# nature's way

## INVASIVE SPECIES

An Taisce
*The National Trust for Ireland*

United Nations Decade on Biodiversity

invasivespecies ireland

NATIONAL BIODIVERSITY DATA CENTRE

HOW THEY GET HERE

ECOLOGICAL AND ECONOMIC IMPACTS

ESTABLISHED THREATS

POTENTIAL INVASIVE SPECIES

# Introduction

Invasive alien species represent one of the greatest threats to biodiversity worldwide. Sometimes these invaders can also affect the economy and human health. Alien species are also known as 'non-native' species and would not be found in Ireland without human involvement.

Some of these alien species dominate our landscapes and impact on native species. Their rate of spread continues to rise. These increases are due in part to a rise in global travel and trade.

## Alien or Invasive?

It is important to explain the difference between alien species and invasive alien species. Alien species are species which are not naturally occurring in an area and have either been accidentally or deliberately introduced into that area.

Not all alien species in Ireland are able to survive and establish in the wild. Of those that do establish some can impact on our biodiversity and become invasive.

The ability of a species to become invasive depends on a number of factors. These can include biological traits such as fast growth and reproduction. Invasive species often spread quickly or can move easily from place to place. Some invasive animal species can eat a wide range of foods or be a new predator in the area. Often they do very well in their introduced areas because they are free from environmental or predator constraints.

**In Ireland alone** over 1000 alien plant species have been recorded compared to Ireland's estimated 1180 native plant species.

**20%** of known animal extinctions were caused by invasive species.

# How Invasive Species Get to Ireland

*Introductions can be accidental or intentional. Many of these introductions have been going on for generations. Species have been introduced intentionally for a variety of reasons. Most invasive alien plants have been introduced for ornamental or functional purposes such as hedging or pond oxygenators or to provide raw materials (wood, fibres etc.). For instance, the Rhododendron plant was introduced into Ireland as an ornamental species and to provide cover for game species such as pheasants. Up to 70% of Ireland's alien plant species have been introduced through gardening, farming or forestry. Mammals, birds and fish are often introduced to provide food or for countryside sports such as hunting or fishing. Often there are economic reasons for an introduction, for example the American Mink for fur farming or the Pacific Oyster for aquaculture. Both of these species have since become established invasive species in Ireland.*

*However, a lot of the species introductions around the world, and arguably some of the most devastating in terms of the environment, have been accidental introductions. The Zebra Mussel was possibly introduced by attaching to hulls of boats from Britain or the Netherlands. This species now causes significant damage to biodiversity in Ireland. Similarly the New Zealand Flatworm, which impacts on native earthworm numbers, was most likely introduced as a stowaway in potting soil.*

## Rhododendron

*is one of the most problematic invasive plant species in Ireland due to its ability to out-compete native plants by forming dense thickets. It also secretes toxins into the surrounding soil which prevents other plants from establishing.*

# Impacts of Invasive Alien Species

*Impacts of invasive species may take many years or decades before they become obvious or significant. Some may have ecological impacts that also affect our economy and human health.*

# Ecological Damage

*Ecological damage by invasive species can occur through several different ways. The main mechanism in Ireland is through competition with native species. Many invasive species are able to out-compete native species for resources, light and space.*

*Invasive species may also disrupt the functioning of the habitat or ecosystem in terms of soil composition, vegetation structure, and changes in the water table or light levels.*

*Hybridization may also occur between alien and native species. This might compromise the genetic integrity of the native species as well as potentially diluting the native species adaptations to the local environment, which can lead to a reduction in fitness. This has most prominently been seen in Ireland with the hybridization of the alien Sika Deer with the Red Deer.*

*Other impacts include increased grazing of native flora and predation of native species and their young by invasive alien species. The lack of a natural predator or*

**Giant Hogweed** *can have a large economic cost as it grows along river banks but dies off in the winter, exposing the soil which is then washed into the river. This can affect river bed habitats with knock-on impacts on fish spawning grounds. Aquatic plants can also block rivers, canals and drainage channels leading to flooding of surrounding areas.*

**Himalayan Balsam** *produces more nectar than native plant species and because of this it receives a higher level of pollination as it is visited by native bumble-bees and other pollinators more frequently than native plant species. This increases its ability to spread while reducing the reproductive success of the native species.*

control can also lead to a situation where the invasive species reaches huge population sizes.

Invasive species can introduce diseases which are harmful to native species. In 2011, Red Squirrels were first recorded with the squirrel pox virus. This is a virus which the Grey Squirrel can carry and not be affected by it but can spread it to Red Squirrels which die within weeks of infection. A similar situation occurs in the invasive species Rhododendron which can carry a plant fungus which can cause "Sudden Oak Death" in native and plantation tree species.

# Economic Impacts

Many invasive alien species can also have economic affects. Invasive species cost the European economy at least €12 billion each year.

This estimate is largely based on the cost of control and management of established invasive species. It is harder to measure in economic terms the cost associated with the fall of productivity of an area or the loss or decline of an ecologically and economically important species. It is widely recognised that it would be far more practical to put resources into measures helping to prevent their introduction into Ireland or new areas before they become established.

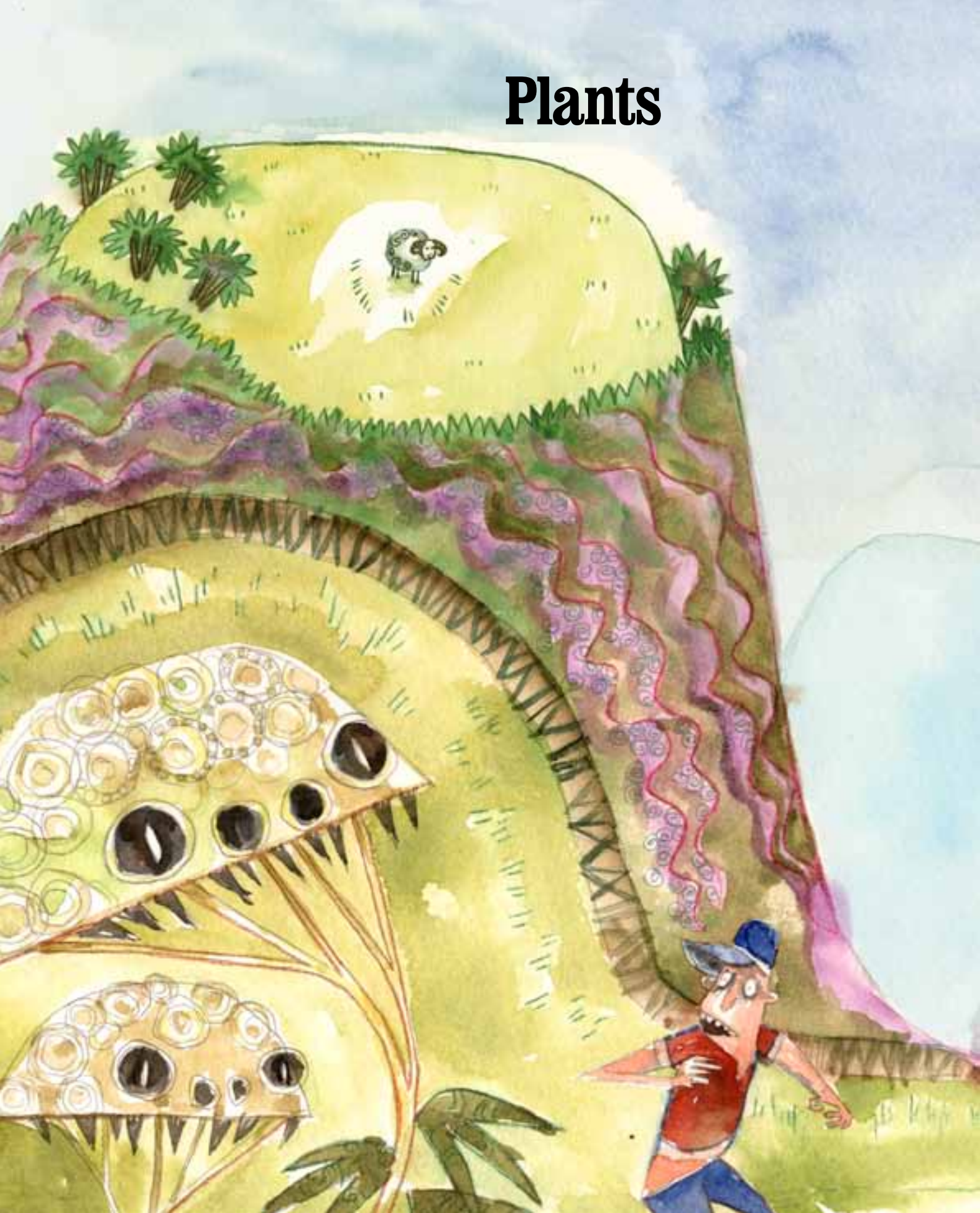
# Damage to Human Health

Some invasive species can even have negative consequences for human health. Sap from the invasive Giant Hogweed can cause irritation if it comes in contact with skin, especially in direct sunlight, and can result in blisters and rashes which may require hospital treatment.

# Benefits of Alien Species

However, it is important to note that not all alien species have negative impacts and many of these species provide huge benefits to human society. In Ireland, our huge agricultural sector has been responsible for many introductions with much of our everyday diet consisting of species which are not native including maize and wheat. As well as this, much of the fibre used for the clothes we wear and wood we use are grown outside their native ranges.

# Plants



# Giant Hogweed

Origin and Distribution:
Giant hogweed is native to Asia but is now invasive in North America and much of Europe.

Impacts:
This species represents a public health hazard. Giant hogweed sap reacts with sunlight and can cause blisters if it comes in contact with the skin. It can out-compete native species for space and resources by shading out native plants. It can also cause increased erosion of river banks. In summer time infestations can become so high that it becomes impossible to access the river which impacts water users such as fishermen.

How did it get here?
Brought to Ireland as an ornamental plant of parks and gardens.

# Rhododendron

Origin and Distribution:
The species is native to Europe and Asia.

Impacts:
Rhododendron can form very dense thickets and out-compete native plants for space and resources, especially for sunlight. It can also impact on fish and invertebrate communities. Rhododendron can also prevent access to sites by the sheer mass of plant material blocking paths and right of way.

How did it get here?
Natural dispersal and planted by people.

# Japanese Knotweed

Origin and Distribution:
A native of Japan, Korea, Taiwan and China. This species is now widespread in continental Europe and Britain.

Impacts:
Japanese Knotweed is a threat in open areas and river habitats where it spreads rapidly to form dense stands, excluding native vegetation. This reduces species diversity and changes the habitat types that are present which can impact wildlife. Once stands become established, they are extremely persistent and difficult to remove. Japanese Knotweed is also of concern to developers and the general public as it has the ability to grow through tarmac and concrete (in some cases within buildings) and therefore must be cleared completely before starting to build or lay roads.

How did it get here?
Brought in as a garden species

# Freshwater

## Waterweeds

Invasive aquatic plants can have serious negative impacts in the wild including smothering our native aquatic plants, clogging up waterways, increasing flooding and removing oxygen from the water which can harm fish and other aquatic species. Invasive aquatic plants are frequently sold by garden centres and they are often found in the wild after escaping from garden ponds. All of the aquatic plants shown here were sold in garden centres. Some of the worst invasive alien plant species include the Curly Waterweed, Nuttalls Waterweed and New Zealand Pygmyweed.

## Fish

Many invasive fish species, including Dace and Chub, have been introduced deliberately by anglers into rivers for fishing. This has had a number of unintended consequences and has impacted negatively on native fish species as well as economically. Often the introduced fish can out-compete the native fish species, such as trout and salmon, for spawning grounds. They can also introduce disease and parasites into a lake or river system.

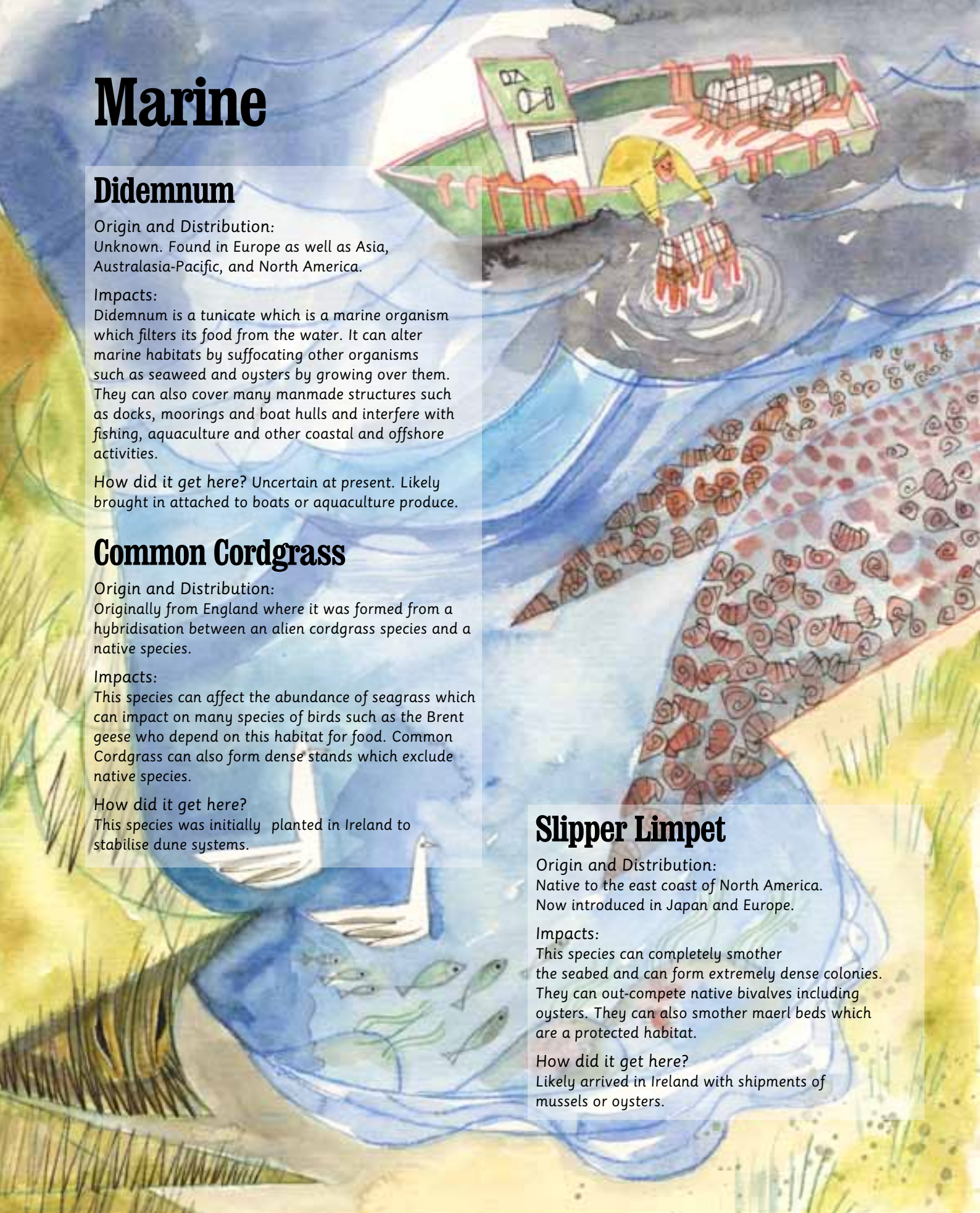
## Zebra Mussel

Origin and Distribution:
Originally from the Caspian and Black Sea region but are now present across Europe, Russia and North America.

Impacts:
Zebra mussels can severely impact waterbodies. They can change the nutrient cycle of the waterbody by removing much of the nutrients from the water which reduces the growth of many aquatic species and affects fish populations. It can also out-compete native mussel species. They can also have significant economic impacts as they block water pipes and attach to the hulls of boats and can block boat engines.

How did it get here?
The zebra mussel probably arrived in Ireland in 1994 attached to the hulls of second-hand boats imported from Britain or the Netherlands.

# Marine



## Didemnum

Origin and Distribution:
Unknown. Found in Europe as well as Asia, Australasia-Pacific, and North America.

Impacts:
Didemnum is a tunicate which is a marine organism which filters its food from the water. It can alter marine habitats by suffocating other organisms such as seaweed and oysters by growing over them. They can also cover many manmade structures such as docks, moorings and boat hulls and interfere with fishing, aquaculture and other coastal and offshore activities.

How did it get here? Uncertain at present. Likely brought in attached to boats or aquaculture produce.

## Common Cordgrass

Origin and Distribution:
Originally from England where it was formed from a hybridisation between an alien cordgrass species and a native species.

Impacts:
This species can affect the abundance of seagrass which can impact on many species of birds such as the Brent geese who depend on this habitat for food. Common Cordgrass can also form dense stands which exclude native species.

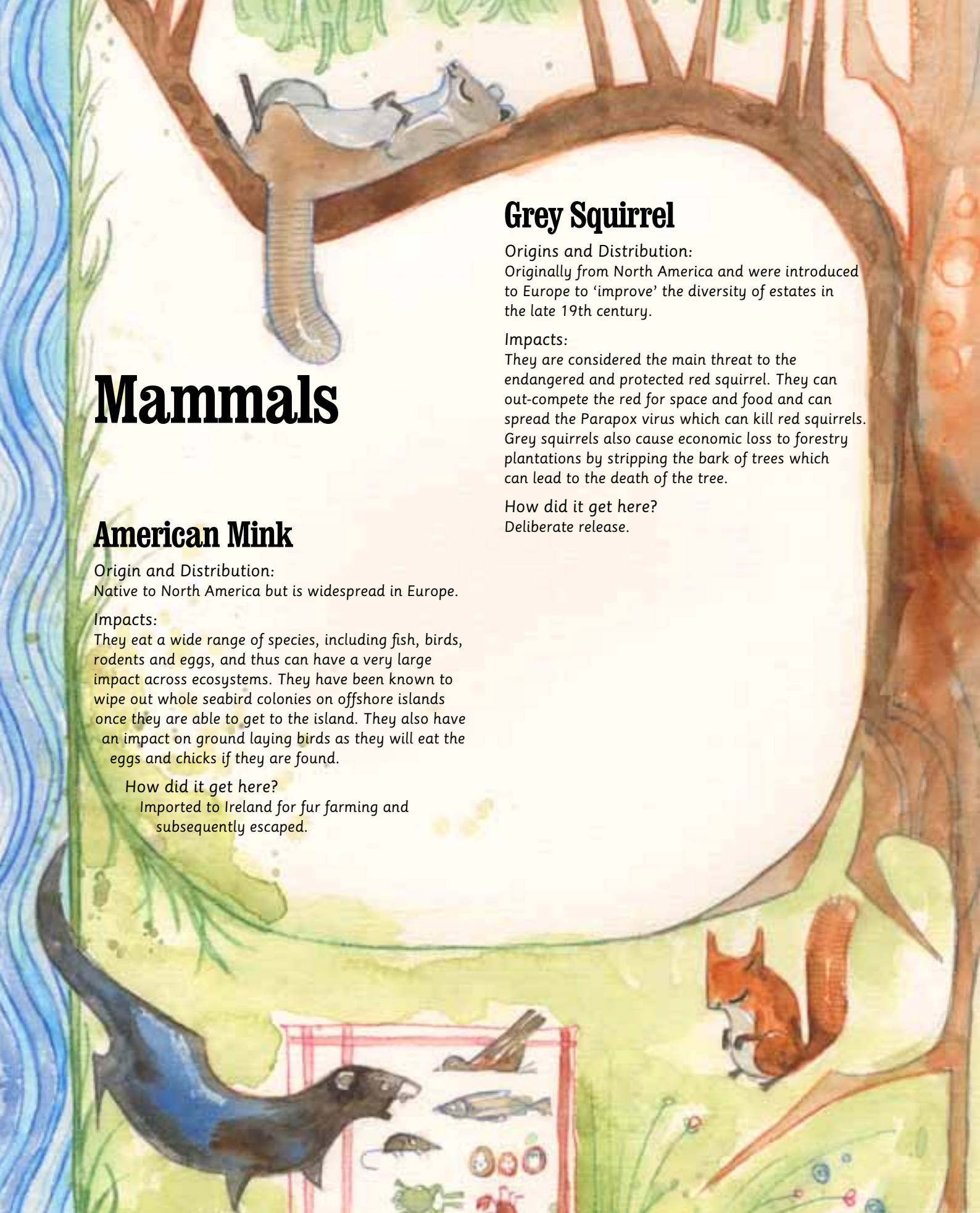
How did it get here?
This species was initially planted in Ireland to stabilise dune systems.

## Slipper Limpet

Origin and Distribution:
Native to the east coast of North America. Now introduced in Japan and Europe.

Impacts:
This species can completely smother the seabed and can form extremely dense colonies. They can out-compete native bivalves including oysters. They can also smother maerl beds which are a protected habitat.

How did it get here?
Likely arrived in Ireland with shipments of mussels or oysters.



# Mammals

## American Mink

Origin and Distribution:
Native to North America but is widespread in Europe.

Impacts:
They eat a wide range of species, including fish, birds, rodents and eggs, and thus can have a very large impact across ecosystems. They have been known to wipe out whole seabird colonies on offshore islands once they are able to get to the island. They also have an impact on ground laying birds as they will eat the eggs and chicks if they are found.

How did it get here?
Imported to Ireland for fur farming and subsequently escaped.

## Grey Squirrel

Origins and Distribution:
Originally from North America and were introduced to Europe to 'improve' the diversity of estates in the late 19th century.

Impacts:
They are considered the main threat to the endangered and protected red squirrel. They can out-compete the red for space and food and can spread the Parapox virus which can kill red squirrels. Grey squirrels also cause economic loss to forestry plantations by stripping the bark of trees which can lead to the death of the tree.

How did it get here?
Deliberate release.

# Potential Species

## Asian Rapa Whelk

Origin and Distribution:
*Native to the western Pacific ocean. It is widespread in the Mediterranean region and the Black Sea.*

Impacts:
*The predatory impact of Asian rapa whelk has serious implications for populations of marine bivalves. They have caused significant changes in the ecology of bottom-dwelling organisms and have resulted in the near extinction of the Gudaut oyster.*

How might it get here?
*Ballast water, aquaculture and hull fouling are considered the main potential pathways to Ireland.*

## Raccoon

Origin and Distribution:
*Native to North America but it now distributed across several European and Asian countries.*

Impacts:
*The raccoon is listed as one of the 100 Worst Invasive Species in Europe. They can impact on native biodiversity by predating on birds' nests and amphibians. They can also carry roundworm which can be dangerous to other species of mammals and birds. They may also transmit infectious diseases to humans.*

How might it get here?
*Through the pet trade or trade in animals for zoos. The species has already been seen in the wild in Co. Cork in April 2011.*

## Citrus Longhorn Beetle

Origin and Distribution:
*Native to China, Japan and other countries in South East Asia.*

Impacts:
*This species can kill many species of broadleaved trees, including maples, alders and willows. Adult beetles feed on twigs, leaf stalks and leaf veins. Eggs are injected under the bark where they hatch into larvae which tunnel under the bark. Older larvae tunnel into the middle of the trunk where their feeding slowly destroys the structure of the tree. Usually, trees are slowly killed over a 3-5 year period.*

How might it get here?
*May be introduced through forestry, solid wood packing material or infected firewood.*

## North American Signal Crayfish

Origin and Distribution:
*This species is widespread across many parts of Europe including the UK.*

Impacts:
*Invasive non native crayfish have a negative effect on populations of the native white clawed crayfish. These species can be carriers of the so-called 'crayfish plague' - a disease caused by a fungus. The 'plague' is lethal to European crayfish species and has caused extinctions of crayfish across Europe.*

How might it get here?
*Intentional introduction or escape from aquaria is considered the most likely route into Ireland for this species.*

## Topmouth Gudgeon

Origin and Distribution
*Originates from South East Asia.*
*The species has invaded lakes in Britain.*

Impacts:
*The species can severely impact on other fish species by eating their eggs. This species is also known to have a breeding rate that is four-times faster than native fish and is a carrier of a parasite of a disease called the 'rosette agent' which can infect native salmon and trout species. They can also impact negatively on plant communities.*

How might it get here?
*Escape from aquaria trade.*
*Deliberate introduction as fish bait.*

# What You Can Do

*Everyone has the ability to help tackle the threat from these invasive species. Some simple steps that people can take include:*

- *Learn about the invasive species in your area. Invasive Species Ireland and the National Biodiversity Centre are a great resource (See "Contacts and Further Information" section).*
- *Never introduce an alien species that may cause harm to the environment or economy.*

- *Promote native species and biodiversity – use alternative, native plants.*
- *Be Pet Wise – Do not allow an exotic pet to escape or be released into the wild*

- *Watch out for hitchhikers – inspect new imported purchases for invasive pests and pathogens. Dispose of plant material and growing media safely, for example, do not compost Japanese Knotweed.*
- *Be Plant Wise – Do not dump aquatic plants from ponds into the wild. Choose native aquatic species for ponds over non-native species.*


- *Check, clean and dry clothing or equipment (such as wellingtons and angling equipment) before moving between waterbodies.*
- *Contribute to raising awareness on invasive species by talking about the issues.*

- *Remember that it is against the law in Northern Ireland and Ireland to release or allow to escape any non-native animal species without a license. This includes species of fish, invertebrates and all other non-native mammal species. It is also against the law to plant or otherwise cause to grow in the wild several non-native plant species.*

# Report Sightings

*If you see an invasive species somewhere it is very important to report the sighting. All records and sightings will help us determine the extent of the invasive species problem in Ireland and facilitate a rapid response, where necessary.*

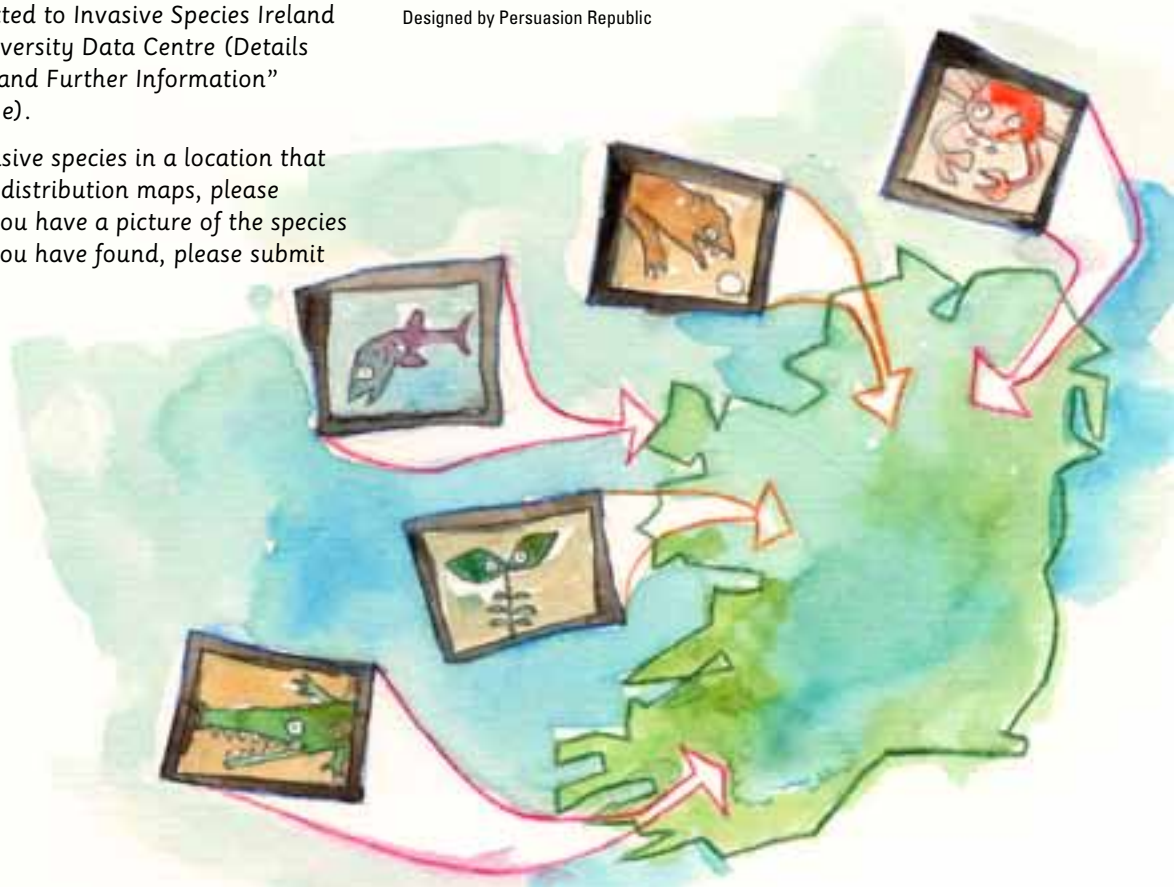
*Sightings can be submitted to Invasive Species Ireland or to the National Biodiversity Data Centre (Details found in the "Contacts and Further Information" Section on the back page).*

*If you know of any invasive species in a location that does not appear on the distribution maps, please submit your record. If you have a picture of the species or are unsure of what you have found, please submit your images.*

Booklet by Roisin Kearney of An Taisce with the assistance of Camilla Keane, Invasive Species Ireland and the National Biodiversity Data Centre.
Funded by the National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht

Illustrated by Ross Stewart of Cartoon Saloon.

Designed by Persuasion Republic



# Contacts and Further Information:

An Taisce: An environmental charity with a focus on conserving Ireland's built and natural heritage - www.antaisce.org

Biology.ie: A web based resource for people interested in biodiversity in Ireland – www.biology.ie.

Coastwatch Ireland: An NGO active in the planning, protection and management of Ireland's coastal zones – www.coastwatch.org

ECO-UNESCO: Ireland's environmental education and youth organisation – www.ecounesco.ie

Friends of the Irish Environment: A network dedicated to protecting Ireland's environment – www.friendsoftheirishenvironment.net

The Heritage Council: A statutory body who promote interest, education, knowledge and pride in our national heritage– www.heritagecouncil.ie

Irish Environmental Network: A network of Irish non-governmental environmental organisations – www.ien.ie

Invasive Species Ireland: Cross-border venture which provides provides advice and resources for stakeholders, in addition to carrying out risk assessment, policy development, education and awareness activities, research and development of invasive species action plans – www.invasivespeciesireland.com

Inland Fisheries Ireland: State agency responsible for the protection, management and conservation of Ireland's inland fisheries and sea angling resources - www.fisheriesireland.ie

National Biodiversity Data Centre: Collects, manages and analyses data and provides information on Ireland's biodiversity – www.biodiversityireland.ie

National Parks and Wildlife Service: A statutory body responsible for the conservation of habitats and species in Ireland – www.npws.ie

Notice Nature: A campaign to increase public awareness of the importance of Ireland's biodiversity – www.noticenature.ie

SWAN: The Sustainable Water Network – www.swanireland.ie

Tree Council of Ireland: A voluntary organisation formed to promote the planting, care and conservation of trees – www.treecouncil.ie

# Further Reading


IUCN (2000) Guidelines for the prevention of biodiversity loss caused by alien invasive species. IUCN, Gland, Switzerland. pp21.

Stokes K., O'Neill K. & McDonald R.A. (2004) Invasive species in Ireland. Unpublished report to Environment & Heritage Service and National Parks & Wildlife Service. Quercus, Queens University Belfast, Belfast.

Reynolds S.C.P. (2002) A Catalogue of Alien Plants in Ireland. Occasional Papers No. 14 of the National Botanic Gardens, Glasnevin, Ireland. 414pp


noticenature
take action on biodiversity loss