV light for up to seven years.



Land can become unusable for construction due to the presence of Japanese Knotweed, with high costs for treatment and eradication

It is estimated that Invasive Alien Species cost the Irish economy over €202 million annually.

Economic

It is estimated that Invasive Alien Species cost the Irish economy over €202 million annually[8]. The cost to the EU is approximately €12 billion per year. Direct impacts are common in agriculture, aquaculture, forestry, tourism and construction industries. Costs can be reduced and savings made, through early treatment and management of these species.

For example:

- Leathery Sea Squirts (*Styela clava*) grow over aquaculture equipment and smother fish spawning grounds, and bivalves and sponges. Unfortunately, this species has been recorded in Dún Laoghaire Harbour and Dublin Bay.
- Floating pennywort (*Hydrocotyle ranunculoides*), first recorded in Dún Laoghaire in 2019, can choke a lake so completely that it becomes devoid of desirable fish species and other water species, and physically inaccessible to anglers.
- Grey squirrels also cause economic damage in woods within their introduced range, through bark stripping. The financial cost of damage is estimated at €4.5 million per year across the island of Ireland[8].
- The removal of Japanese Knotweed (*Fallopia japonica*) often adds hugely to the cost of commercial and housing development sites.

[8] Kelly, J., Tosh, D., Dale, K. & Jackson, D. (2013) *The economic cost of invasive and non-native species in Ireland and Northern Ireland*. Invasive Species Ireland for the Northern Ireland Environment Agency and the National Parks and Wildlife Service.


Himalayan Balsam

Despite its pretty appearance, Himalayan Balsam is one of Ireland's most high impact invasive species, reducing biodiversity and causing erosion along our riverbanks.

3 Climate Change and Invasive Alien Species

Climate change will have a substantial impact on biodiversity in the coming years, both by affecting the distribution of our native species, and by enabling some invasive species to become more abundant and widely distributed.

The impacts of climate change in relation to IAS are recognised in Ireland's Biodiversity Sectoral Climate Change Adaptation Plan by the Department of Culture, Heritage and the Gaeltacht (2019)[9]. It identifies two main impacts:

1. Arrival of new IAS better able to survive the new conditions, some of which may have negative impacts on the economy (e.g. via impacts on farming, riverbank invasions resulting in flooding)
2. IAS already established here may change their range as a result of climate change and become problematic.

Increasingly we could see more non-native species, which are currently benign, become invasive as the climate changes. Non-native species arriving by their own means, driven by climate change and displaying invasive characteristics, are also likely. All of these will be included in the scope of measures proposed in this Action Plan, such as gathering information, detection, surveillance, mitigation, and control where appropriate.

[9] https://www.npws.ie/sites/default/files/files/32631_NPWS_Climate%20Change%20Report_15Feb(1).pdf

Climate change will likely challenge effective invasive species management in a number of ways. For example, the geographic ranges of some invasive species are expected to shift as the climate warms, adding new invasive species to those currently being managed.

As a result, higher latitude areas, including Ireland, may become 'hotspots' of invasion, with increased numbers of problematic species.

Additionally, climate change stresses native ecosystems and increases disturbances through climate extremes, potentially creating new opportunities for introduced species to establish and thrive. The timing and efficacy of current treatment practices could also change if climate affects invasive species' phenology, if biocontrol agents are less resilient to climate warming than their hosts, or if increasing atmospheric CO2 enhances plant growth and reduces the efficacy of current control methods. Collectively, these changes point to the need for proactive planning and management that incorporates climate change. (Beaury *et al.*, 2020).[10]

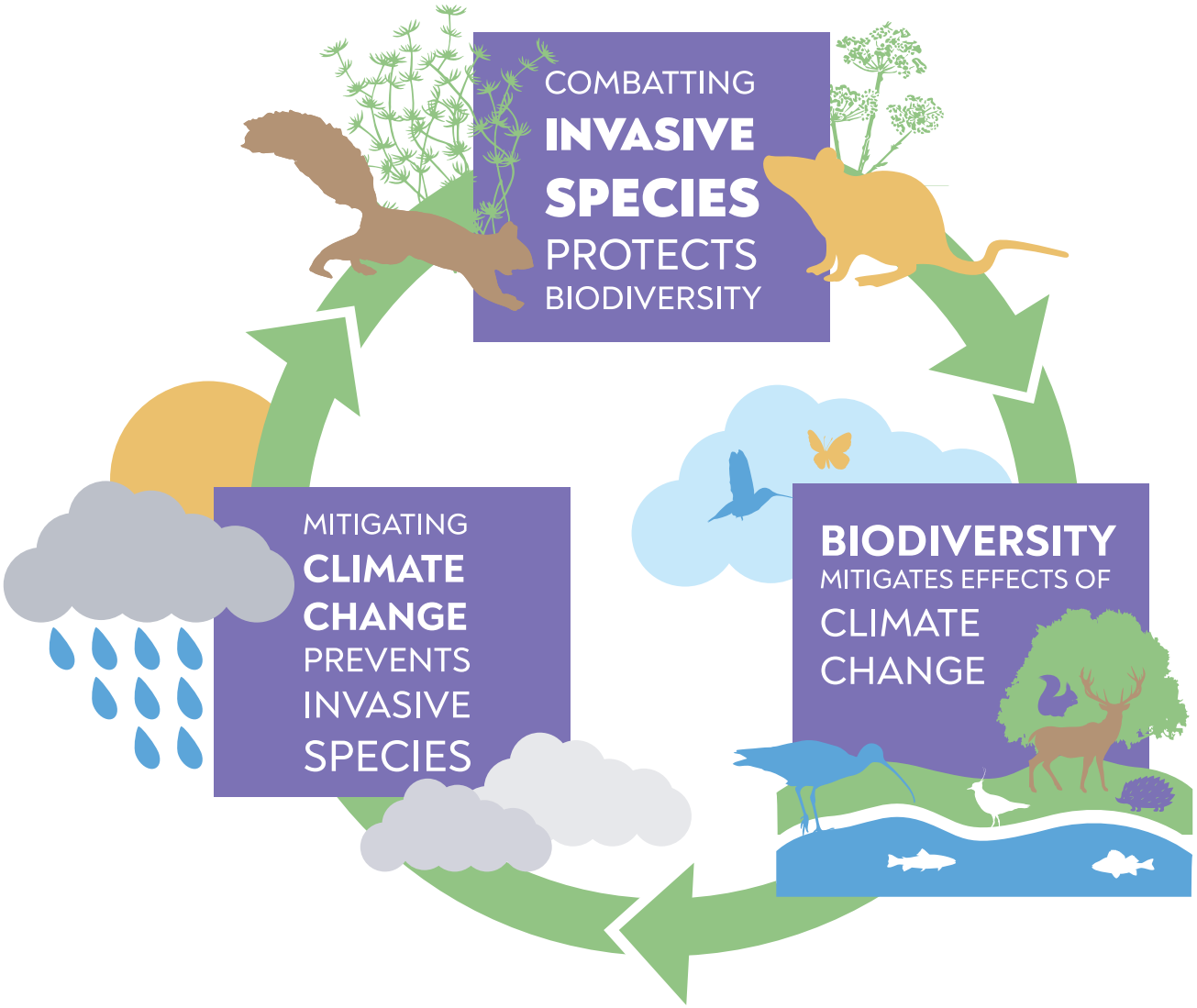
Early detection and rapid response at the initial stages of invasion is the most effective strategy for averting widespread invasion.

Incorporating Climate Change into DLR'S Invasive Alien Species Action Plan

Despite the challenges, climate change also affords novel opportunities for successful invasive species prevention and management. Early detection and rapid response (EDRR) at the initial stages of invasion is the most effective strategy for averting widespread invasion. Existing models of invasive species distribution shifts under climate change can characterize likely range shifts of many problematic species.

These model predictions provide an opportunity for EDRR of range-shifting invasive species before they become widespread in new areas, and in areas predicted to lose invasive species overall, managers may be able to focus resources on species predicted to persist. Tools such as range shift maps and risk assessments developed through research and implemented by managers show the potential for optimizing invasive species management in a changing climate through collaboration. (Beaury *et al.*, 2020). DLR will work with various government agencies, with third level institutions on research, and with the National Biodiversity Database Centre on the All-Ireland Invasive Species programme.

[10] Beaury, E.M., Fusco, E.J., Jackson, M.R. *et al*. Incorporating climate change into invasive species management: insights from managers. *Biol Invasions* 22, 233–252 (2020).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4 Invasive Species Legislation

The Wildlife Acts

The Wildlife Amendment Act (2000)

The Wildlife Amendment Act (2000) of The Wildlife Act (1976) made it an offence to cause an exotic species of flora or fauna to grow in the wild anywhere in the State. It states:

"(7) Any person who —

(a) turns loose, wilfully allows or causes to escape any species of wild animal or the spawn of such wild animal or wild bird or the eggs of such wild bird,

(b) transfers any species of wild animal or the spawn of such wild animal or wild bird or the eggs of such wild bird, from any place in the State to any other place in the State for the purpose of establishing it in a wild state in such other place,

(c) plants or otherwise causes to grow in a wild state in any place in the State any species of flora, or the flowers, roots, seeds or spores of flora, otherwise than under and in accordance with a licence granted in that behalf by the Minister shall be guilty of an offence.

(8) For the purposes of subsection (7), any reference to wild animals, wild birds, plants, flowers, roots, seeds or spores refers only to exotic species thereof.",

Irish Statutory Instrument 477/2011 – European Community (Birds and Natural Habitats Regulations) 2011

In 2011, the EC Birds and Natural Habitats Regulations introduced important legislation concerning invasive species in the Republic of Ireland.

Article 49 prohibits the introduction, breeding, releasing, planting or dispersal of certain species; and Article 50 prohibits dealing, distributing and keeping certain species.

Article 49 (1) "Save in accordance with a licence granted under paragraph (7), any person who breeds, reproduces or releases or allows or causes to disperse or escape from confinement, any animal which –

(a) is not —

(i) ordinarily resident in or is not a regular visitor to the State in a wild state, or

(ii) of a kind that is domesticated or that is in the normal course the subject of human husbandry,

(b) is included in Part 2A of the Third Schedule in any place specified in relation to such animal in the third column of Part 2A of the Third Schedule, or

(c) is included in Part 2B of the Third Schedule in any place specified in relation to such animal in the third column of Part 2B of the Third Schedule,

Article 49 (2) "Save in accordance with a licence granted under paragraph (7), any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow in any place specified in relation to such plant in the third column of Part 1 of the Third Schedule, any plant which is included in Part 1 of the Third Schedule, shall be guilty of an offence."

Article 50 (2) "Save in accordance with a licence granted under paragraph (7), a person shall be guilty of an offence if he or she has in her possession for sale, or for the purposes of breeding, reproduction or propagation, or offers or exposes for sale, transportation, distribution, introduction or release –

(a) an animal or plant listed in Part 1 or Part 2 of the Third Schedule

(b) anything from which an animal or plant referred to in Part 2 of the Third Schedule can be reproduced or propagated, or

(c) a vector material listed in Part 3 of the Third Schedule,

into or in or to any place in the State specified in relation to such an animal or plant or vector material in relation to that animal or plant or vector material in the third column of the Third Schedule."

A copy of the Third Schedule is given in Appendix III.

EU Regulation 1143/2014 on Invasive Alien Species

EU Regulation 1143/2014 on invasive alien species entered into force on 1 January 2015. It provides for a set of measures to be taken across the EU in relation to the IAS included on the list of IAS of Union concern. The list was updated to include a total of 49 species in August, 2017, and to 66 species in Aug°ust, 2019. Three distinct types of measures are envisaged, which follow an internationally agreed hierarchical approach to combatting IAS:

- Prevention: a number of robust measures aimed at preventing IAS of Union concern from entering the EU, either intentionally or unintentionally.
- Early detection and rapid eradication: Member States must put in place a surveillance system to detect the presence of IAS of Union concern as early as possible and take rapid eradication measures to prevent them from establishing.
- Management: some IAS of Union concern are already well-established in certain Member States and concerted management action is needed so that they do not spread any further and to minimize the harm they cause.

Chapter II Preventions – Article 7 Restrictions

1. Invasive alien species of Union concern shall not be intentionally: (a) brought into the territory of the Union, including transit under customs supervision; (b) kept, including in contained holding; (c) bred, including in contained holding; (d) transported to, from or within the Union, except for the transportation of species to facilities in the context of eradication; (e) placed on the market; (f) used or exchanged; (g) permitted to reproduce, grown or cultivated, including in contained holding; or (h) released into the environment.
2. Member States shall take all necessary steps to prevent the unintentional introduction or spread, including, where applicable, by gross negligence, of invasive alien species of Union concern.

A copy of the list of 66 species of European Union Concern is given in Appendix IV

Statutory Instrument 354/2018 - European Union (Invasive Alien Species) (Freshwater Crayfish) Regulations 2018

EU (Invasive Alien Species) (Freshwater Crayfish) Regulations 2018 entered into force on 3rd September 2018. Its purpose is to target the introduction of several species of non-native crayfish, which are included on the list of IAS of EU concern. White-clawed Crayfish are considered a globally threatened species, with Ireland holding one of the largest surviving populations. They are Ireland's only native crayfish species. In the 19th century, a disease known as the Crayfish plague began to spread across Europe, carried by North American species of crayfish. This disease is fatal to White-clawed Crayfish, however North American crayfish species are resistant to the disease. The disease has now reached five river systems in Ireland. The threat of this disease spreading remains very high. This new regulation aims to halt the spread of the disease by providing authorities in Ireland with additional powers to prevent the arrival and spread of the non-native crayfish species of EU concern.

Irish Risk Assessments for Invasive Species

In addition to these pieces of legislation, the Invasive Species Ireland project identified and assigned a risk score to a whole host of invasive species present within Ireland[11]. An impact risk score is assigned to each species based on its expected impact on the environment, human health and economy of Ireland. Scores range from high impact for species such as Japanese Knotweed, down to low impact for species such as Spanish Bluebell. Ireland has also ratified a number of international conventions that oblige the Government to address the issue of non-native invasive species, including the Convention on Biological Diversity, the Bern Convention and the International Plant Protection Convention.

[11] http://nonnativespecies.ie/risk-assessments/

5 Dún Laoghaire-Rathdown's Biodiversity

Although Dún Laoghaire-Rathdown only covers a very small area of the state, it has a number of locally, nationally and internationally important areas for biodiversity.

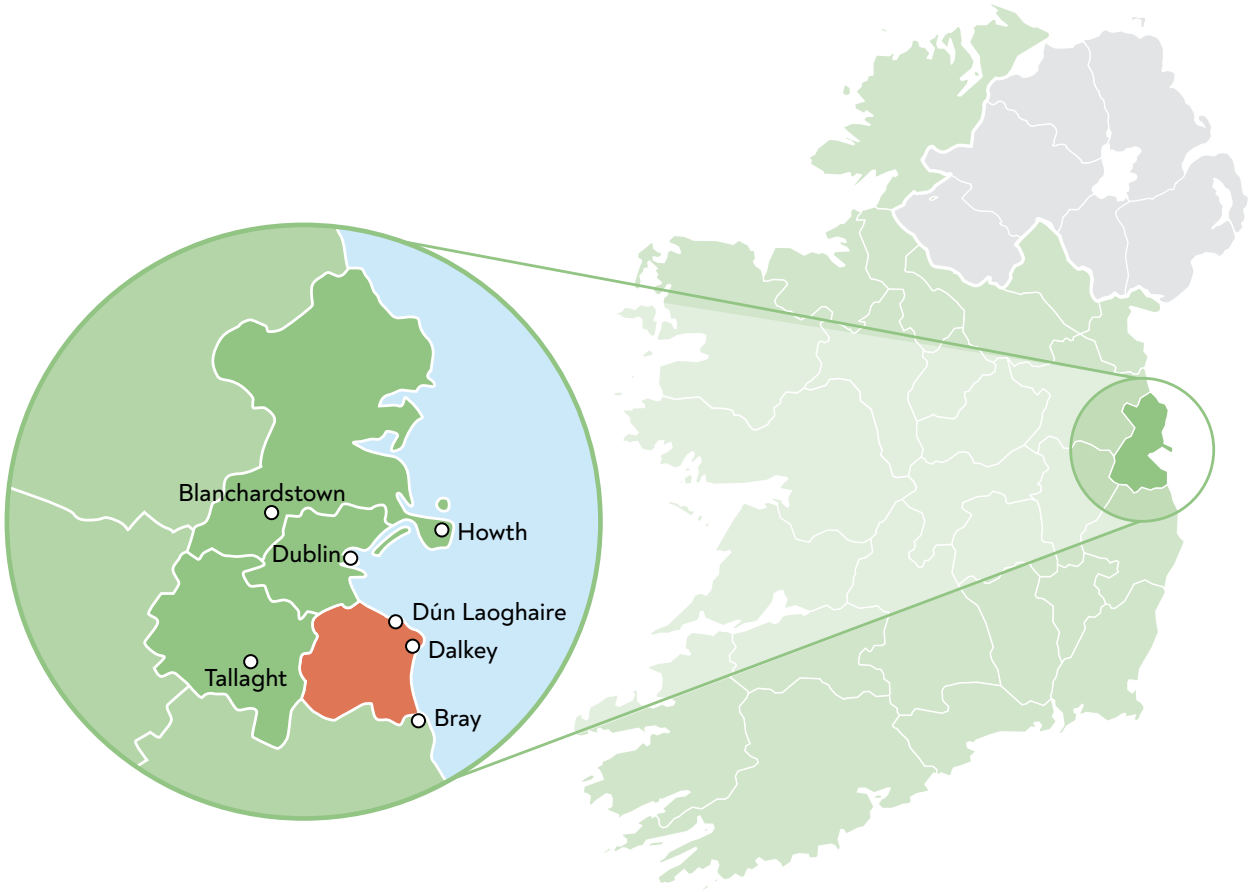


Figure 1: The Dún Laoghaire-Rathdown administrative area (in red) is situated in the Greater Dublin area of Ireland.

Dún Laoghaire-Rathdown County is the smallest county in the State, with an area of 125 square kilometres. Its administrative centre is Dún Laoghaire, situated just 10 kilometres south of Dublin City. The east of the county is bordered by a 17km stretch of coastline, including harbours, cliffs and beaches, with varying degrees of accessibility. Dense urban suburbs comprise most of the north and east of the county. The south and west of the county is mostly agricultural land and rural uplands that typically contain publicly accessible woodlands and commercial forests. A number of rivers and streams flow through the county, forming some of our most important wildlife corridors.

Although Dún Laoghaire-Rathdown only covers a very small area of the state, it has a number of nationally and internationally recognised areas of ecological importance. The most important of these sites have been designated under EU legislation and are part of what's known as the Natura 2000 network. Natura 2000 is the largest network of protected areas in the world and includes Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). It offers a protected haven to Europe's most valuable and threatened species and habitats. Sites of national importance are designated as Natural Heritage Areas (NHAs). In total, Dún Laoghaire-Rathdown has 14 protected areas within its administrative boundaries, comprising five SACs, three SPAs and nine proposed NHAs (three of which are also SACs). There are also a number of locally important sites and EU Annex habitats that occur beyond these designations and all are shown in the Ecological Network Map in Figure 2.

Dún Laoghaire-Rathdown is also one of the partners of the Dublin Bay Biosphere Reserve, an internationally important UNESCO Site. Biosphere reserves are areas comprising terrestrial, marine and coastal ecosystems. Each reserve promotes solutions reconciling the conservation of biodiversity with its sustainable use.

Eight Natura 2000 sites overlap with the Dún Laoghaire-Rathdown area. These sites are listed here:

Site Name	Site Number
South Dublin Bay SAC	[000210]
Ballyman Glen SAC	[000713]
Knocksink Wood SAC	[000725]
Wicklow Mountains SAC	[002122]
Rockabill to Dalkey Island SAC	[003000]
South Dublin Bay and River Tolka Estuary SPA	[004024]
Dalkey Islands SPA	[004172]
Wicklow Mountains SPA	[004040]

In addition to the Natura 2000 designations, there are nine sites listed as proposed Natural Heritage Areas (pNHAs) under the Wildlife Act 1976 (as amended) and are protected under the Dún Laoghaire-Rathdown County Development Plan. Three of the pNHAs (South Dublin Bay, Ballyman Glen and Knocksink Wood) have been designated as SACs, and so are also included above. The pNHAs that are within or overlap with the Dún Laoghaire-Rathdown area are listed here.

Site Name	Site Number
South Dublin Bay pNHA	[000210]
Ballyman Glen pNHA	[000713]
Knocksink Wood pNHA	[000725]
Ballybetagh Bog pNHA	[001202]
Booterstown Marsh pNHA	[001205]
Dalkey Coastal Zone and Killiney Hill pNHA	[001206]
Dingle Glen pNHA	[001207]
Loughlinstown Woods pNHA	[001211]
Fitzsimon's Wood pNHA	[001753]

The Dún Laoghaire-Rathdown Invasive Alien Species Action Plan is a commitment to leadership in the successful management of Invasive Species across the county.

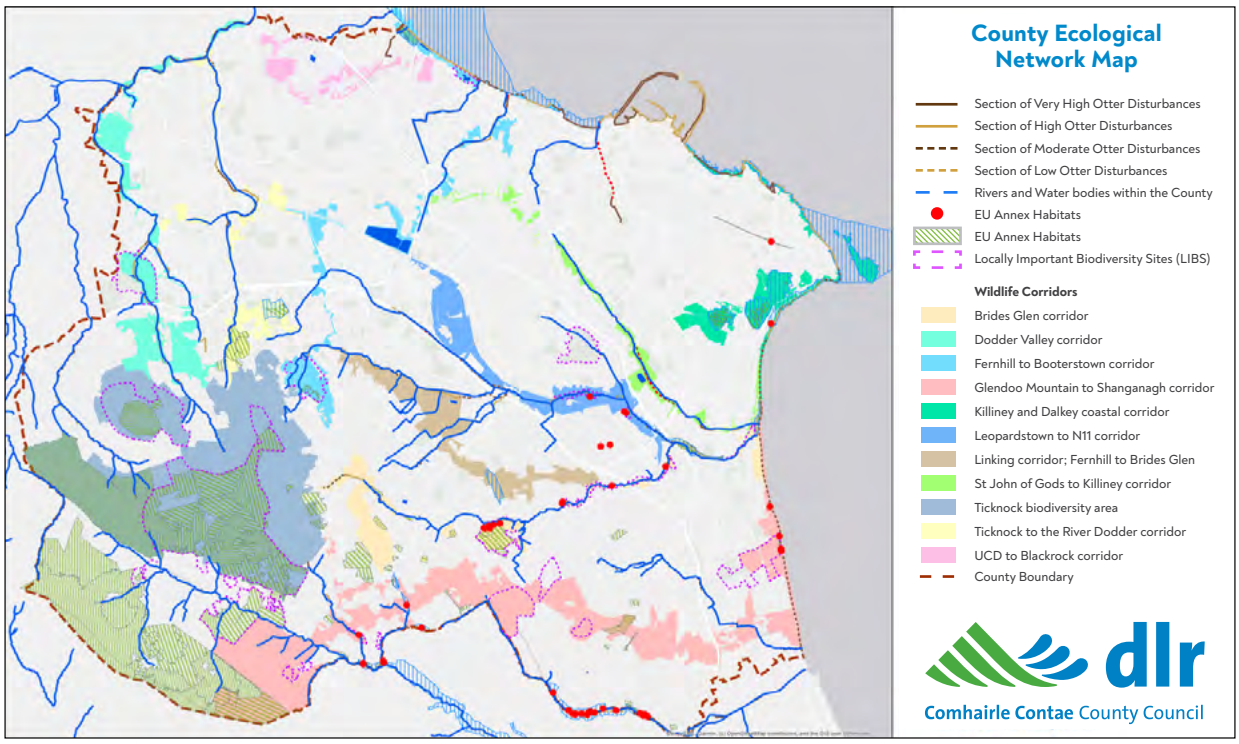


Figure 2: Ecological Network Map (Draft 2020)

As part of this plan, DLR aims to minimise the impacts of IAS in Natura 2000 sites, pNHAS, locally important biodiversity sites and other important areas, such as our rivers, streams and wildlife corridors, along with our infrastructure, in order to protect our biodiversity, our services and our communities from damage caused by IAS.

The Dún Laoghaire-Rathdown Invasive Alien Species Action Plan is a commitment to leadership in the successful management of Invasive Species across the county. To date, Dún Laoghaire-Rathdown County Council have focused their efforts on conserving the Red Squirrel through an organised Eastern Grey Squirrel trapping programme in the Killiney area and Fernhill. DLR has also aimed to control Common Toad in collaboration with NPWS and the Herpetological Society Ireland (HSI) through the 'Toad-in-the-Hole' campaign. In terms of other IAS plant species, DLR have been actively managing Canadian Waterweed in Marlay Park lakes; Parrot's Feather in Rathmichael; Floating Pennywort and other waterweeds in Cabinteely Park; and American Skunk Cabbage, Japanese Knotweed and Giant Hogweed in its parks and properties across the county. In terms of Planning and Development, DLR also require an Invasive Alien Species survey, management plan and biosecurity protocols for all developments through our Planning System.

Public information events, along with Staff information and training events have been undertaken throughout 2017-2019 in relation to IAS. Workshops with staff were held in 2019 as part of the drafting of this Plan. The National Biodiversity Data Centre (NBDC) have provided input. This action plan will provide a roadmap for future efforts to combat Invasive Species in the Dún Laoghaire-Rathdown area.

Towards our DLR Goal of Recording and Prioritising IAS

River Catchment Level – Mapping of Giant Hogweed

This project was commissioned by the DLR Biodiversity Officer in order to provide data about one of our most common and harmful IAS, Giant Hogweed.

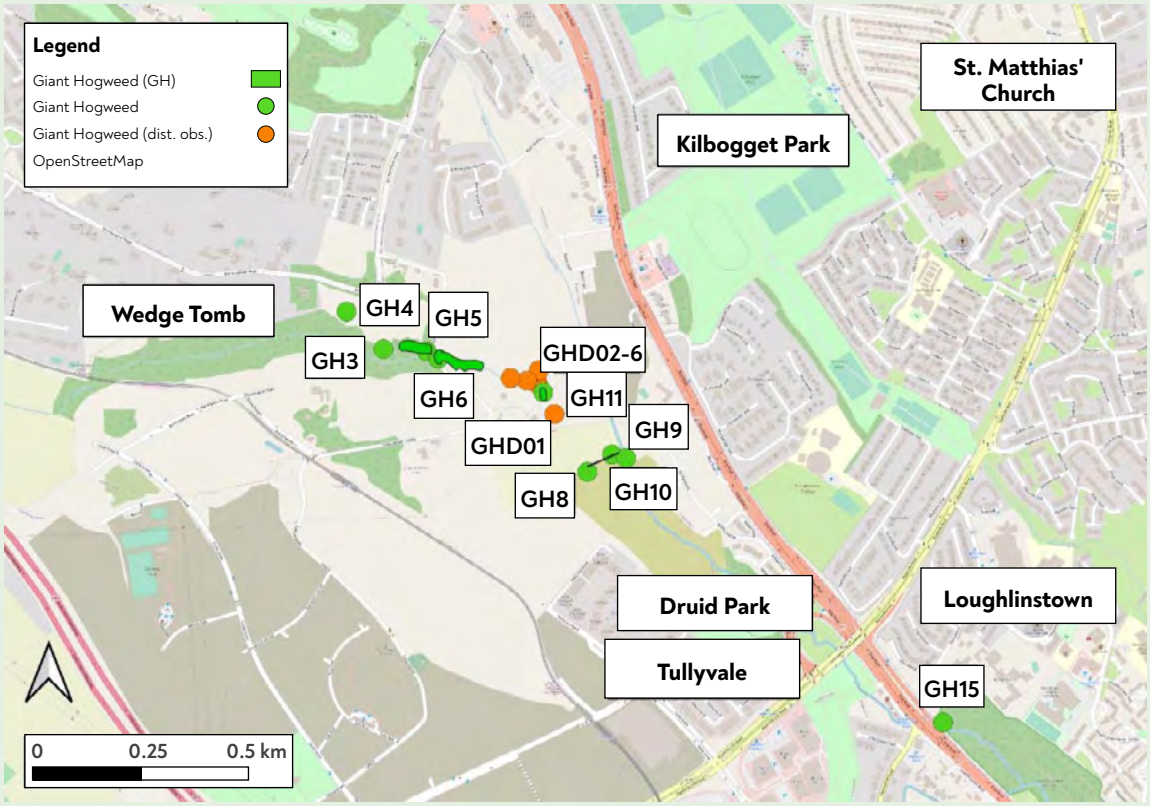
Giant Hogweed occurs along rivers, streams, roadsides and other areas. It produces 20,000 to 50,000 seeds per plant, which can remain viable in the soil for up to 15 years. Seeds can be spread by the surface run-off of rain, in rivers and streams or by wind. A small number of seeds can even be transported unintentionally by humans or animals if trampled upon.

DLR are currently treating known areas of Giant Hogweed, such as at Loughlinstown Wood, which is also a proposed Natural Heritage Area, and another area at Tullyvale. These areas occur downstream in the Carrickmines River and Shanganagh River (also called the Loughlinstown River).

It is important to look at the wider river catchment as there is little point treating the Giant Hogweed downstream without treating where the seed source is coming from.

Saving Money

This method aims to avoid the spread of the Giant Hogweed from upstream areas and also makes economic sense by reducing the need to treat new Giant Hogweed infestations downstream.



DLR Workshops and Training on Invasive Alien Species

DLR have carried out numerous Invasive Species workshops and training for both the public and our own staff over the past three years. The aim of training is to:

- Raise awareness of the presence of Invasive Alien Species across the county
- Provide the public and staff with information on the most common IAS and how to identify these
- Launch of the Invasive Species App in 2018 for recording IAS
- Provide training to staff and the public on using the Invasive Species App
- Provide information booklets on IAS to all our staff
- Include our staff in the drafting of the actions for our Invasive Alien Species Action Plan
- Encourage collaboration between DLR teams in managing and treating IAS
- Encourage the use of IAS specialists for specific advice where necessary

Due to the cross-departmental and cross-boundary nature of invasive species, it is vital that all sections of the local authority take ownership of this plan and that we work in partnership with other authorities.

6 Goals and Targets

The following tables of goals and actions have been developed to ensure that IAS are considered in all areas of our work in DLR. Some of these actions are already implemented, some are ongoing actions or have commenced recently. The actions will be reviewed and updated annually to ensure that they continue to be relevant.

A Recording and prioritising Invasive Alien Species

B Preventing our activities causing spread of IAS

C Early detection, rapid response for new IAS

D Minimising the impacts of IAS

E Effective treatment of IAS

F Preventing new introductions or re-establishment of IAS

G Overall management and implementation of IAS Action Plan

GOAL A: Recording and Prioritising Invasive Alien Species

Focus: Establishing the current distribution of IAS within the DLR area in order to best prioritise actions and to provide a baseline from which the success of interventions can be measured.

Actions	Section Lead	Timeline	Indicators	Partners
A1 Record the known locations of IAS throughout the county on the National Biodiversity Data Centre portal via the desktop invasives recording form or the smartphone 'Biodiversity' App	Parks, Cleansing, Environment and Climate Change, Transport, Water and Drainage, Housing, Architects	2022	County IAS Map of known locations of IAS Annual Report on County IAS map updates	National Biodiversity Data Centre (NBDC) OPW Universities Private landowners Residents' Associations Irish Rail
A2 Encourage use of 'Report Invasive' or 'Biodiversity' applications among Council staff. Staff will input the findings into the app	Parks, Cleansing, Environment & Climate Change, Transport, Water and Drainage, Architects, Housing	Ongoing	Annual reports from IAS Alert Staff Paper map in each depot to allow staff indicate locations for IAS Alert Staff	
A3 Establish a link from the DLR website to the National Biodiversity Data Centre Mapping feature for the county IAS records	Biodiversity Drawing Section – GIS Technician	2020	Link put on our website via GIS	NBDC
A4 Prioritise species, sites and infestations for treatment based on a matrix combining the risks they pose in their current environment and the likelihood of achieving eradication or control	Biodiversity	2021	List of Priority Species	NBDC
A5 Identify a flagship species that is not yet well established in the DLR area that can be targeted for complete eradication as a means of engaging public and media interest in the IAS action plan, e.g. American Skunk Cabbage or Giant Hogweed	Biodiversity Parks	2021	Flagship species identified and treatment commenced	Include a Third Level University Project
A6 Climate Proofing our IAS Plan: Record and report species increasing in spread across the county as a result of climate change and also the arrival of new species in collaboration with the National Biodiversity Database Centre[12]	Biodiversity	Ongoing	Annual reporting on new IAS and/or notable spread of existing IAS	NBDC

[12] https://www.npws.ie/sites/default/files/files/32631_NPWS_Climate%20Change%20Report_15Feb(1).pdf

GOAL B: Preventing our activities causing spread of IAS

Focus: Implementing practical strategies to ensure that human activities do not cause the spread of IAS within the DLR county area

Actions	Section Lead	Timeline	Indicators	Partners
B1 Provide Biosecurity[13] training for council field staff, amenity managers and other key personnel to provide them with the knowledge to protect the areas in which they work	Parks, Sports and Recreation, Cleansing, Environment and Climate Change, Beaches, Harbour, Transport, Water and Drainage, Housing	2021	Council Staff Training completion	
B2 Establish Biosecurity cleaning station at DLR Harbour and at DLR water-based events. Promote the use of cleaning stations to other event organisers outside of DLR County Council Provide a Biosecurity Support Pack for event organisers	Parks, Climate and Environment, Sports and Recreation, Communities, Event organisers	2021	Number of Biosecurity cleaning stations established Biosecurity Support Pack completed	
B3 Conduct public awareness campaigns on the impacts of IAS and the importance of biosecurity, e.g. require event organisers to include an IAS awareness campaign as part of their contracts	Biodiversity, Parks, Communities, Sports and Recreation, Harbour, Event Organisers	Ongoing	Number of campaigns annually	
B4 Establish new planning standard that means that new developments, plans and projects must submit an IAS survey as part of their planning application and a management plan where relevant	Planning, Biodiversity	2021	Objective in the County Development Plan	
B5 Produce a best-practice biosecurity document for outdoor staff, field workers and contractors, developers, etc. to follow while on-site, e.g. Construction Industry Invasive Species Good Housekeeping Plan[14]	Biodiversity, Parks, Water and Drainage, Architects, Sports and Recreation, Housing	2021	Best Practice Biosecurity Guide completed	NBDC NPWS Inland Fisheries Ireland (IFI)

[13] *Biosecurity* means taking action in order to minimise the introduction or spread of invasive non-native species and diseases.

[14] Document should detail best practice for setting up biosecurity areas and wash-down facilities, and for cleaning equipment and machinery that may have had contact with invasive species propagules

GOAL C: Early Detection, Rapid Response for new IAS

Focus: Ensuring that DLR County Council are aware of any new threats from Invasive Alien Species (IAS) in sufficient time to allow the problem to be dealt with before spread occurs

Actions	Section Leads	Timeline	Indicators	Partners
C1 Provide invasive Species Identification training for council field staff, amenity managers and other key personnel. Training to include section on the importance of reporting sightings and details of how to report, treat, dispose of (where relevant) and monitor	Parks, Sports and Recreation, Cleansing, Environment and Climate Change, Transport, Water and Drainage, Housing	Ongoing	Council training complete	
C2 Place an Invasive Species Section on the DLR website to include an Invasive Species Page with ID information and advice on treatment for home owners/ landowners, etc.	Biodiversity, Communications	2021	Webpage set up	NBDC
C3 Continue involvement in Invasive Species Week – Provide information to the public with list of IAS recorded in DLR County and information on how to report suspected IAS to NBDC. Provide IAS identification training for the public	Biodiversity	Ongoing	DLR Invasive Species Event	NBDC
C4 Maintain contact with National Biodiversity Data Centre so DLR will be alerted and will take immediate action when alerted on any new invasive species in their area	Biodiversity	Ongoing	Contact provided to NBDC	NBDC
C5 Keep regular check on the National Biodiversity Data Centre Invasive Species Alerts to monitor new invasive species introductions nationally, including any changes as a result of Climate Change	Biodiversity	Ongoing	Contact provided to NBDC	NBDC
C6 Establish and monitor an Early Warning System through the coordination of Actions C1 to C5	Biodiversity, Parks, Sports and Recreation, Cleansing, Environment and Climate Change, Transport, Water and Drainage, Housing	Ongoing	Early Warning System completed	
C7 Establish Rapid Response procedures for newly recorded species or infestations. Rapid Response procedures should be based on best-practice biosecurity and control for the species or taxon concerned	Biodiversity, Parks, Sports and Recreation, Cleansing, Environment and Climate Change, Transport, Water and Drainage, Housing	Ongoing	Notification through contact to NBDC Rapid Response implemented for species concerned	NBDC

GOAL D: Minimising the impacts of IAS

Focus: Minimising the impact of IAS within the DLR Natura 2000 network, along roadsides, within amenity areas, the riparian habitat and wildlife corridors

Actions	Sub-Actions	Section Responsible	Timeline	Indicators	Partners
D1 Identify the most prevalent invasive species in DLR and the ecosystem types and ecosystem services most at risk from these species	**D1.1** Identify the significant benefits to be gained economically from implementing control measures	Biodiversity	2023	Ecosystem Services gains reporting	NPWS EPA Other local authorities
	D1.2 Identify the ecosystem service benefits that will be realised and the benefits in turn to the people and county of DLR	Biodiversity	2023		NPWS EPA Other local authorities
D2 Minimise the impacts of IAS in Natura 2000 sites and other important nature conservation sites within DLR	**D2.1** Identify IAS that occur within the Natura 2000 site network and other important protected nature conservation sites within DLR and assign priority in accordance with Action A4	Biodiversity	2022	List of Priority Species	NPWS
	D2.2 Engage with the National Parks and Wildlife Service to establish a joint effort policy for tackling IAS within Natura 2000 sites and important nature conservation sites	Biodiversity	2021	NPWS Consultations	NPWS
	D2.3 Carry out treatments of priority infestations on DLR lands	Parks Water & Drainage Transport	Ongoing	Areas Treated (Ha) reported by Section Rep	
	D2.4 Identify and engage with landowners where priority invasive species are present	Parks Water & Drainage Transport	Ongoing	Progress reported by Section Rep	NPWS IFI EPA

continued

GOAL D: Minimising the impacts of IAS					
Actions	**Sub-Actions**	**Section Responsible**	**Timeline**	**Indicators**	**Partners**
	D2.5 Continue public engagement with Invasive Species Week by offering ID workshops and funding information for community initiatives at important nature conservation sites	Transport Parks	Ongoing	DLR Invasive Species events	NPWS
D3 Minimise the impacts of IAS along the roadsides	**D3.1** Identify IAS along roadsides using the master IAS county map	Transport Parks	Ongoing	Mapping of IAS	TII
	D3.2 Access funding through the Transport Infrastructure Ireland IAPS Framework to treat IAS growing along the National Road network	Transport Parks	Ongoing	Funding approval	TII
	D3.3 Develop a plan to treat all Knotweeds, Giant Hogweed and Giant Rhubarb growing along regional and byroads, and tender for contractors to carry out the treatments	Transport Parks	Ongoing	Plan by Section Leads	Transport Infrastructure Ireland (TII)
	D3.4 Engage with landowners who have IAS growing on their land by roadsides to enable full and effective treatment of infestations	Transport Parks		Progress reported by Section Rep	
D4 Minimise the impacts of IAS in DLR's amenity areas	**D4.1** Identify IAS causing problems within amenity areas	Parks Sports and Recreation	Ongoing	#amenity areas identified	TII

continued

GOAL D: Minimising the impacts of IAS

Actions	Sub-Actions	Section Responsible	Timeline	Indicators	Partners
	D4.2 Prioritise areas for treatment based on the negative impact on public enjoyment and in accordance with Action A4	Parks Sports and Recreation	Ongoing	#areas prioritised	
	D4.3 Carry out treatment of priority areas and establish a practical maintenance regime to prevent re-establishment	Parks Sports and Recreation	Ongoing	Treatment and maintenance records	
	D4.4 Educate the public on the dangers of introducing aquarium or terrarium contents/ garden waste, etc. into public areas through appropriate signage and/or information leaflets at local pet shops and on website	Biodiversity	2021	Public awareness campaign on website and at events	
D5 Minimise the impact of IAS on DLR's river systems	**D.5.1** Identify IAS growing in riparian habitats and assign priority in accordance with Action A4	Parks Water and Drainage	2021	List of Priority Species	Other private landowners Irish Water Inland Fisheries
	D5.2 Carry out treatment of priority areas on DLR lands	Parks Water and Drainage	Ongoing	Areas treated (Ha or km)	Other County Councils, e.g. Dublin County Council/South Dublin County Council River Dodder
	D5.3 Encourage community and local action group involvement in the control of Himalayan Balsam and other select species	Parks Water and Drainage Heritage Biodiversity	2021	#groups involved	Water Framework Officers

continued

GOAL D: Minimising the impacts of IAS					
Actions	**Sub-Actions**	**Section Responsible**	**Timeline**	**Indicators**	**Partners**
D6 Minimise the impact of IAS on DLR's marine habitats	**D6.1** Identify IAS growing in DLR's marine and coastal habitats and assign priority in accordance with Action A4	Biodiversity Climate Change & Environment Beaches Harbour	2022	List of Priority Species	Department of Agriculture, Food and the Marine
	D6.2 Begin treatment of priority IAS where practical on terrestrial areas	Climate Change and Environment Beaches Harbour	Ongoing	Areas treated (Ha) Species treated	
	D6.3 Hold public information day when opening DLR Harbour Biosecurity cleaning station (per Action B3) to promote 'Check, Clean, Dry' initiative	Climate Change and Environment Beaches Harbour	Ongoing	DLR harbour and beaches events	
	D6.4 Erect signage promoting 'Check, Clean, Dry' at busy recreation areas	Climate Change & Environment Beaches Harbour	2021	Signage erected	
	D6.5 Ensure marine biosecurity is planned into the structure of ongoing operations and management at all levels at DLR harbour	Harbour	2021	Number of operational plans with biosecurity incorporated	

GOAL E: Effective treatment of IAS

Focus: Ensuring that all treatments of IAS in DLR are carried out effectively and in accordance with best practice

Actions	Section Lead	Timeline	Indicators	Partners
E1 Provide training and CPD on best-practice treatments for all staff involved in managing or carrying out IAS treatments, including training updates in response to any changes as a result of Climate Change, e.g. new species. If using contractors, staff to ensure that only approved contractors are used	Parks, Sports and Recreation, Cleansing, Environment and Climate Change, Transport, Water and Drainage, Architects, Housing	2021	Completion of training	IFI
E2 Create a treatment/management calendar for IAS that details ideal times of year for treatment to occur	Biodiversity	2021	Calendar provided	Third level university project
E3 Research into non-chemical treatments of IAS	Biodiversity, Parks, Cleansing, Housing	Ongoing	Report on non-chemical treatment of IAS	NBDC Third level university project
E4 Agree on and establish a DLR county policy on the use of chemical versus non-chemical treatments of IAS	Parks, Cleansing, Housing	Completed 2018	'Weed Control on Hard Surfaces Development of an Integrated Weed Control Plan 2018'	Other local authorities
E5 Continue treatment of Grey Squirrel populations	Biodiversity	Ongoing Subject to ongoing advice from NPWS	Continued success of viable Red Squirrel Population in Killiney Hill	NPWS

GOAL F: Preventing new introductions or re-establishment of IAS

Focus: Minimise the opportunities for IAS to enter DLR and eliminate opportunities for re-infestation

Actions	Section Responsible	Timeline	Indicators	Partners
F1 Identify likely pathways for IAS introductions	Biodiversity, Parks, Climate Change and Environment, Transport, Cleansing, Architects, Housing, Water and Drainage	Ongoing	Pathways identified, e.g. Grey Squirrel corridors, watercourse corridors, roadside corridors, Architects/ Housing to check vacant sites for IAS	TII IFI NPWS NBDC
F2 Monitor likely pathways for IAS introductions	Biodiversity, Parks, Climate Change and Environment, Transport, Cleansing, Architects, Housing, Water and Drainage	Ongoing	Reports from Section Reps	TII IFI NPWS NBDC
F3 Identify and implement specific actions that can be taken to minimise the threat posed by each identified pathway	Biodiversity, Parks, Climate Change and Environment, Transport, Cleansing, Architects, Housing, Water and Drainage	2024	Reports from Section Reps	TII IFI NPWS NBDC
F4 Monitor previously treated areas for signs of re-establishment as an integral part of the standard treatment programme	Biodiversity, Parks, Climate Change and Environment, Transport, Cleansing, Architects, Housing, Water and Drainage	Ongoing	Reports from Section Leads	
F5 Restore habitats wherever possible, following IAS eradication, to minimise invasion by other IAS	Biodiversity, Parks, Climate Change and Environment, Transport, Cleansing, Architects, Housing, Water and Drainage	Ongoing	Habitats restored (Ha/Km)	
F6 Establish strong working relationships with other partners and agencies to tackle invasive species where their pathways cross administrative boundaries	Biodiversity, Parks, Transport, Water and Drainage	2022	Collaboration established	SDCC, DCC, Wicklow CC
F7 Identifying new invasive species occurring as a result of climate change or spread of existing IAS due to climate change and their pathways	Biodiversity	Ongoing	Number of of species identified	NBDC

GOAL G: Overall management and implementation of IAS Action Plan

Focus: Ensure that the IAS Action Plan is implemented in a coordinated fashion and that the effectiveness of the actions taken are monitored

Actions	Section Lead	Timeline	Indicators	Partners
G1 Elect one member of each Council Section to manage the actions for the section, including invasive surveys and treatment contracts for their section	Biodiversity, Parks, Climate Change and Environment, Transport, Cleansing, Housing, Water and Drainage, Harbour	2020	Each Section Rep nominated for Invasive Species	
G2 Hold annual meetings between the Council Section Representative to report on progress and results	Biodiversity, Parks, Climate Change and Environment, Transport, Cleansing, Housing, Water and Drainage, Harbour	Ongoing	Meeting records and attendance by Section Rep	
G3 Maintain an ongoing record of actions taken and quantify their effectiveness to inform future management efforts	Biodiversity, Parks, Climate Change and Environment, Transport, Cleansing, Housing, Water and Drainage, Harbour	Ongoing	Annual Report on actions taken by Section Rep	
G4 Oversee actions G1 to G3	Biodiversity	Ongoing	Annual Report on actions completed by DLR	

7 IAS Management

Early Detection and Rapid Response

Early Detection and Rapid Response (EDRR) systems are designed to stop the spread of new and emerging invasive species *before* they become established. These systems include having an early warning system in place for new sightings, and establishing emergency protocols that can be rapidly actioned when the alert is triggered.

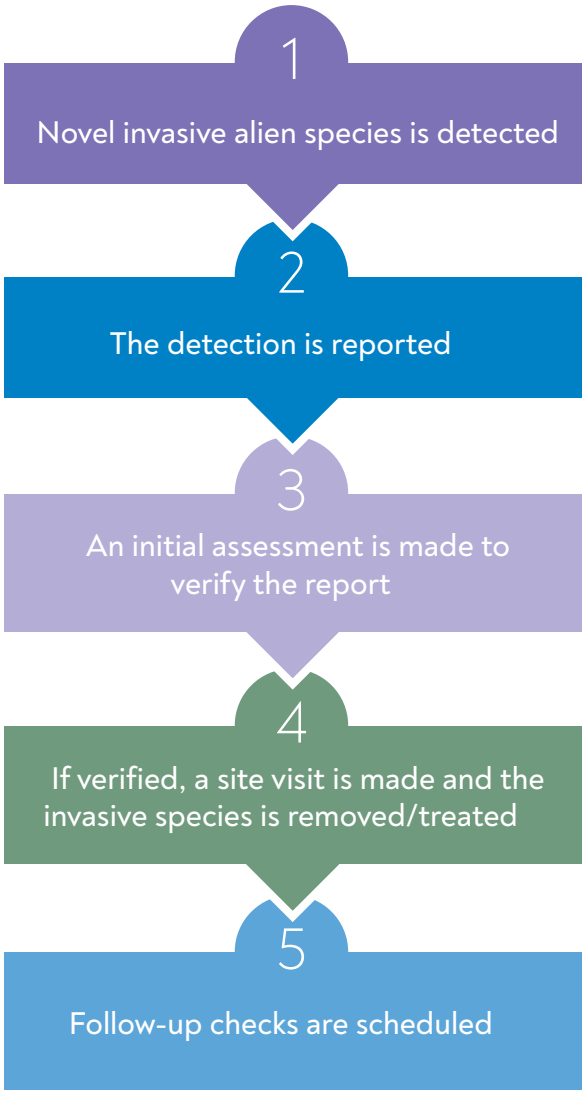
EDRR systems are a critical component of any large-scale invasive species management plan, and also one of the most cost-effective and ecologically sound methods for the control of invasive species. Having this type of system in place greatly increases the chance of new species being detected, contained and eradicated before they become well established, and can eliminate the need for expensive, ongoing control measures. Prevention really is better than cure.

A crucial factor in creating an effective EDRR system is increasing public awareness about invasive species. This means engaging with the public and landowners in relation to identification, potential impacts, current distribution and what to do if an invasive species is discovered.

In the event that a new species is detected within the Dún Laoghaire-Rathdown area, our EDRR Emergency Protocol will be followed.

Remember
Detection is good,
early detection is better
Response is good,
rapid response is better

EDRR Emergency Protocol



For specific actions related to EDRR, refer to **Goal C in the Action Plan Table**.

Ongoing Management of Invasive Species within DLR

Dún Laoghaire-Rathdown County Council's ultimate goal is to eradicate IAS where possible within the county, and to successfully control those species it is not practical to eradicate.

Effective, ongoing management is a necessary part of any IAS treatment programme. Decisions about the type of control used should be based on: the type of IAS, the ecosystem in which the IAS is located, the extent of the infestation, its ability to spread from that location and the projected cost of control. Best-practice management must always be followed.

Factors crucial to a successful ongoing management plan are:

- Knowledge of best management practices for the species involved
- A current county distribution map
- Accurate site assessment
- Creation of a treatment/management calendar
- Reference to relevant legislation and health and safety procedures
- Engagement with local landowners to reduce risk of re-infestation
- Safe disposal of material where relevant

Partnerships between public bodies, including professional conservation organisations and other stakeholders, provide a coordinated approach that brings together the necessary expertise, equipment and funding that make an ongoing management plan successful. These partnerships will vary depending on the specific target or area of concern within the county.

Engagement with landowners and local community groups is an essential part of our management plan and brings benefits of local knowledge, manpower, access to infestations, as well as increasing public awareness. These benefits will be essential to the success of our efforts.

Working with other Local Authorities that neighbour Dún Laoghaire-Rathdown, and those that form part of the pathways for the introduction of IAS, will also be crucial to the success of the programme. IAS do not respect administrative boundaries, and Dún Laoghaire-Rathdown County Council are committed to collaborative efforts with other Local Authorities to tackle particular issues of concern.

Habitat Restoration

Control operations carried out on large infestations of IAS may leave expansive areas of bare ground. Unfortunately, this often leaves the area open for new IAS to colonise. Habitat restoration, as part of a control programme, can reduce the likelihood of other IAS gaining a foothold.

Restoration of the habitat can be allowed to happen naturally, and as long as this includes regular monitoring for IAS, this approach is often successful. However, an extensive loss of cover may require human intervention to aid habitat re-establishment. This can be particularly important on riverbanks, where soil erosion may temporarily increase after methods to control IAS have been successful.

Expert ecological knowledge and experience is essential in undertaking any habitat restoration project. Therefore, appropriate partners should be identified in order to facilitate information and research exchange and specialist environmental and ecological contractors should be brought in as required.

Options for Habitat Restoration

- Natural colonisation or succession
- Planting native shrubs or trees (or using cuttings)
- Seeding with native grasses/herbs
- Physical land management, e.g. drainage, re-wetting, river re-profiling
- Reintroduction of key native species

When Himalayan Balsam dies back for winter or due to treatment, it leaves riverbanks highly vulnerable to erosion.

Our native Pine Marten, *Martes martes*

Only native plants and trees of known provenance should be used in habitat restoration. A combination of seeding and planting is often useful to further reduce the risk of recolonization of the areas disturbed during planting. Any habitat restoration project should include ongoing monitoring of the area for re-infestation by IAS.

In certain cases, a reintroduction of key native animal species can have a beneficial impact; however, there must be sufficient habitat and habitat connectivity to enable these species to thrive in their new environment.

A rise in our native Pine Marten (*Martes martes*) numbers has been associated with a significant reduction in the range and population of the Eastern Grey Squirrel (*Sciurus carolinensis*). This important squirrel predator is acting as a deterrent to Grey Squirrel , and this is helping the native Red Squirrel (*Sciurus vulgaris*) population to recover. [15]

Only native plants and trees of known provenance should be used in habitat restoration.

[15] Sheehy, E., Sutherland, C., O'Reilly, C. & Lambin, X. (2018) The enemy of my enemy is my friend: native Pine Marten recovery reverses the decline of the Red Squirrel by suppressing Grey Squirrel populations. *(285) Proceedings of the Royal Society B: Biological Sciences*

Preventing new infestations or reintroductions

Monitoring is critical to the prevention of invasion by IAS, whether a new invasion or a reintroduction. Areas that need to be specifically considered are:

- Main pathways, e.g. frequently visited areas, tourist spots.
- Pathways for spread across borders, coasts and water systems that are shared with neighbouring counties.
- Areas that have undergone disturbance, e.g. roads, railways, forestry, construction.
- Ecologically sensitive areas e.g. SACs, SPAs, NHAs, pNHAs

Table 2 provides a summary of common pathways for IAS introductions in different industry sectors.

Raising public awareness is important to prevent the reintroduction of IAS or the introduction of new IAS into the environment.

Information on IAS and their pathways can be shared with the public in a variety of ways, including the following:

- Posters, signs, merchandise
- Brochures, bumper stickers, the media
- Community work days
- Displays/stands at community events

Aquatic ecosystems are particularly vulnerable to IAS, as detection is difficult and spread can be rapid. The 'check, clean, dry' initiative is critical in preventing introductions. Signage at waterway entry points will help to increase public awareness of the threat from aquatic IAS.

For specific actions related to preventing new IAS infestations or reintroductions, refer to **Goal F in the Action Plan Table**.

Figure 3: Sample posters to help create awareness of Invasive Alien Species

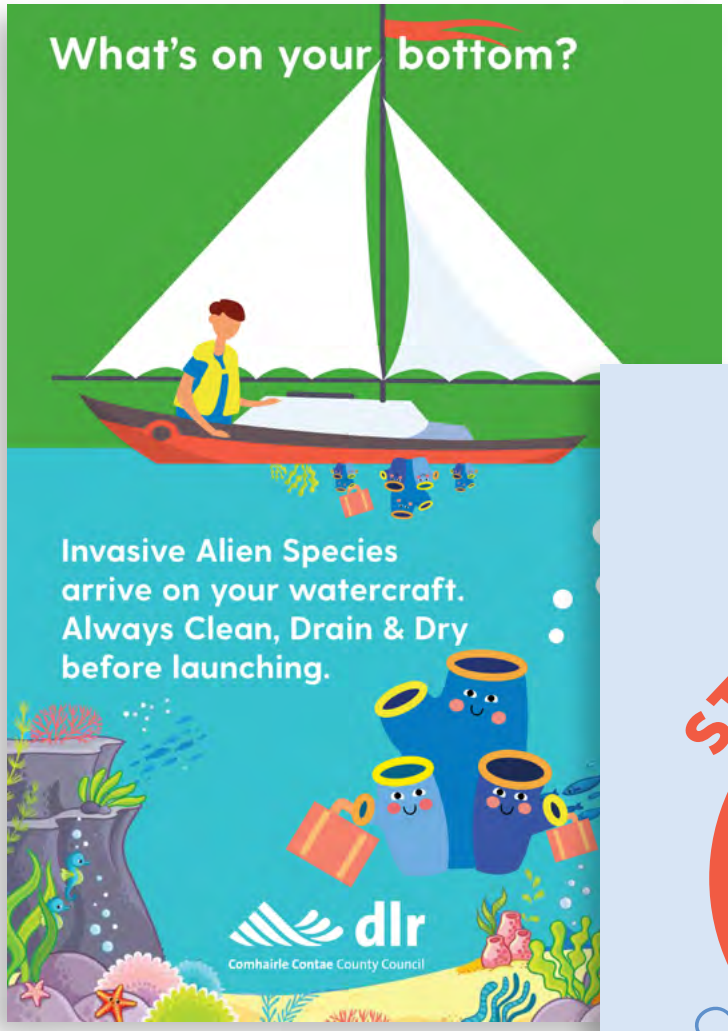


Table 2: Common pathways by which IAS are introduced into an area and examples of mitigation to minimise the risks from these pathways

Sector	Risk	Mitigation
Agriculture	Unintentional introduction of IAS through imported plants and plant products	Increase awareness and liaise with Department of Agriculture, Food and the Marine, and farming organisations
Forestry	Unintentional importation of alien tree species	Promote use of independent native certification schemes
Horticulture/ Gardening	Inappropriate disposal of plants or growth medium	Increase awareness of appropriate disposal methods and not planting plants near waterways/coastlines
Aquaculture/ Mariculture	Escape from fish farms, transfer of alien parasites	Work with relevant organisations to ensure best practice methods are used and enforced
Fishing	Use of live bait and intentional introduction of sport fish	Liaise with angling clubs and associations to increase awareness and reduce risk of intentional introductions
Pet owners and retailers	Escapes and dumping of pets	Increase public awareness in store and provide a recovery system for unwanted pets
Hunting	Introduction of alien species for restocking	Work with hunt associations to assess risks and regulate introductions
Aviculture/ Falconry	Escapes and hybridisation with native species	Work with bird breeders and falconry association to reduce risks of escapes and develop best-practice systems

8 Conclusions and Recommendations

This Dún Laoghaire-Rathdown Invasive Species Action Plan has been designed to provide the county with a practical roadmap to successfully control IAS within its administrative boundaries. Some 40 actions have been identified, along with timeframes for their completion.

Progress indicators have been purposefully included, so that the progression towards achieving each goal of the action plan can be measured objectively. Completion of these actions will ensure that IAS are eradicated and controlled wherever possible within DLR, which will in turn bring major benefits for its biodiversity, economy, and the health and wellbeing of its inhabitants.

There is no one part of this Action Plan that is more important than another. Recording of IAS; preventing spread; rapid eradication of new infestations; effective control methods; and identifying pathways of introduction; will all be necessary to successfully halt the spread of IAS in DLR. Likewise, this plan will only be fully effective if efforts are coordinated across agencies and counties, across County Council sections, and by engaging the efforts of the public.

The implementation of this plan will be challenging, and will take time, effort, and persistence. Managing and treating IAS occurs over years and will take ongoing work beyond initial identification and commencing treatment. However, despite the challenges, the benefits Dún Laoghaoire-Rathdown will gain are immense, and the county will be setting a new standard for the ongoing fight against IAS in Ireland.

This plan will only be fully effective if efforts are coordinated across agencies and counties, across County Council sections, and by engaging the efforts of the public.

Appendices

Appendix I – List of Known Invasive Alien Species in DLR, 2020*

Common Name	Scientific Name	Species Group	Environment	Risk Score
American Skunk Cabbage	*Lysichiton americanus*	Flowering Plant	Terrestrial	Medium
Bohemian Knotweed	*Fallopia x bohemica*	Flowering Plant	Terrestrial	High
Black Currant	*Ribes nigrum*	Flowering Plant	Terrestrial	Medium
Butterfly Bush	*Buddleja davidii*	Flowering Plant	Terrestrial	Medium
Canadian Fleabane	*Erigeron canadensis*	Flowering Plant	Terrestrial	Medium
Canadian Waterweed	*Elodea canadensis*	Flowering Plant	Freshwater	High
Cherry Laurel	*Prunus laurocerasus*	Flowering Plant	Terrestrial	High
Common Broomrape	*Orobanche minor*	Flowering Plant	Terrestrial	Medium
Floating Pennywort	*Hydrocotyle ranunculoides*	Flowering Plant	Freshwater	High
Giant Hogweed	*Heracleum mantegazzianum*	Flowering Plant	Terrestrial	High
Giant Knotweed	*Fallopia sachalinensis*	Flowering Plant	Terrestrial	Medium
Hairy Rocket	*Erucastrum gallicum*	Flowering Plant	Terrestrial	Medium
Himalayan Honeysuckle	*Leycesteria formosa*	Flowering Plant	Terrestrial	Medium
Himalayan Knotweed	*Persicaria wallichii*	Flowering Plant	Terrestrial	High
Hottentot Fig	*Carpobrotus edulis*	Flowering Plant	Terrestrial	High
Japanese Knotweed	*Fallopia japonica*	Flowering Plant	Terrestrial	High
Least Duckweed	*Lemna minuta*	Flowering Plant	Freshwater	Medium
New Zealand Pygmyweed	*Crassula helmsii*	Flowering Plant	Freshwater	High
Nuttall's Waterweed	*Elodea nuttallii*	Flowering Plant	Freshwater	High
Parrots Feather	*Myriophyllum aquaticum*	Flowering Plant	Freshwater	High
Rhododendron	*Rhododendron ponticum*	Flowering Plant	Terrestrial	High
Russian Vine	*Fallopia baldschuanica*	Flowering Plant	Terrestrial	Medium
Sea Buckthorn	*Hippophae rhamnoides*	Flowering Plant	Terrestrial	Medium
Spanish Bluebell	*Hyacinthoides hispanica*	Flowering Plant	Terrestrial	Low
Sycamore	*Acer pseudoplatanus*	Flowering Plant	Terrestrial	Medium
Three-cornered Garlic	*Allium triquetrum*	Flowering Plant	Terrestrial	Medium
Traveller's Joy	*Clematis vitalba*	Flowering Plant	Terrestrial	Medium

** Other invasive species may be recorded after 2020*

continued

Common Name	Scientific Name	Species Group	Environment	Risk Score
Turkey Oak	*Quercus cerris*	Flowering Plant	Terrestrial	Medium
Wall Cotoneaster	*Cotoneaster horizontalis*	Flowering Plant	Terrestrial	Medium
Water Fern	*Azolla filiculoides*	Flowering Plant	Freshwater	Medium
Japanese Skeleton Shrimp	*Caprella mutica*	Crustacean	Marine	Medium
New Zealand Land Hoppers	*Arcitalitrus dorrieni*	Crustacean	Terrestrial	Medium
Feral Greylag Goose	*Anser*	Bird	Terrestrial	Unknown
Wakame	*Undaria pinnatifida*	Alga	Marine	High
Wireweed	*Sargassum muticum*	Alga	Marine	High
American Mink	*Neovison vison*	Mammal	Terrestrial	High
Brown Rat	*Rattus norvegicus*	Mammal	Terrestrial	High
European Rabbit	*Oryctolagus cuniculus*	Mammal	Terrestrial	Medium
Fallow Deer	*Dama dama*	Mammal	Terrestrial	High
Feral Goat	*Capra hircus*	Mammal	Terrestrial	Medium
Grey Squirrel	*Sciurus carolinensis*	Mammal	Terrestrial	High
House Mouse	*Mus musculus*	Mammal	Terrestrial	High
Raccoon	*Procyon lotor*	Mammal	Terrestrial	High
Sika Deer	*Cervus nippon*	Mammal	Terrestrial	High
Leathery Sea Squirt	*Styela clava*	Tunicate	Marine	High
Australian Flatworm	*Australoplana sanguinea*	Flatworm	Terrestrial	Medium
New Zealand Flatworm	*Arthurdendyus triangulatus*	Flatworm	Terrestrial	High
Budapest Slug	*Tandonia budapestensis*	Mollusc	Terrestrial	Medium
Jenkins' Spire Snail	*Potamopyrgus antipodarum*	Mollusc	Freshwater	Medium
Keeled Slug	*Tandonia sowerbyi*	Mollusc	Terrestrial	Medium
Wrinkled Snail	*Candidula intersecta*	Mollusc	Terrestrial	Medium
Harlequin Ladybird	*Harmonia axyridis*	Insect	Terrestrial	High
Horse Chestnut Leaf-miner	*Cameraria ohridella*	Insect	Terrestrial	High
Common Toad	*Bufo bufo*	Amphibian	Terrestrial	Unknown

* *Species list as of publication date and is subject to change*

Appendix II – High Impact Invasive Species in DLR, 2020*

Species Name

Bohemian Knotweed (*Fallopia japonicus x bohemica*)

Habitat

Terrestrial. Most common along riverbanks, roadsides and waste ground

Identification

- A hybrid of Japanese and Giant Knotweed
- Large, entire leaf, 25cm in length. Green, heart or spade-shaped with pointed tips Arranged in a zig zag formation along the stem
- Small white flowers appear in late summer and throughout autumn
- Green, hollow, bamboo-like stem with red/purple mottling and nodes
- Similar to bamboo in appearance

Threat

- Outcompetes native species
- Chokes small streams and increases flood risk
- Can cause structural damage to infrastructure

Prevention and Control

- Prevent cutting or digging of the plant
- Variety of treatment options, including applying herbicide, excavation, incineration, burial, etc

Species Name

Canadian Waterweed (*Elodea canadensis*)

Habitat

Freshwater aquatic. Invades slow-moving waterbodies, such as lakes, ponds, ditches or streams

Identification

- Leaves are oblong, bright green and somewhat translucent, with very finely serrated margins. They are 6-15mm long, 1-5mm wide and the leaf tips taper to a blunt point. Leaves are found in whorls of three (occasionally four) around the stem
- Stems are branched, round and slender. They produce adventitious roots which can hang free in the water or root at the water bottom
- Canadian waterweed is dioecious – male and female flowers occur on separate plants. From June to August, small white flowers occur on the ends of thread-like stalks, floating at the water surface. Flowers are often not produced
- Fruit capsules, if produced, are 6mm long and ripen underwater
- Reproduces mainly by stem fragments (stolons) and overwintering buds (short compact branches that appear in late summer)

Threat

- Outcompetes and shades out native species
- Can clog infrastructure such as water intake pipes
- Forms large mats that are unsightly, and can be mistaken for solid ground by children and animals

Prevention and Control

- Prevent the dumping of garden and pond waste
- Clean boats, trailers and equipment before moving from one body of water to the next
- Create shade by planting trees that overhang the banks and shade the waterway
- Opaque tarps can be floated on the water to create shade but care must be taken to prevent deoxygenation of the water
- Careful mechanical control

** Other invasive species may be recorded after 2020*

Species Name

Cherry Laurel (*Prunus laurocerasus*)

Habitat

Terrestrial. Grows on acidic, well-drained soils and is also tolerant of salt spray

Identification

- *Prunus laurocerasus* is an evergreen shrub that grows 3-6m, with wide spreading, dense, coarse-textured foliage
- Leaves are alternate, oblong, range from slightly to fully serrated, and are between 5-15 cm long. The leaves range from medium to dark green
- White, fragrant flowers 5-10cm long bloom in clusters in mid-spring
- The plant produces berries in the summer, which are purple to black, and poisonous to humans

Threat

- Outcompetes native species

Prevention and Control

- Do not plant as a hedging plant
- Careful mechanical control of seedlings
- Clip plant before flowering or remove fruit
- Cutting of large plants and application of herbicide to the cut stump

Species Name

Floating Pennywort (*Hydrocotyle ranunculoides*)

Habitat

Freshwater aquatic. Grows in the shallow margins of slow-flowing water bodies, especially canals, ditches, ponds, lakes and slow-flowing rivers

Identification

- Perennial, stoloniferous, aquatic plant
- Emergent or floating alternate leaves are circular or kidney-shaped, with a crenelated margin
- White flowers produced in a small umbel are borne on a leafless stalk May-October
- Reproduces by stem fragments – stolons

Threat

- High growth rates allow the plant to outcompete native species
- Reduced oxygen levels caused by the floating mats can cause fish mortality
- Impedes drainage, causing siltation and increased risk of flooding
- Currently no recorded impacts in Ireland due to its restricted distribution and proactive and intensive eradication and management procedures

Prevention and Control

- EU-wide ban on the sale, growing and keeping of this plant
- Prevent dumping of pond and aquarium waste
- Biosecurity measures in place for boats and equipment moving from one waterbody to another
- Planting of overhanging trees along the banks of infected waterways to increase shade levels
- Mechanical control: Hand-pulling, raking, cutting and hydro-venturi
- Chemical control is considered a last resort option for treatment. Only use permitted and licensed herbicides for aquatic plants

Species Name

Giant Hogweed (*Heracleum mantegazzianum*)

Habitat

Terrestrial. Most common on riverbanks

Identification

- The size of Giant Hogweed makes it easy to identify, as it can grow up to 5-6m in height
- Serrated and sharply divided leaves; can grow to over 2m across
- White or rarely pink, flowering from June to August. Flowers in large umbrels up to 80cm across. There can be up to 50,000 (1.5cm) seeds per plant
- The main stem is large, usually with purple blotches, hollow and can have hairy bristles and be 5-10cm in diameter

Threat

- Giant Hogweed poses a threat to human health due to production of a hazardous sap that can cause severe burns and scarring by sensitising the skin to light (UV radiation)
- Its large surface area means it shades out native species and its high volume of seed production means it easily propagates
- The species can also increase soil erosion along riverbanks

Prevention and Control

- Treatment with herbicide
- Careful mechanical cutting of root system

NOTE: The invasive Giant Hogweed should not be confused with our common native Hogweed, which is an important plant for pollinators. Key differences between Hogweed and Giant Hogweed include the height, width of stem, size of leaf, size of flower head and size of seed.

Giant Hogweed can grow to 5-6m in height, has a much wider stem, larger leaves, and larger flower heads, up to 80cm across, than the native Common Hogweed.

Hogweed, *Heracleum sphondylium*, is a tall native wildflower of meadows and hedgerows. Its flowers form large umbrels up to 15cm in width, and it can grow to 2m in height.

Species Name

Giant Knotweed (*Fallopia sachalinensis*)

Habitat

Terrestrial. Often in gardens, parks and along watercourses

Identification

- Very large (4-5m high), rhizomatous, bamboo-like perennial
- Large heart-shaped alternate leaves up to 40cm long and arranged along the stem in a zig-zag pattern
- Flowers small, greenish-white and borne in dense panicles, July-October
- Stems are green, hollow, with reddish joints and resemble bamboo

Threat

- Form dense thickets and outcompete native species
- Can block smaller water bodies and increase risk of flooding
- Infrastructure damage
- Reduce the amenity value of public areas

Prevention and Control

- Prevent cutting or digging of the plant, which increases the risk of spread
- Controlled by herbicide application, excavation, and then incineration or deep burial

Species Name
Himalayan Knotweed (*Persicaria wallichii*)

Habitat
Terrestrial. Most common along riverbanks, roadsides and waste ground

Identification
- Large lanceolate leaf, often with a reddish mid-rib
- Small white flowers appearing from a green/red stem
- Green stem becoming red near the flowering heads
- Similar to bamboo in appearance
- Plant can grow up to 1.5m (approx. 5ft) tall

Threat
- Outcompetes and shades out native species

Prevention and Control
- Prevent cutting of the plant
- Treatment with herbicide

Species Name
Hottentot Fig (*Carpobrotus edulis*)

Habitat
Terrestrial. Most common on coastal cliffs

Identification
- May first notice a dense mat of succulent green leaves, with trailing dead leaves and stems
- Very succulent leaves, in opposite pairs. Leaves are triangular in cross section. Some older leaves may appear reddish
- Yellow or magenta solitary flower with a yellow centre. Only opens in sunlight generally in the afternoon
- Vegetative propagation by runners (rooting at nodes), also capable of reproducing from seed which ripens from July to September

Threat
- Competes aggressively for space with native plant species. Can smother the EU-protected habitat type 'Vegetated sea cliffs of the Atlantic and Baltic coasts' (1230)
- Hybrid species can lead to intensified invasions
- Can hinder the disturbance regime in dune habitats protected under the Habitats Directive 92/43/EEC

Prevention and Control
- Correct disposal of domestic plant material
- Careful manual removal
- Treatment with herbicide

Species Name

Japanese Knotweed (*Fallopia japonica*)

Habitat

Terrestrial. Most common along riverbanks, roadsides and waste ground

Identification

- Large, entire leaf 10-15cm in length. Green, shield-shaped with pointed tips and a flat base. Arranged in a zig-zag formation along the stem
- Small white flowers appearing in late summer and throughout autumn
- Green, hollow, bamboo-like stem, with red/purple mottling
- Similar to bamboo in appearance
- Rhizomatous roots can extend to 3m deep and 7m horizontally. Bright orange inside and break very easily which can cause the plant to spread

Threat

- Outcompetes native species
- Can leave riverbanks vulnerable to erosion when the plant dies in winter
- Can cause structural damage to infrastructure

Prevention and Control

- Prevent cutting of the plant
- Variety of treatment options including applying herbicide, incineration, burial, etc.

Species Name

New Zealand Pigmyweed (*Crassula helmsii*)

Habitat

Freshwater aquatic. Invades slow-moving waterbodies, such as lakes, ponds, ditches or streams

Identification

- Singular plants form dense areas of green mats
- Rigid and round stem
- Leaves are up to 2cm long and in opposite linear pairs. Leaf bases joined around the stem to form a collar. Leaves fleshy when emergent, and flatter when permanently submerged
- Very small flower, with four whitish petals, flowers are often absent
- Seeds can be produced, but reproduction usually takes place through fragments
- Tiny individual plant nodes are capable of producing a new viable individual

Threat

- Dense mats of the plant can outcompete native species
- Dense mats of the plant can deplete oxygen from the water, killing native flora and fauna
- Dense mats of the plant can cause a health hazard as they may be mistaken for dry land
- Can clog infrastructure such as water intake pipes

Prevention and Control

- Prevent the dumping of garden and pond waste
- Clean boats, trailers and equipment before moving from one body of water to the next
- Create shade by planting trees that overhang the banks and shade the waterway
- Opaque tarps can be floated on the water to create shade, but care must be taken to prevent deoxygenation of the water
- Careful mechanical control

Species Name

New Waterweed (*Elodea nuttallii*)

Habitat

Freshwater aquatic. Invades slow-moving waterbodies, such as lakes, ponds, ditches or streams

Identification

- Leaf tips taper to a point, with the leaf being broadest at the base
- Usually some leaves are strongly recurved and/or twisted
- Root tips white to greyish-green when fresh

Threat

- Dense mats of the plant can outcompete native species
- Dense mats of the plant can deplete oxygen from the water, killing native flora and fauna
- Dense mats of the plant can cause a health hazard as they may be mistaken for dry land
- Can clog infrastructure, such as water intake pipes

Prevention and Control

- Prevent the dumping of garden and pond waste
- Clean boats, trailers and equipment before moving from one body of water to the next
- Create shade by planting trees that overhang the banks and shade the waterway
- Opaque tarps can be floated on the water to create shade, but care must be taken to prevent deoxygenation of the water
- Careful mechanical control

Species Name

Rhododendron (*Rhododendron ponticum*)

Habitat

Terrestrial. Common on acid, peaty or sandy soils in woodland, heathland, rocky hillsides, riverbanks, gardens and parks

Identification

- A large evergreen shrub with wide spreading, dense, leathery foliage
- Leaves are oblong, arranged in a spiral at the end of the stem, and are between 6-12cm long. The leaves have a dull green upper surface with a pale underside
- Attractive, usually pink/purple flowers are produced in May/June
- Stems can be up to 15cm in diameter and up to 5m tall. Often twisted

Threat

- Outcompetes native species

Prevention and Control

- Do not plant as a garden plant
- Careful mechanical control of seedlings
- Clip plant before flowering or remove fruit
- Cutting of large plants and application of herbicide to the cut stump

Species Name

Parrot's Feather (*Myriophyllum aquaticum*)

Habitat

Freshwater aquatic. Invades slow-moving waterbodies, such as lakes, ponds, ditches or streams

Identification

- Aquatic perennial which grows in emergent and submerged form
- Leaves are bright to blue-grey green, arranged in whorls of 4-6 around the stem
- Finely divided leaves which resemble feathers, hence its name
- Stems can grow to 2m and break easily
- Reproduces by stem fragments (stolons)

Threat

- Outcompetes native species
- Can clog infrastructure such as water intake pipes

Prevention and Control

- Prevent the dumping of garden and pond waste
- Clean boats, trailers and equipment before moving from one body of water to the next
- Create shade by planting trees that overhang the banks and shade the waterway
- Opaque tarps can be floated on the water to create shade, but care must be taken to prevent deoxygenation of the water
- Careful mechanical control

Species Name

Wakame (*Undaria pinnatifida*)

Habitat

Marine. Can colonize any hard surface, including ropes, pylons, buoys, the hulls of vessels, bottles, floating pontoons and plastic and reefs

Identification

- Annual brown seaweed species with two separate lifecycles
- Can grow up to 3m in length
- Young plants are distinguished by a long, flat blade 'leaf', while mature plants display a divided blade
- Both young and old plants have a midrib

Threat

- Outcompetes native species
- Can clog up water valves

Prevention and Control

- Prevent disturbance of the plant, which can trigger the plant to release reproductive spores.
- Clean boats, trailers and equipment before moving from one body of water to the next

Species Name
Wireweed (*Sargassum muticum*)

Habitat
Marine. Widespread throughout coastal areas

Identification
- Brown seaweed species ranging in colour from dark to light brown
- Can grow up to 16m in length, with a daily growth potential of 10cm
- Characterised by brown fronds and air bladders along the stem of the plant

Threat
- As wireweed can form mats, it reduces the levels of light penetration. This can adversely impact underwater plant communities
- It can outcompete native plant species such as sugarkelp and thongweed
- Surface growth can impede the movement of both swimmers and boats

Prevention and Control
- Clean boats, trailers and equipment before moving from one body of water to the next
- No known control

Species Name
American Mink (*Neovison vison*)

Habitat
Terrestrial and semi-aquatic. Widespread throughout Ireland

Identification
- Dark brown mammal which appears almost black when wet
- Head and body average length 330-450mm
- Adult male ranges in weight 840-1805g
- American mink displays a characteristic white/cream patch on the chin and throat
- Tail about half the length of the body
- Breeding occurs for a period of 3-4 weeks, with a litter of 4-6 kits born in April-May

Threat
- Predator of a large number of species, leading to a reduction of native biodiversity
- It is a particular threat to ground-nesting birds, especially those that are already threatened or vulnerable
- The species will often practice 'surplus killing', which means they kill more than they are able to eat
- Due to its proficiency at swimming, the species can make its way between islands, spreading its range even further

Prevention and Control
- Trapping
- Shooting

Species Name
Brown Rat (*Rattus norvegicus*)

Habitat
Terrestrial. Widespread throughout Ireland

Identification
- Omnivorous, greyish-brown mammal with prominent pointed muzzle, eyes, ears, and long, almost naked, tail, about as long as the head-and-body
- Head and body length can be up to 270mm in males
- An adult male can weigh up to 600g however 200-300g is average
- Lifespan can be up to six years, however in the wild few survive more than a year
- If conditions are favourable, breeding can take place continuously, with a female giving birth up to five times per year

Threat
- Because they will eat eggs, Brown Rats are a particular threat to ground-nesting birds, especially those species that are already threatened or vulnerable
- Due to its proficiency at swimming, the species can make its way between islands, spreading its range even further

Prevention and Control
- Trapping
- Poisoning

Species Name
Grey Squirrel (*Sciurus carolinensis*)

Habitat
Terrestrial

Identification
- Grey, but coat can vary greatly through the seasons, and have tinges of red
- Grey Squirrels are larger than the native Red Squirrel (*Sciurus vulgaris*)
- A Grey Squirrel has a head and body length of 240-285mm in comparison to the smaller Red Squirrel, which measures 180-240mm
- Wide variation in body weight, between 480-650g

Threat
- Outcompetes the native Red Squirrel
- Grey Squirrels carry the squirrel pox virus (SQPV) which is known to affect Red Squirrels in Ireland. The Red Squirrels develop myxomatosis-type symptoms and die shortly afterwards. This may cause a decrease in numbers of Red Squirrels
- Grey Squirrels can damage timber by bark-stripping in both commercial forestry and trees planted for amenity and conservation value, etc.
- Grey Squirrels can cause an alteration to the canopy of a woodland community by targeting certain tree species for bark-stripping more than others

Prevention and Control
- Trapping
- Poisoning
- Shooting

Species Name

Fallow Deer (*Dama dama*)

Habitat

Terrestrial. Deciduous woodland, grassland, mixed woodland

Identification

- A medium-sized deer, with males weighing up to 63kg
- Characterised by a heavily spotted coat, which can range from almost white through to dark brown or almost black
- Fallow deer typically live in a herd of 10-50 animals
- Diet consists of mainly grasses, with herbs, broadleaf browse and fruits/nuts also eaten
- Males grow flat, palmate antlers

Threat

- Damage crops in commercial forestry and farmland by grazing
- Present a danger to traffic

Prevention and Control

- Shooting

Species Name

House Mouse *(Mus musculus)*

Habitat

Terrestrial. Widespread throughout Ireland

Identification

- Omnivorous mammal, light brown-black above and whitish underneath
- The head is relatively small, with prominent pointed muzzle, eyes, oval ears and a long, almost naked, tail, the same length as the head-and-body
- Head and body length is usually less than 10cm
- Lifespan can be up to 20 months, however in the wild few survive more than three months
- If conditions are favourable, breeding can take place continuously, with a female giving birth up to five times per year

Threat

- Because it will eat eggs, it is a particular threat to ground-nesting birds, especially those species already threatened or vulnerable
- Due to its proficiency at swimming, the species can make its way between islands, spreading its range even further

Prevention and Control

- Trapping
- Poisoning

Species Name
Raccoon (*Procyon lotor*)

Habitat
Terrestrial

Identification
- Omnivorous mammal, about the size of a domestic cat
- Distinctive black mask on the face, which surrounds eyes, cheeks and forehead
- Distinctive black rings are also present on the tail
- The head is relatively big, with a prominent pointed muzzle

Threat
- Will prey on a wide variety of native species

Prevention and Control
Currently an EU ban in place on the sale of this species. Also, zoo ownership being phased out
- Trapping
- Poisoning
- Shooting

Species Name
Sika Deer (*Cervus nippon*)

Habitat
Terrestrial. Deciduous woodland, grassland, mixed woodland

Identification
- A medium-sized deer, with males weighing up to 63kg
- Similar spotted coat to fallow deer in summer. In winter, the coat of sika deer turns a dark grey-brown
- Sika deer typically live in a herd of 6-7, which increases during the breeding season in autumn
- Diet consists of mainly grasses, with herbs, broadleaf browse and fruits/nuts also eaten
- Males grow branched, rounded antlers similar to those of Red Deer (but not as large)

Threat
- Damage crops in commercial forestry and farmland by scoring tree trunks
- Present a danger to traffic on roads
- Hybridize with Ireland's native Red Deer

Prevention and Control
- Shooting

Species Name
Leathery Sea Squirt (*Styela clava*)

Habitat
Marine. Hard surfaces in shallow, sheltered water

Identification
- Sea squirts are animals shaped like a stout bag with two openings (siphons)
- Both siphons are located at the top of the animal and are close together
- The body can be up to 12cm in length
- Appearance is of a leathery, rumpled, knobbly surface
- Leathery sea squirts connect to hard surfaces via a solitary basal stalk

Threat
- Outcompetes native species
- Fouls the hull of ships and aquaculture infrastructure

Prevention and Control
- Clean boats, trailers and equipment before moving from one body of water to the next
- No known control

Species Name
New Zealand Flatworm (*Arthurdendyus triangulatus*)

Habitat
Terrestrial. Most common in gardens and landscaped areas

Identification
- Flattened body with pointed ends without segmentation. Forms a coiled shape sitting on a bed of whitish mucus when at rest
- Colours can range from grey to black but normally chocolate brown, with a contrasting pale yellowish speckled rim. Underside is yellow to light buff in colour, covered in grey/brown speckles
- Can range from 5-20cm and is covered in a sticky mucus

Threat
- Reduction in biodiversity as the species feeds on native earthworm species. Due to this predation on native earthworm species, the fertility and the drainage of agricultural ground could be put at risk
- Humans should be careful and wear gloves when inspecting species as the mucus which covers its body may irritate the skin and cause allergic reactions

Prevention and Control
- The species can last up to a year without food, making it difficult to control
- Easily spread through the transport of its eggs in plant and soil material so great care should be taken

Species Name

Harlequin Ladybird (*Harmonia axyridis*)

Habitat

Terrestrial

Identification

- Has a very variable elytral (wing case) ground colour (yellow, orange, red or black). Its legs are usually reddish to brown in colour
- Their spots are usually black but can be reddish-brown and number from 0-22
- They are slightly larger and more domed-shaped than most native species of ladybirds (6-8mm in length)
- The species often has a W or M-shaped marking on the pronotum (back of the head)

Threat

- It threatens the diversity of native ladybirds as both the adult and larvae will feed on other ladybird larvae if food is short; in particular the smaller 2-spot ladybird
- There is a possibility it could impact upon fruit production
- Could become a nuisance in buildings during the autumn and winter, when it congregates indoors, possibly in large numbers of hundreds and hibernates colonially on walls and behind curtains. When disturbed, it exudes a caustic yellow liquid which is known to stain and damage furnishings

Prevention and Control

- No known control

Species Name

Horse Chestnut Leaf-miner (*Cameraria ohridella*)

Habitat

Horse Chestnut trees. Larvae feed on the leaves

Identification

- Tiny reddish-brown adult moth, approximately 5mm long, seen flying from May-October
- White stripes with black edges across the wing
- Reddish tufted head with long antennae
- Yellow and brown blotches on Horse Chestnut trees towards the end of the summer caused by feeding larvae
- Entire trees may be defoliated
- Heavy infestations can cause the production of smaller conkers, thereby affecting production and replacement
- Possible competition with native Leaf-miners
- Economic impacts – cost of control, tree removal, tree replacement

Prevention and Control

- Pesticides – expensive and difficult to apply, publicly unpopular
- Mechanical removal of fallen leaves during autumn and winter. The leaves are then composted or burnt to kill the overwintering larvae

Appendix III – Medium Impact Invasive Species in DLR, 2020

American Skunk Cabbage (*Lysichiton americanus*)

The American Skunk Cabbage is commonly found in wet areas, such as wetlands and the margins of freshwater bodies. It is characterised by a large green leaf surrounding a yellow spike of inflorescence. The plant releases a foul-smelling odour that attracts flies as pollinators. The plant can grow to 1.5m in height and can form dense stands which shade out native species.

Black Currant (*Ribes nigrum*)

Black Currant is a medium-sized shrub, which typically grows to 1.5m in height. Black Currant is characterised by a simple, 3-5cm, five palmate lobed leaf with a serrated margin. All parts of the plant are very aromatic. These plants have the potential to carry a fungus that causes a blister rust on white pine trees, which are often used in the landscape industry.

Butterfly Bush (*Buddleja davidii*)

Butterfly Bush is a large, deciduous, fast-growing shrub that can grow to a height of 3m. It is characterised by lancelot-shaped leaves with distinctive pink/purple flowers arranged in clusters on a main flower spike. It is commonly found in disturbed areas of waste ground and within native Irish hedgerows. Butterfly Bush can impact on native biodiversity by outcompeting native flora. It can also cause structural damage with its strong root system.

Canadian Fleabane (*Conyza canadensis*)

Canadian Fleabane is an annual plant native to Central and North America. It is found in waste ground and along roadsides in DLR. It is characterised by small, white/yellow flower heads and pale green narrow leaves. It can grow to 1m in height. Canadian Fleabane can form dense areas of plant growth which outcompete native vegetation.

Common Broomrape (*Orobanche minor*)

Common Broomrape is a species of parasitic plant which feeds off the root systems of other plants. It is characterised by two lipped, tubular, pinkish-yellow flowers with purple veins. They contain no chlorophyll, so lack the usual green leaves of plants. They have pointed scales along the stems instead. Common Broomrape is a parasitic plant of legumes meaning it can have a significant economic impact on such crops.

Hairy Rocket (*Erucastrum gallicum*)

Hairy Rocket is also known as Common Dog Mustard. It is an annual plant found growing in fields, roadsides and disturbed areas. It grows between 12 and 24 inches in height, with pale yellow to whitish flowers. The flowers appear from May to September and are divided into four petals, which are rounded at the top and taper at the base. Hairy Rocket has the potential to form dense mats of vegetation which can outcompete native vegetation.

Himalayan Honeysuckle (*Leycesteria Formosa*)

Himalayan Honeysuckle, also known as Pheasant Berry, is a deciduous shrub originating from the temperate, lowland areas of the Himalayas. It can grow to 3m in height and is commonly found alongside hedgerows, roadsides and river edges. It is easily recognisable when it bears pale pink-purple funnel-shaped flowers in July – September. These flowers are surrounded by distinctive maroon bracts. In autumn, the flowers are replaced by dark coloured berries, which are eaten by birds, causing further spread of this species. Himalayan Honeysuckle has the potential to form dense thickets of vegetation which can outcompete native vegetation.

** Other invasive species may be recorded after 2020*

Least Duckweed (*Lemna minuta*)

Least Duckweed is a species of perennial, floating aquatic plant, which is found in bodies of standing or slow-flowing water. It is easily identified, with slightly translucent green leaves which can be up 4mm and have a single vein. This plant also has a single thread-like root. It can take over a waterbody it invades, blocking out light to native species.

Russian-vine (*Fallopia baldschuanica*)

Russian-vine is a perennial deciduous woody climbing plant, which can grow rapidly to a height of 10m or more. It is recognised by its oblong-shaped leaves and dense bunches of greenish-white flowers which appear between May and October. It is most often found on waste ground, roadside verges and hedgerows, where it rapidly shades out native species.

Sea Buckthorn (*Hippophae rhamnoides*)

Sea Buckthorn is a deciduous shrub native to China. It is commonly found along sand dunes and sea cliffs. It was introduced to Ireland as a means of coastal protection as its root system stabilises the sand of dunes and cliffs. It is easily recognisable due to its large thorns and bright orange berries which are produced in autumn. Sea Buckthorn threatens native coastal ecosystems by forming dense thickets which shades out native floral species.

Sycamore (*Acer pseudoplatanus*)

Sycamore is a very common invasive tree species in Ireland. It is commonly found growing in hedgerows, woodlands and waste ground throughout the country. It is a large deciduous tree with maple-shaped leaves of five serrated lobes. It produces a fruit that is held in a wing-shaped casing which glides from the tree when released. Sycamore has a dense canopy when mature, which can shade out native floral species.

Three-cornered Garlic (*Allium triquetrum*)

Three-cornered Garlic is an invasive species native to north-western Africa, the Azores, the Madeira Islands and southern Europe. It inhabits parks, roadsides, waste areas and open woodlands, amongst other habitats. It is a perennial herbaceous plant that grows to a height of 18-50cm. It is easily recognised by its three-cornered leaves, which give off a pungent garlic smell when damaged. It also displays clusters of white bell-shaped flowers at the top of the stems. The petals of the flower each have a green stripe down their middle. It should be noted that this plant is very similar to our native Wild Garlic, so identification needs to be confirmed by an experienced botanist. Three-cornered Garlic has the potential to form dense stands of vegetation, which can outcompete native vegetative species.

Traveller's Joy (*Clematis vitalba*)

Traveller's Joy is a perennial climbing plant that has escaped into the wild from gardens. It is found mainly on alkaline soils in hedgerows and along roadsides. It can grow up to 30m, providing it has a climbing medium such as a large tree. Its leaves are pinnate in shape and are arranged opposite each other on the stem. Its flowers are displayed in dense clusters. The flowers are white-cream, with four petal-like sepals and very noticeable stamens, which are spread out. Traveller's Joy has the potential to form dense stands of vegetation, which can outcompete native vegetative species.

Turkey Oak (*Quercus cerris*)

The Turkey Oak is an ornamental species of oak tree native to south-east France, the Balkans and Turkey. It can grow to a height of 30m, with dark grey, deeply-fissured bark. Its leaves are variable in shape, but appear similar to the leaves of our native oak species. Its leaves are shiny above and hairy below. The distinguishing feature of this species is its acorns, which are orange at the base turning green towards the tip. The cup that holds the acorn is distinctively hairy and looks like a hat made of moss. Turkey oak can invade woodland and heath habitats where its canopy can shade out native floral species.

Wall Cotoneaster *(Cotoneaster horizontalis)*

Wall Cotoneaster is commonly used in gardens as a landscaping plant. It is a semi-evergreen shrub that tends to form dense thickets of low growth. It is characterised by dark green leaves, with small pink flowers appearing in May. An abundance of dark red, shiny fruits are visible on the species in autumn. Wall Cotoneaster has the potential to form dense stands of vegetation, which can outcompete native vegetative species. Its root system also has the potential to damage structures.

Water Fern *(Azolla filiculoides)*

Water Fern is a species of freshwater aquatic plant native to central and north America. It inhabits still and slow-flowing water bodies such as ponds, ditches and canals. It is usually visible as green leaves (to 2.5cm), which form a dense mat of vegetation on the water surface. These dense mats of vegetation can shade out native species as well as drastically reduce oxygen levels in the waterbody. During cold periods or when the plant is stressed, the leaves may turn red, which makes the presence of the plant easily recognisable.

New Zealand Land Hoppers *(Arcitalitrus dorrieni)*

Arcitalitrus dorrieni is a species of crustacean known as a Land Hopper. It is mainly found under stones and dead wood in gardens, damp scrub and woodland. It is identified by a body flattened from the side and is almost black in colour. It jumps into the air when disturbed. New Zealand Land Hoppers can impact on Ireland's biodiversity by outcompeting native soil invertebrates for resources.

Japanese Skeleton Shrimp *(Caprella mutica)*

Japanese Skeleton Shrimps are marine shrimps native to the Sea of Japan. They are commonly found around man-made marine structures such as piers, oil rigs etc. They are large and can grow up to 49mm in length. There are fine hairs on the first two body segments, large spines on third to seventh body segments in males and orange spots on the females' brood pouch. Due to their size, they outcompete our native species for resources.

European Rabbit *(Oryctolagus cuniculus)*

The European Rabbit originates in the western Mediterranean. Rabbits were brought to Ireland by the Normans in the 12th century as a means of providing meat and fur. They are easily distinguished from hare species by their shorter ears without black tips, shorter legs and their bobbing gait. They can grow to 2kg in weight and up to 40cm in length. European Rabbits are well established in Ireland and often impact in a positive way on Ireland's ecosystem by providing an additional food source to native species. They can also impact negatively on native biodiversity by competing for resources.

Feral Goat *(Capra hircus)*

Feral Goats are descendants of ancient breeds of goats which have become extinct through domestication. These ancient breeds would have originated in Turkey and countries to the east of there. There is a broad spectrum of coat colours, including grey, white, fawn, brown, black or a mixture of these colours. Both males and females have horns, with the male's horns being considerably larger and backward sweeping. They are most commonly found in rocky areas and moorland. Feral goats can impact on Ireland's biodiversity by overgrazing and outcompeting native species for resources.

Budapest Slug *(Tandonia budapestensis)*

The Budapest Slug is native to eastern Europe. They are found in greenhouses, gardens, ploughed fields and woodlands. They feed on living plant material and are known to be a pest of crops such as potatoes and also ornamental plants. They appear black at first, however they are actually orange or pale cream, with a very dense coverage of dark coloured spots. When they are not active, they coil into a 'C' shape.

Flatworm (*Australoplana sanguinea*)

This Flatworm is native to eastern Australia. It is most commonly found under stones or other above-ground debris in gardens, parks, etc. It can grow to 5cm long and 5mm wide. It is identified by its flattened appearance and orange colouration. It preys on earthworms, which can lead to a decline in our native earthworm species.

Jenkins' Spire Snail (*Potamopyrgus antipodarum*)

Jenkins' Spire Snails are native to New Zealand. They can be found in both saltwater and freshwater up to a depth of 20m. They primarily burrow into soft sediments on the bottom, but can also be found on concrete and gravel. They grow up to 11mm and range in colour from light grey to dark brown. They can cause problems with infrastructure by blocking pipes.

Sowerby's Keeled Slug (*Tandonia sowerbyi*)

Sowerby's Keeled Slug can grow to a length of 7.5cm when fully grown. It is found in lowland habitats, such as gardens, farmland and woodland. It has a brown-grey body with dark coloured spots. It has a distinctive cream stripe which runs along half the entirety of the tail end of the body. Like the Budapest Slug, it is a pest of root crops and ornamental plants.

Wrinkled Snail (*Candidula intersecta*)

The Wrinkled Snail is native to the Mediterranean. It is found in dry, warm areas, such as coastal dunes, dry field margins, waste ground and quarries. It can grow to a length of 12mm. It has a slightly globular, strongly depressed shell with 5-6 whorls. It is white to yellow-brown in colour, with dark spiral bands and blotches. Wrinkled Snails can have an impact on the economy by damaging fruit crops.

Common Toad (*Bufo bufo*)

The Common Toad is a brownish-grey/green colour, 5-9cm long, with warty skin. It is currently found at two locations in Ireland (Donegal and South County Dublin). It is not usually regarded as an invasive species. However, should it spread into the range of the native and highly endangered Natterjack Toad (*Epidalea calamita*) in Kerry and Wexford, it could have a negative impact on Ireland's native toad.

Appendix IV – Third Schedule of S.I. 477 of 2011. European Communities (Birds and Natural Habitats) Regulations 2011

THIRD SCHEDULE: Non-native species subject to restrictions under Regulations 49 and 50

Part 1: PLANTS		
Common name	**Scientific name**	**Geographical**
American Skunk Cabbage	*Lysichiton americanus*	Throughout the State
A Red Alga	*Grateloupia doryphora*	Throughout the State
Brazilian Giant-Rhubarb	*Gunnera manicata*	Throughout the State
Broad-Leaved Rush	*Juncus planifolius*	Throughout the State
Cape Pondweed	*Aponogeton distachyos*	Throughout the State
Cord-Grasses	*Spartina* (all species and hybrids)	Throughout the State
Curly Waterweed	*Lagarosiphon major*	Throughout the State
Dwarf Eel-Grass	*Zostera japonica*	Throughout the State
Fanwort	*Cabomba caroliniana*	Throughout the State
Floating Pennywort	*Hydrocotyle ranunculoides*	Throughout the State
Fringed Water-Lily	*Nymphoides peltata*	Throughout the State
Giant Hogweed	*Heracleum mantegazzianum*	Throughout the State
Giant Knotweed	*Fallopia sachalinensis*	Throughout the State
Giant-Rhubarb	*Gunnera tinctoria*	Throughout the State
Giant Salvinia	*Salvinia molesta*	Throughout the State
Himalayan Balsam	*Impatiens glandulifera*	Throughout the State
Himalayan Knotweed	*Persicaria wallichii*	Throughout the State
Hottentot-Fig	*Carpobrotus edulis*	Throughout the State
Japanese Knotweed	*Fallopia japonica*	Throughout the State
Large-Flowered Waterweed	*Egeria densa*	Throughout the State
Mile-A-Minute Weed	*Persicaria perfoliata*	Throughout the State
New Zealand Pigmyweed	*Crassula helmsii*	Throughout the State

continued

Common name	Scientific name	Geographical
Parrot's Feather	*Myriophyllum aquaticum*	Throughout the State
Rhododendron	*Rhododendron ponticum*	Throughout the State
Salmonberry	*Rubus spectabilis*	Throughout the State
Sea-Buckthorn	*Hippophae rhamnoides*	Throughout the State
Spanish Bluebell	*Hyacinthoides hispanica*	Throughout the State
Three-Cornered Leek	*Allium triquetrum*	Throughout the State
Wakame	*Undaria pinnatifida*	Throughout the State
Water Chestnut	*Trapa natans*	Throughout the State
Water Fern	*Azolla filiculoides*	Throughout the State
Water Lettuce	*Pistia stratiotes*	Throughout the State
Water-Primrose	*Ludwigia* (all species)	Throughout the State
Waterweeds	*Elodea* (all species)	Throughout the State
Wireweed	*Sargassum muticum*	Throughout the State

Part 2: ANIMALS
A: animals to which Regulations 49 and 50 apply throughout the State or in particular places or categories of places.

Common name	Scientific name	Geographical
A Colonial Sea Squirt	*Didemnum spp.*	Throughout the State
A Colonial Sea Squirt	*Perophora japonica*	Throughout the State
All freshwater Crayfish species except the White-clawed Crayfish	All freshwater crayfish species except *Austropotamobius pallipes*	Throughout the State
American Bullfrog	*Rana catesbeiana*	Throughout the State
American Mink	*Neovison vison*	Throughout the State
American Oyster Drill	*Urosalpinx cinerea*	Throughout the State
Asian Oyster Drill	*Ceratostoma inornatum*	Throughout the State
Asian Rapa Whelk	*Rapana venosa*	Throughout the State
Asian River Clam	*Corbicula fluminea*	Throughout the State
Bay Barnacle	*Balanus improvisus*	Throughout the State
Black Rat	*Rattus rattus*	Offshore islands only

continued

Common name	Scientific name	Geographical
Brown Hare	*Lepus europaeus*	Throughout the State
Brown Rat	*Rattus norvegicus*	Offshore islands only
Canada Goose	*Branta canadensis*	Throughout the State
Carp	*Cyprinus carpio*	Throughout the State
Chinese Mitten Crab	*Eriocheir sinensis*	Throughout the State
Chinese Water Deer	*Hydropotes inermis*	Throughout the State
Chub	*Leuciscus cephalus*	Throughout the State
Common Toad	*Bufo bufo*	Throughout the State
Coypu	*Myocastor coypus*	Throughout the State
Dace	*Leuciscus leuciscus*	Throughout the State
Freshwater Shrimp	*Dikerogammarus villosus*	Throughout the State
Fox	*Vulpes vulpes*	Offshore islands only
Grey Squirrel	*Sciurus carolinensis*	Throughout the State
Greylag Goose	*Anser anser*	Throughout the State
Harlequin Ladybird	*Harmonia axyridis*	Throughout the State
Hedgehog	*Erinaceus europaeus*	Offshore islands only
Irish Stoat	*Mustela erminea hibernicus*	Offshore islands only
Japanese Skeleton Shrimp	*Caprella mutica*	Throughout the State
Muntjac Deer	*Muntiacus reevesi*	Throughout the State
Muskrat	*Ondatra zibethicus*	Throughout the State
Quagga Mussel	*Dreissena rostriformis*	Throughout the State
Roach	*Rutilus rutilus*	Throughout the State
Roe Deer	*Capreolus capreolus*	Throughout the State
Ruddy Duck	*Oxyura jamaicensis*	Throughout the State
Siberian Chipmunk	*Tamias sibiricus*	Throughout the State
Slipper Limpet	*Crepidula fornicata*	Throughout the State
Stalked Sea Squirt	*Styela clava*	Throughout the State
Tawny Owl	*Strix aluco*	Throughout the State
Wild Boar	*Sus scrofa*	Throughout the State
Zebra Mussel	*Dreissena polymorpha*	Throughout the State

Part 2: ANIMALS B: Animals to which specified provisions of Regulations 49 and 50 apply		
Common name	**Scientific name**	**Geographical**
Fallow Deer	*Dama dama*	Throughout the State
Sika Deer	*Cervus nippon*	Throughout the State

Part 3: VECTOR MATERIALS		
Vector material	**Species referred to**	**Geographical**
Blue Mussel (*Mytilus edulis*) seed for aquaculture taken from places (including places outside the State) where there are established populations of the Slipper Limpet (*Crepidula fornicata*) or from places within 50km of such places	Mussel *(Mytilus edulis)* Slipper Limpet (*Crepidula fornicata*)	Throughout the State
Soil or soil taken from places infested with Japanese Knotweed (*Fallopia japonica*), Giant Knotweed (*Fallopia sachalinensis*) or their hybrid Bohemian Knotweed (*Fallopia x bohemica*)	Japanese Knotweed *(Fallopia japonica)* Giant Knotweed (*Fallopia sachalinensis*) Bohemian Knotweed (*Fallopia x bohemica*)	Throughout the State

Appendix V – List of Invasive Species of European Union Concern

A. Plants

Scientific name	English name	Entered into list
Acacia saligna	Golden Wreath Wattle	2019
Ailanthus altissima	Tree of Heaven	2019
Alternanthera philoxeroides	Alligator Weed	2017
Andropogon virginicus	Broomsedge Bluestem	2019
Asclepias syriaca	Milkweed	2017
Baccharis halimifolia	Eastern Baccharis	2016
Cabomba caroliniana	Green Cabomba	2016
Cardiospermum grandiflorum	Balloon Vine	2019
Cortaderia jubata	Purple Pampas Grass	2019
Ehrharta calycina	Perennial Veldtgrass	2019
Eichhornia crassipes	Water Hyacinth	2016
Elodea nuttallii	Nuttall's Waterweed	2017
Gunnera tinctoria	Chilean Rhubarb	2017
Gymnocoronis spilanthoides	Spadeleaf Plant	2019
Heracleum mantegazzianum	Giant Hogweed	2017
Heracleum persicum	Persian Hogweed	2016
Heracleum sosnowskyi	Sosnowski's Hogweed	2016
Humulus scandens	Japanese Hop	2019
Hydrocotyle ranunculoides	Floating Pennywort	2016
Impatiens glandulifera	Himalayan Balsam	2017
Lagarosiphon major	Curly Waterweed	2016
Lespedeza cuneata	Chinese Bushclover, Sericea	2019
Ludwigia grandiflora	Water Primrose	2016
Ludwigia peploides	Floating Primrose	2016
Lygodium japonicum	Vine-Like Fern	2019
Lysichiton americanus	American Skunk Cabbage	2016
Microstegium vimineum	Japanese Stiltgrass	2017

continued

Scientific name	English name	Entered into list
Myriophyllum aquaticum	Parrot's Feather	2016
Myriophyllum heterophyllum	Broadleaf Watermilfoil	2017
Persicaria perfoliata	Asiatic Tearthumb	2016
Parthenium hysterophorus	Whitetop Weed	2016
Pennisetum setaceum	Crimson Fountaingrass	2017
Prosopis juliflora	Mesquite	2019
Pueraria montana var. lobata	Kudzu Vine	2016
Salvinia molesta	Giant Salvinia, Kariba Weed	2019
Triadica sebifera	Chinese Tallowtree	2019

B. Animals

Scientific name	English name	Entered into list
Acridotheres tristis	Common or Indian Myna	2019
Alopochen aegyptiaca	Egyptian Goose	2017
Arthurdendyus triangulatus	New Zealand Flatworm	2019
Callosciurus erythraeus	Pallas's Squirrel	2016
Corvus splendens	Indian House Crow	2016
Eriocheir sinensis	Chinese Mitten Crab	2016
Herpestes javanicus	Small Asian Mongoose	2016
Lepomis gibbosus	Pumpkinseed	2019
Lithobates catesbeianus	American Bullfrog	2016
Muntiacus reevesi	Muntjac Deer	2016
Myocastor coypus	Coypu	2016
Nasua nasua	South American Coati	2016
Nyctereutes procyonoides	Racoon Dog	2017
Ondatra zibethicus	Muskrat	2017
Orconectes limosus	Spiny-Cheek Crayfish	2016
Orconectes virilis	Virile (Northern) Crayfish	2016
Oxyura jamaicensis	Ruddy Duck	2016
Pacifastacus leniusculus	Signal Crayfish	2016

continued

Scientific name	English name	Entered into list
Perccottus glenii	Amur Sleeper	2016
Plotosus lineatus	Striped Eel Catfish	2019
Procambarus clarkii	Red Swamp Crayfish	2016
Procambarus fallax f. virginalis	Marbled Crayfish	2016
Procyon lotor	Racoon	2016
Pseudorasbora parva	Topmouth Gudgeon	2016
Sciurus carolinensis	Grey Squirrel	2016
Sciurus niger	Bryant's Fox Squirrel	2016
Tamias sibiricus	Siberian Chipmunk	2016
Threskiornis aethiopicus	Sacred Ibis	2016
Trachemys scripta	Red Eared Slider	2016
Vespa velutina nigrithorax	Asian Hornet	2016

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