



Department of the
Environment

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An Invasive Alien Species Strategy for Northern Ireland



May 2013

Front cover photographs of floating pennywort (*Hydrocotyle ranunculoides*) provided by John Early, Northern Ireland Environment Agency; hottentot fig (*Carpobrotus edulis*) – provided by Richard Weyl, Northern Ireland Environment Agency; and carpet sea squirt (*Didemnum vexillum*) – provided by Dan Minchin, Marine Organism Investigations.

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Executive summary

Invasive species are a growing environmental and economic threat to Northern Ireland. They are defined as harmful alien species whose introduction or spread threatens the environment, the economy, or society, including human health. Once established, invasive species are extremely difficult and costly to control and eradicate, and their ecological effects are often irreversible.

The current threats posed by invasive species in Northern Ireland are significant. In response to these threats the Department of Environment has developed the Invasive Alien Species Strategy for Northern Ireland. The overarching strategic aim of the Strategy is to minimise the risk posed, and reduce the negative impacts caused, by invasive alien species in Northern Ireland. Increasing awareness and understanding of the risks and issues involved in tackling invasive alien species is a central overarching issue.

Foreword

I am pleased to publish this Invasive Alien Species Strategy for Northern Ireland.

Here, as elsewhere in the world, invasive species are increasingly a serious threat to biodiversity and the benefits that healthy ecosystems provide to us. Indeed, save for global warming and climate change, invasive species are the biggest threat to biodiversity. They are a risk to our unique flora and fauna, our economic interests such as forestry, fishing, and farming, our health, and our recreational interests.



Many of us will be familiar with the sight of *Rhododendron (Rhododendron x superponticum)* encroaching woodlands, habitats and landscapes; anglers having to contend with aquatic invasive plants overgrowing rivers and lakes; landowners across the country struggling with Japanese knotweed (*Fallopia japonica*); and the red squirrel (*Sciurus vulgaris*) has been reduced in number by competition with, and disease spread by, the grey squirrel (*Sciurus carolinensis*).

In the past decade there has been an increasing interest in the area of invasive species both in Northern Ireland and across Europe. A recent estimate put the cost of invasive species to the European economy as being at least €12 billion per annum over the last 20 years. Invasive species are both an economic and environmental threat.

The Northern Ireland Invasive Alien Species Strategy is an important step forward in our efforts to tackle the threat posed by invasive species. The Strategy provides a comprehensive and integrated framework for Government agencies and external partners, building on a foundation of sound scientific knowledge. It is structured into components which reflect the main challenges for Northern Ireland and are in line with the guiding principles set out by the Convention on Biological Diversity and the Global Invasive Species Programme.

Increasing awareness and understanding of the risks and the issues involved in tackling invasive alien species is a central overarching issue. That is why it is tackled domestically, on the island of Ireland and between the islands.

We are fortunate in Northern Ireland to have such an abundance and variety of natural wealth and beauty. Hopefully through increased awareness we will be able to maintain it that way for now and future generations.

A handwritten signature in dark ink, appearing to read 'Alex Attwood'. The signature is written in a cursive, slightly slanted style.

Alex Attwood MLA

Minister of the Environment



1. Introduction

Many non-native (exotic/alien) species have been intentionally or unintentionally introduced into Northern Ireland from around the world. Many of these non-native species are important to our economy and society, in particular agricultural and garden plants. They are valued both commercially and aesthetically and have not become established outside human influenced habitats. However some non-native species become 'invasive'. Invasive alien species are defined by the Convention on Biological Diversity as an alien species whose introduction and/or spread threatens biodiversity (CBD Decision V1/23). Once established invasive alien species can have a wide range of economic and social impacts.

The ecological effects of invasive species are often irreversible and, once established, they can be extremely difficult and costly to control and eradicate. Significant threats are now posed by invasive species, and it is critical that Northern Ireland takes measures to address them.

The challenge of dealing with the spread and impact of invasive alien species is receiving increasing attention globally and in Northern Ireland. The European Union (EU) has committed to a target to halt the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, restore them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss. In addition to the practical need to respond to the impacts of invasive alien species directly, there is a range of policy drivers which require us to take action.



Japanese knotweed (*Fallopia japonica*) is a highly invasive plant species introduced into the UK in the mid nineteenth century. It is extremely difficult to eradicate. It is spread from site to site entirely via vegetative means.

(Photograph by John Early)

1.1 The need for a Strategy

There are five key pressures directly driving biodiversity loss namely, habitat change, overexploitation, pollution, climate change and invasive alien species. In Europe, as a whole, the rate of new introductions has risen steadily in recent decades and is still increasing for all taxonomic groups except mammals. The cumulative number of high impact invasive alien species recorded on the island of Ireland has continued to grow and many species are expanding their distributions posing a threat to biodiversity and contributing to the degradation of ecosystem services.

Tackling invasive alien species is complex due to the range of environmental, social, economic, political and technological factors

involved and the interactions between them. The main challenges for Northern Ireland include:

- Halting impacts on biodiversity and the economy from invasive alien species
- Preventing new introductions
- Early detection of new species
- Controlling and containing existing species
- Mitigating impacts
- Building capacity and support amongst stakeholders
- Developing the evidence base for policy and decision making



Giant hogweed (*Heracleum mantegazzianum*) is a highly invasive plant that was introduced in the mid nineteenth century as an ornamental garden plant prior to its negative impacts becoming known. Each plant is capable of producing thousands of seeds which can remain viable for several years enabling it to quickly take over an area. It poses a risk to human health through its phototoxic sap.

(Photograph by John Early)

An additional challenge is the wide range of stakeholders that need to be involved. There is a need for a policy framework that can address these factors and involve stakeholders to reduce risk, and enable and incentivise action on the ground.

The approach to date in the UK and Ireland has been to address invasive alien species on a biogeographical basis. A Great Britain Non-Native Species Programme Board (GB NNSPB) has been established which includes representation from England, Scotland and Wales. For the island of Ireland a joint programme of work between Northern Ireland and the Republic of Ireland, known as the Invasive Species Ireland Project, has been established since 2006 as part of

this biogeographical approach. To ensure harmonisation of approach both the GB NNSPB and the Invasive Species Ireland Project Steering Group work closely.

In the development of the Strategy a co-ordinated process has been undertaken with the Republic of Ireland to ensure that the Strategies are harmonised and opportunities for sharing resources were maximised. Both Strategies will share the same core aims and objectives.

The 'Invasive Non-Native Species Framework Strategy for Great Britain' has also helped to inform the development of this Strategy. Both these Strategies share many core aims and objectives (www.nonnativespecies.org).

The impact of invasive alien species in Northern Ireland

Negative impacts of invasive alien species (IAS) on biodiversity can occur through a range of mechanisms such as competition, herbivory, predation, alteration of habitats and food webs, introduction of parasites and pathogens and through the dilution of native gene pools. On the island of Ireland the most prominent of the negative impacts appears to be direct competition with native biota, whilst alteration to habitats and the influence of parasites and pathogens are also important (Stokes et al., 2006).

Specific habitat types currently under threat include freshwater rivers and lakes; coastal floodplains, saltmarsh and sand dunes; tidal mudflats and sandflats; maritime cliff and slopes; upland raised bogs, woodland, lowland heath and semi-natural grassland. A variety of protected or native species are also threatened by IAS, including red squirrels (*Sciurus vulgaris*), white-clawed crayfish (*Austropotamobius*

pallipes), red deer (*Cervus elaphus*), earthworms (*Lumbricus terrestris*) and now the freshwater pearl mussel (*Margaritifera margaritifera*) with the recent introduction of the Asian clam (*Corbicula fluminea*).

Estimates of the number of IAS on the island of Ireland do not always distinguish between non-native species and invasive species and not all non-native species are invasive or have an impact on biodiversity. The total number of alien species has been estimated at 1,259 (DAISIE, 2009); estimates for particular biodiversity groups include 99 non-native animal species (Stokes et al., 2006); 716 non-native terrestrial plants (Reynolds, 2002); 112 aquatic IAS and 63 cryptogenic aquatic IAS (Minchin, 2007). A pan-European analysis of presence of the 163 'worst' terrestrial and freshwater IAS threatening biodiversity in Europe showed that in 2006, the island of Ireland had 34 of these species (EEA, 2009) and since then a further 7 have been recorded (Maguire, pers.com., 2010).

1.2 Economic impacts of invasive alien species

In Great Britain (GB) it is estimated that invasive alien species cost the British economy at least £1.7 billion each year (Williams et al. 2010). Little information exists on the economic impact of many species so this is likely to be significantly less than the full economic cost since many indirect costs, such as the damage to ecosystem services and loss of biodiversity, cannot be easily quantified.

Williams et al. (2010) estimated annual costs to key economic sectors. The analysis revealed that two thirds of the

costs are to the agriculture and horticulture sectors (approximately £1 billion) and the construction, development and infrastructure sector had the second highest cost at £227 million, mainly due to the impact of Japanese knotweed (*Fallopia japonica*). The leisure and tourist industry, which is an important part of the Government's economic development plans, is vulnerable to invasive alien species impacts from freshwater plants in particular. In GB the cost to recreational boating has been estimated at £30.45 million, with an additional £21.86 million cost to waterway management and £4.89 million to angling.

The overall cost to the biodiversity and conservation sector was £40.58 million although this does not include the full value of indirect costs due to the difficulties in estimating them.

Costs were calculated for individual species which highlight the benefits of prevention, surveillance and rapid response. Japanese knotweed (*Fallopia japonica*), which is widely established in Northern Ireland, has

an annual cost to the GB economy of £179 million. Floating pennywort (*Hydrocotyle ranunculoides*) is a freshwater plant which has a relatively restricted distribution in Northern Ireland and control efforts are underway at affected sites. It is more widely established in England and Wales where it costs the economy an estimated £25 million per year. Actions to prevent the introduction of the water primrose (*Ludwigia spp.*) have been taken in Northern Ireland and it has recently been found in the south-west of Ireland.



Floating pennywort (*Hydrocotyle ranunculoides*) is a highly invasive aquatic plant that originated from North America. It was originally introduced as an ornamental garden pond plant but has subsequently escaped into the wild at a number of locations in Northern Ireland. It is capable of growing at a rate of up to 20 centimetres per day. The majority of sites at which it is known to occur have now either been eradicated or are subject to ongoing control works in an effort to prevent its further spread and potential economic costs. This species has been estimated to cost the GB economy approximately £25 million per annum highlighting the need to eradicate this species before it spreads further (Photograph by John Early).

The analysis from GB clearly highlight the economic justification for early eradication of this species which has been estimated to cost £73,000 compared to the £242 million it would cost if it became fully established in Britain as it has in France and Belgium.

A number of studies have been carried out on the economic impact of invasive species in other countries and regions but only recently have the costs been estimated for Ireland and Northern Ireland.

A study to review the economic impact of invasive and non-native species in both Ireland and Northern Ireland was undertaken as part of the Invasive Species Ireland project, and the final report was published in March 2013 (Kelly et al. 2013).

In summary, the findings of the report estimate that the current annual cost of invasive species to the economies of Ireland and Northern Ireland is £161,027,307 (€202,894,406) and £46,526,218 (€58,623,034) respectively.

The combined estimated current annual cost of invasive species on both economies is £207,553,528 (€261,517,445).

The report is available on the Invasive Species Ireland web site at

http://invasivespeciesireland.com/wp-content/uploads/2010/07/Economic_Impact_Assessment_FINAL_280313.pdf

1.3 Meeting our commitments

There is a wide range of International, European and National policy drivers for the Strategy. Northern Ireland, as part of the UK, is committed to a number of International Conventions and agreements, such as the Convention on Biological Diversity (CBD), the Ramsar Convention and the Bern Convention, which require us to take account of invasive alien species.

At a European level, the UK Government is committed to the target to halt the loss of biodiversity and the degradation of ecosystem services in the EU by 2020 and is obliged under the EC Wild Birds and the Habitats Directives to have certain measures in place addressing the introduction of invasive alien species.

The European Commission is currently finalising proposals for a legislative instrument on invasive alien species which it expects to publish during 2013. The ongoing developments within the Commission have been considered during the development of this Strategy and we will continue to engage with the Commission as the process continues.

The Marine Strategy Framework Directive (MSFD) and Water Framework Directive (WFD) require the implementation of measures to address invasive alien species that can impact on the ecological status of waterbodies. Locally, the Wildlife (Northern Ireland) Order 1985 (as amended) by the Wildlife and Natural Environment (Northern Ireland) Act 2011

<http://www.legislation.gov.uk/nia/2011/15/data.pdf> is particularly important in that it represents the Government's approach to implementing the provisions of the CBD and the current obligations concerning invasive alien species in the Wild Birds and Habitats Directives. The Northern Ireland Biodiversity Strategy (NIBS) also identifies actions relating to invasive alien species.

Legislative drivers for invasive alien species

European:

- Wild Birds Directive 2009/147/EC
- Habitats Directive 92/43/EEC
- Water Framework Directive 2000/60/EC
- Plant Health Directive 2000/29/EC
- Animal Health Directive 2006/88/EC
- Marine Strategy Framework Directive 2008/56/EC
- The Environmental Impact Assessment Directive (EIA) 85/337/EEC (as amended)
- The Strategic Assessment Directive (SEA) 2001/42/EC
- Wildlife Trade Regulation 388/97/EC
- Use of locally absent species in aquaculture 708/2007/EC

National:

- The Wildlife (Northern Ireland) Order 1985 (as amended)
- The Wildlife and Natural Environment (Northern Ireland) Act 2011
- The Environment (Northern Ireland) Order 2002
- The Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995
- The Waste Management Licensing Regulations (Northern Ireland) 2003
- Fisheries (Northern Ireland) Act 1966
- Prohibition of Introduction of Fish Order (Northern Ireland) 1979
- The Alien and Locally Absent Species in Aquaculture Regulations (Northern Ireland) 2012
- Molluscan Shellfish (Control of Deposit) Order (Northern Ireland) 1972
- Foyle Fisheries Act (Northern Ireland) 1952 (as amended)
- Destructive Imported Animals Act (Northern Ireland) 1933
- The Plant Health Order (Northern Ireland) 2006
- The Plant Health (Phytophthora ramorum) Order (Northern Ireland) 2005
- The Water Environment (WFD) Regulations (Northern Ireland) 2003
- The Environmental Assessment of Plans and Programmes Regulations (Northern Ireland) 2004

1.4 Building on experience and working in partnership

In Northern Ireland, practical management of invasive alien species is challenging due to the cross-border implications of controlling introductions and spread. A pro-active stance is fundamental since prevention of introductions is demonstrably more cost-effective than reactive control or long term eradication/control measures.

A review of invasive alien species in Ireland was jointly commissioned by the Northern Ireland Environment Agency (NIEA) and the National Parks and Wildlife Service (NPWS) in the Republic of Ireland. In March 2004, the 'Invasive Species in Ireland Report' (Stokes *et al.* 2006) was presented to both Ministers and it was agreed that NIEA in Northern Ireland and NPWS in the Republic of Ireland would work together and with others to begin to tackle the issue of invasive alien species.

In 2006, NIEA and NPWS commissioned the Invasive Species Ireland Project as a joint initiative to reduce the impact and threats of invasive alien species on the island of Ireland (www.invasivespeciesireland.com). Preventing new introductions and spread of invasive alien species is an issue of shared responsibility and requires the involvement of all relevant Government Departments and Agencies, Local Government, non-governmental organisations, academia, private and voluntary sectors. To date, much progress has been made and practical steps have been put in place which aim to prevent introductions; evaluate and implement control and management measures; and put in place

a cross-jurisdictional framework to respond to species introductions. This provides a solid foundation for the actions in the Strategy to build upon.

Invasive alien species are a cross-cutting issue which requires the participation of a wide range of stakeholders to be effective. An extensive stakeholder consultation was carried out in 2008 by NIEA and NPWS to determine the scope of activities relating to invasive alien species; the effectiveness of the Invasive Species Ireland Project; and to identify the way forward. The review conclusions and recommendations addressed a range of issues and identified stakeholder priorities. A summary of stakeholder recommendations can be downloaded from the Invasive Species Ireland website (www.invasivespeciesireland.com) and has informed the development of the Strategy and priority actions.

1.5 Our vision and the role of the Strategy

Countries that are seen as leaders in addressing invasive alien species include New Zealand and Australia. New Zealand has taken a biosecurity approach and integrates invasive alien species with plant and animal health, placing a strong emphasis on border control and rapid response. We share the aims of countries such as New Zealand and their vision of keeping people, natural resources, agriculture and biodiversity safe and secure from damaging pests and diseases. However, it is not possible to move to such a comprehensive biosecurity system without significant resources and change at an EU level as well as locally. The approaches

taken to tackling invasive species to date in both GB and the island of Ireland are seen as being two of the most advanced programmes in Europe.

Putting in place an effective framework to prevent and manage invasive alien species is a long term process and the Strategy is the next step in developing an effective and integrated system to address economic, environmental and social impacts. The Strategy seeks to maximise the effectiveness of existing approaches while putting in place new actions to address gaps that have been identified. The focus of the Strategy is on invasive alien species rather than wider plant and animal health issues although it aims to maximise any synergies with plant and animal health regimes.

Invasive alien species occur in all taxonomic groups and affect all types of ecosystems and many economic sectors. The scope of the Strategy is broad and includes all invasive alien species with the exception of genetically modified organisms (GMOs), bacteria and viruses. The Strategy does not aim to address issues related to human health although potential impacts of invasive alien species on human health are taken into account in the risk assessment process. 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. Increasingly we could see more non-native species, which are currently benign, become invasive as the climate changes. However non-native

species arriving by their own means, driven by climate change and displaying invasive characteristics will be included in the scope of measures proposed in the Strategy such as horizon scanning, detection, surveillance, mitigation and control where appropriate.

The vision of the Strategy is to establish a coordinated policy and management framework that minimises the risk of invasive alien species to the economy, environment and society. The Strategy is structured into components which reflect the challenges outlined in Section 1.1 and are in line with the guiding principles set out by the CBD and the Global Invasive Species Programme (GISP). The CBD principles provide an international framework and emphasise the precautionary approach and prevention and together with the GISP national implementation phases, provide a guide to the development of national approaches.

See <http://www.biodiv.org/decisions/default.aspx?dec=VI/23>

Given the current economic climate and the fact that significant additional resources are unlikely to be available, the Strategy has prioritised a range of actions that will not only address invasive alien species now but also help provide a firm foundation for future efforts. The limited number of actions reflects the short term priorities but are not the sum of our ambition to tackle invasive alien species and will be updated and expanded in coming years, not only to incorporate forthcoming direction from the EU but to contribute to halting the loss of biodiversity and degradation of ecosystem services by 2020.

2. Strategic aims and objectives

2.1 Aims

The overarching aim of the Strategy will be to minimise the risk posed, and reduce the negative impacts caused, by invasive alien species in Northern Ireland.

The aims of the Strategy are to:

- Address gaps such as low levels of awareness; poor baseline distribution information, pathways and impacts; and provide clarification to stakeholders.
- Prevent invasive alien species introductions through a combination of legislation and voluntary measures.
- Increase awareness of invasive alien species which are currently affecting the native biodiversity and economy of Northern Ireland.
- Minimise the number of unintentional introductions and prevent unauthorised, intentional introductions of invasive alien species.
- Ensure that intentional introductions, including those for biological control purposes, are properly assessed in advance, with full regard to potential impacts on biodiversity and the economy.
- Encourage the development and implementation of eradication and control programmes for invasive alien species.
- Provide support to enable stakeholders to take action to tackle invasive alien species.

- Build capacity and skills for invasive alien species management through partnership working.

Although the Strategy relates to Northern Ireland, it recognises that issues will arise at both national and local levels. The Strategy will therefore guide action at Government level and provide a strategic framework for regional or local initiatives.

2.2 Objectives

The overall objectives of the Strategy are to:

- Minimise the risk of invasive alien species entering and becoming established in Northern Ireland and reduce the risks associated with the activities which may cause the further spread of invasive alien species already established within Northern Ireland.
- Develop an effective mechanism for detection, surveillance and responding to threats posed by both new and established invasive alien species through the establishment of an early warning and rapid response system.
- Develop an effective mechanism for monitoring, reporting and recording invasive alien species to inform the response to threats posed by new and established invasive alien species.
- Put in place an integrated management framework that prevents further spread of invasive alien species and prioritises species for eradication in a timely manner.

- Minimise and mitigate against the negative impacts of established invasive alien species in a cost effective manner.
- Maximise organisational effectiveness and collaboration on invasive alien species issues among Government Departments and Agencies, Local Government, non-governmental organisations, industry and individuals.
- Raise awareness of invasive alien species amongst the general public and the capacity for action amongst key stakeholders to increase their understanding of the risks that invasive alien species can pose to our native wildlife, economy, environment, society and the actions that minimise these risks.
- Ensure that the legislative framework in Northern Ireland which regulates for invasive alien species issues is coherent, comprehensive, fit for purpose and 'proportionate'.
- Encourage a strategic and coherent research programme to underpin Northern Ireland invasive alien species policy. This research will inform management and the implementation of the Strategy.

The Strategy has placed an emphasis on preventing new invasions. Early detection and rapid response will enable us to make better use of existing resources in order to reduce future ecological, economic, social and financial pressures caused by invasive alien species.

There is already a wide range of actions underway as part of the Invasive Species Ireland Project and other Government and stakeholder initiatives. These have been highlighted in each section as ongoing commitments and have not been included as actions.



Hottentot fig (*Carpobrotus edulis*)- Orlock
(Photograph by Richard Weyl)

3. Prevention and exclusion

3.1 Introduction

The CBD Guiding Principles place the greatest emphasis on prevention as this is generally more cost-effective and environmentally desirable than measures taken following the introduction and establishment of a species. There are already a few pathways and species which are well regulated such as animal diseases, plant diseases/pests and the aquaculture regulations which cover the introductions of new organisms. However most pathways and species are not regulated and there is continued import and spread of known invasive alien species. Given the unpredictability of the pathways and impacts on biodiversity of invasive alien species, efforts to identify and prevent unintentional introductions as well as decisions concerning intentional introductions should be based on the precautionary approach.

3.2 Challenges

There is a wide range of potential preventative measures including horizon scanning, risk assessment and developing standards for key sectors. These are all underpinned by education and awareness campaigns. However, with limited resources, a focus on preventative measures can lead to the perception that less is being done to manage already established species and overcoming this perception is an important action. Prevention efforts must be coupled with efforts to explain the rationale, encourage more involvement and make sufficient resources available for management of current problem species.

Horizon scanning and risk assessment are fundamental aspects of preventative measures. Risk assessments provide an objective and transparent evidence base for policy and decision making. There will always be a subjective element to the process but this can be minimised and the outputs used to prioritise species and pathways for management and to help to communicate relative risk to stakeholders and the public.

3.3 Commitments and achievements to date

A range of prevention and exclusion measures have been undertaken to date. These include development of a risk assessment framework, identification of the highest risk species (both established and potential) and the prioritisation of species for preventative actions. A number of exclusion and contingency plans have been drawn up along with Codes of Practice for the horticulture sector, recreational water users and marina managers.

The risk assessment framework initially developed through the Invasive Species Ireland Project in 2007 has been reviewed and updated. To date, approximately 834 invasive alien species identified through a horizon scanning exercise have now been assessed and the findings will become available on the Invasive Species Ireland website. This analysis helped to identify the highest risk established and potential invasive alien species and will help to inform future policy development such as new Codes of Practice,

new exclusion and contingency plans for species and management plans for high risk pathways.

However, significant challenges remain and the prevention measures outlined in the Strategy aim to minimise the risk of the entry and establishment of species that can have an unacceptable level of negative impact on biodiversity, the economy or human health. They address the risk of Northern Ireland acting as a donor region for invasive alien species to other countries as many introduction pathways are two way.

3.4 Objective 1

To minimise the risk of invasive alien species entering and becoming established in Northern Ireland and reduce the risks associated with the activities which may cause the further spread of invasive alien species already established within Northern Ireland.

Priority Actions

- 1.1 Update risk assessments and carry out horizon scanning exercise.
- 1.2 Develop and implement exclusion and action plans for high risk species and pathways.
- 1.3 Introduce subordinate legislation prohibiting sale of high risk species.
- 1.4 Develop Codes of Practice with key sectors and integrate invasive alien species into industry standards.

1.5 Provide information for public on the threats from invasive alien species.

1.6 Consider mechanisms to control the import and possession of high risk invasive alien species at all points of entry.



Common cordgrass (*Spartina anglica*)
Strangford Lough (Photograph by John
Early).

4. Early detection, surveillance and rapid response

4.1 Introduction

As measures to prevent the introduction of invasive alien species will not always be successful, it is important that species are detected early before they can become widely established. Early detection requires a system for reporting and verifying records as well as effective and clear communication protocols. An effective programme of early detection leading to rapid response is totally dependent on information being collected, communicated and acted upon. A surveillance programme is crucial and should be a combination of a species and site approach focused on high risk species, high risk entry points and areas of high biodiversity value, informed by risk assessments. Surveillance programmes for early detection need to be carefully designed and targeted to answer specific questions as economically as possible. Some invasive alien species are easily detected and identified whilst others require greater effort particularly when at low densities.

Surveillance programmes need to include active and passive surveillance. Active surveillance should be risk-based with areas selected and sampled for invasive alien species through surveys. Passive surveillance relies on people reporting invasive alien species occurrences at their discretion and this is encouraged through education and awareness actions. This will enable early detection and triggering of a rapid response mechanism. Surveillance is not just for new species but also whether

the status of known invasive alien species is changing by expanding their populations or distribution range. Rapid response will be defined as initiating eradication and containment measures before the species has had the opportunity to spread beyond a size amenable to complete removal. This will vary from species to species and is dependent on numerous factors.

4.2 Challenges

The CBD Guiding Principles recommend taking the precautionary approach when dealing with invasive alien species. It recommends that lack of scientific certainty about the various implications of an invasion should not be used as a reason for postponing or failing to take appropriate eradication, control or containment measures. There is the need for a rapid response mechanism that has the capacity and ability to act. The development of contingency and eradication plans for high risk species will aid a rapid response and provide the clarity needed by organisations on roles and responsibilities and where support is available. The greatest challenge is securing resources and buy-in from multiple stakeholders and ensuring invasive alien species become part of stakeholder work programmes.

Rapid Response to floating pennywort, (*Hydrocotyle ranunculoides*), discovered in the River Lagan

In September 2010 members of Dromore and District Angling Club received training on invasive alien species identification and management by Northern Ireland Environment Agency (NIEA) staff. Within 2 weeks of receiving the training, club members, spotted the highly invasive plant floating pennywort (*Hydrocotyle ranunculoides*), one of Ireland's most unwanted species, in the River Lagan. Dromore and District Angling Club members recognised its threat and immediately informed the authorities, who confirmed their discovery.

Floating pennywort (*Hydrocotyle ranunculoides*) is native to North America. It was first brought into Ireland as a plant for tropical aquariums and ponds, but has since escaped into the wild. It is a floating or creeping, mat-forming perennial plant which thrives in shallow, still flowing water, rooting in water less than 1 metre deep and growing up to 20 cm a day. The thick mats form across the water body surface effectively blocking out any light to native vegetation below. It also increases the risk of flooding and can obstruct recreational activities such as fishing and canoeing.

Following the discovery, NIEA, Agri-Food and Biosciences Institute (AFBI) and Dromore and District Angling Club initiated a rapid response clean up operation to prevent any fragments of this highly invasive plant establishing in the River Lagan. Over two days an estimated 7 to 8 tonnes of floating pennywort (*Hydrocotyle ranunculoides*) was removed in this joint rapid response operation. In 2011, during follow up monitoring of a 3 mile stretch of the River Lagan downstream of the original occurrence only two small areas of growth were found and were removed. During 2012 follow up monitoring was carried out twice during the summer months and no regrowth was found. Follow up monitoring will continue for several years to ensure this highly invasive aquatic plant does not re-establish in the River Lagan.

(Photograph by Andrew Shanks, Dromore & District Angling Club)



4.3 Commitments and achievements to date

There is no formal surveillance programme in place at present. However, in the last few years greater awareness of invasive alien species threats has led to more reporting of new species and new sightings. A system for reporting, verifying records and issuing species alerts is in place through Invasive Species Ireland and the National Invasive Species Database (NISD). The facility to trigger a rapid response has been in place through Invasive Species Ireland.

Northern Ireland has worked in partnership with the Republic of Ireland to establish an early warning alert system. The early warning alert system is being led by the National Biodiversity Data Centre (NBDC) in Waterford in collaboration with key stakeholders including the Centre for Environmental Data and Recording (CEDaR), the local records centre for Northern Ireland. In addition an expert registry has been established which enables taxonomic experts to help with the identification of species. An alert network has been

'Species Alert' – Examples of the type of invasive species alert fact sheets available to view and download from the National Biodiversity Data Centre website

INVASIVE SPECIES ALERT!
Harlequin Ladybird

Invasive species alert for: *Harmonia axyridis* (image A) and varieties.

Common name(s): Harlequin Ladybird, Multicoloured Asian Ladybird, Halloween Ladybug.

Why the concern? This is an invasive species of ladybird that was found at two sites in the Republic of Ireland during November 2010. Previous records came from 2007 and 2009 in Northern Ireland (inset map). If the harlequin ladybird becomes established, it will threaten native invertebrate diversity, could impact on the fruit production and be a nuisance in buildings.

What does it look like? Variable in colour (yellow to orange to red) (image B) and number of spots (0-20) (images A, C and D). At 6 - 8 mm long, they tend to be larger and more domed than most native ladybirds, normally with reddish brown legs. They may also have a distinctive 'M' or 'W' marking on the pronotum (back of head) (image D). Juveniles have an orange stripe on each side of their body (image E).

Where might I see it? Entering houses in winter (image C) where they can aggregate on windowsills and walls (image B); on imported vegetables, fruit or plants; and in gardens, woodlands, agricultural or horticultural lands.

For more information or to report any sightings please email
coflynn@biodiversityireland.ie or visit
www.invasivespeciesireland.com

Date issued: December 2010. Up-dated Dec, 2011

INVASIVE SPECIES ALERT
Muntjac Deer

Invasive species alert for: *Muntiacus reevesi* (Ogilby, 1839)

Common name(s): Muntjac deer; Reeves's muntjac, Chinese muntjac, Barking deer

Why the concern? Muntjac browsing in woodland can clear areas of brambles and other shrubs, and prevent tree regeneration, with profound effects on coppice woodlands, the structure of the shrub and ground layers and the animals that depend on them for food or shelter, such as birds and butterflies. Muntjac occasionally browse on growing crops and can cause serious losses in market gardens, allotments, and orchards. In forestry, trees often require protection from deer during their early years.

Muntjac deer can cause road traffic accidents. In Britain, Muntjac contribute a substantial part of the almost 30,000 traffic accidents a year that are believed to be the result of collisions with invasive non-native deer.

What does it look like? This is a small, thicket deer with reddish fur and relatively short legs. It measures approximately 50cm at the shoulder in males and 47cm in females. When disturbed it shows a conspicuous white underside to the tail which can be seen as the animal runs away. Males have short simple antlers and two blackish lines that run across the forehead towards the snout. Females and young have a blackish pattern on the forehead.

Where might I see it? Muntjac are found in a variety of lowland woodland types, preferring a dense understorey and access to arable farmland. They can occur in urban parks and large gardens. They are sometimes seen on road sides running away from a passer-by or from vehicles.

For more information or to report any sightings please email
coflynn@biodiversityireland.ie or visit
<http://invasivespeciesireland.com>

Date issued: March 2010. Updated August 2011

<http://invasives.biodiversityireland.ie/species-alerts-2/about-species-alerts/>

developed in parallel to the expert registry. Once a new invasive alien species has been confirmed an alert is issued to all registered stakeholders.

At European level, Northern Ireland is a member of the North European and Baltic Network on Invasive Alien Species (NOBANIS), sometimes referred to as the European Network on Invasive Species.

Through this network Northern Ireland is participating in an early warning pilot scheme with over 20 other participating NOBANIS countries which will help to inform the development of an early warning and information exchange system for Europe.

4.4 Objective 2

To develop an effective mechanism for detection, surveillance and responding to threats posed by both new and established invasive alien species through the establishment of an early warning and rapid response system.

4.5 Priority Actions

- 2.1 Further develop an early warning system.
- 2.2 Maximise the potential of ongoing surveillance programmes.
- 2.3 Develop and implement a rapid response mechanism.
- 2.4 Develop and implement contingency and eradication plans for high risk species.

5. Monitoring, recording and reporting

5.1 Introduction

The CBD Guiding Principles state that a monitoring programme should include targeted and general surveys for invasive alien species. Also, countries should assist in the development of databases and information systems and disseminate information for use in invasive alien species management. Accurately tracking the movement of invasive alien species is particularly important and this requires monitoring, recording and reporting systems.

5.2 Challenges

Monitoring of invasive alien species currently takes place in an ad-hoc way. There is no dedicated monitoring programme as invasive alien species have not yet been fully integrated into current monitoring programmes. Developing an effective programme of monitoring, recording and reporting is challenging as it requires the participation of a wide range of stakeholders and information to be submitted and verified in a timely way. As invasive alien species are managed on a biogeographical basis collaboration is therefore required between CEDaR and NBDC.

There needs to be a well structured approach to ensuring that the information from these programmes is verified and fed into the NISD and decision making on invasive alien species. The main challenges are to maximise the use of existing programmes and information sources to ensure available resources are targeted to achieve the greatest

benefit; and to take an integrated and collaborative approach to development and delivery with leadership by Government and involvement of relevant stakeholders.

5.3 Commitments and achievements to date

Efforts to date have focused on putting in place an information technology infrastructure, collating old records and carrying out targeted surveys for high impact species to generate new records. The development of the NISD has been a major step in putting in place an effective dedicated recording system for invasive alien species. Efforts are currently focused on populating the NISD and current surveys include high risk aquatic invasive alien species. The NISD is integrated with Invasive Species Ireland through the 'Alien Watch' facility on its website. Education and awareness activities have been undertaken to encourage reporting and recording by stakeholders and the general public. Data quality protocols and guidelines for invasive alien species records have been developed and are available on the NBDC website along with an Excel recording template. This template has been integrated into the Invasive Species Ireland website which acts as a portal to submit records for validation. This validation is undertaken by either NBDC or CEDaR. A review of monitoring, surveillance and recording schemes was carried out by Invasive Species Ireland and recommendations were made on how these programmes could be further

developed in Northern Ireland and have informed the actions in the Strategy.

Developing and implementing an effective surveillance, monitoring and recording programme should be viewed as a process as resources are unlikely to be available for a comprehensive programme in the coming years. Different components of the programme are at different stages of development. At present the recording programme is more developed than the monitoring programme. In recent years there

has been a significant increase in record gathering with 26,890 records for 99 invasive alien species now being held in the NISD for the island of Ireland. Actions currently underway and due for completion in 2013 include the further development of recording and reporting mechanisms; development of data sharing networks; development of specific recording information and information materials; and establishment of links with the Central Data Repository for non-native species in GB.

Rapid Marina Survey for invasive alien species in Northern Ireland

In 2012 the Northern Ireland Environment Agency (NIEA) commissioned Marine Organism Investigations (MOI) to undertake a dedicated survey for marine invasive species around the coastline of Northern Ireland. This survey was commissioned as a follow up to a previous survey of marinas around the coastline of Ireland undertaken in 2006.

The project initially identified high risk marina sites around the coastline of Northern Ireland to be surveyed and identified a target list of invasive alien species to be surveyed for using a variety of techniques.

Through the survey two new high risk invasive species were identified as being present in Northern Ireland's marine environment. The carpet sea squirt (*Didemnum vexillum*) which was previously recorded in other parts of the UK and Ireland was detected in Strangford Lough and the invasive seaweed Japanese kelp (*Undaria pinnatifida*) was recorded in Carrickfergus. In addition some invasive alien species which previously were only known to occur at a limited number of sites, such as the leathery sea squirt (*Styela clava*), were found to have expanded their range to a number of previously unrecorded sites.

The Northern Ireland Environment Agency specified in the contract that all records must be submitted to both the Centre for Environment Data and Recording (CEDaR) and the National Invasive Species Database (NISD).



Image of National Invasive Species Database website Home page <http://invasives.biodiversityireland.ie/>

5.4 Objective 3

To develop an effective mechanism for monitoring, reporting and recording invasive alien species to inform the response to threats posed by new and established invasive alien species.

5.5 Priority Actions

- 3.1 Develop and establish protocols for invasive alien species monitoring.
- 3.2 Maximise potential of ongoing monitoring programmes.

- 3.3 Provide a mechanism to allow stakeholders to monitor, record and report invasive alien species.
- 3.4 Further development of databases.
- 3.5 Investigate the possibility, of including a clause in the terms and conditions of all Government contracts to make it a requirement for contractors to submit datasets where Invasive Alien Species are involved.

6. Eradication, control and containment

6.1 Introduction

If a species has been introduced, early detection and rapid action are crucial to prevent its establishment. If it does become established, the preferred response is to eradicate as soon as possible but in the majority of cases this is not feasible or cost effective so long term control and containment measures may need to be implemented. As stated previously when taking the precautionary approach with regard to invasive alien species the lack of scientific certainty about the impacts should not be used as a reason for postponing or failing to take appropriate eradication, control or containment measures. However risk assessment will inform this process and allocation of resources.

6.2 Challenges

It may not always be possible to control and contain species once they have become established as effective control methods may not be available. This is the case for many aquatic invasive alien species. It may be necessary to direct resources away from programmes that will not be successful towards those that will. The development of criteria on which these decisions are based will enable transparency and stakeholder

support. Long term control and containment will involve appropriate management measures at the relevant geographic scale and this will require the involvement of individual land owners and managers. While priorities can be set through the actions in the Strategy, it will be vital to provide support and resources for local action, which can include technical advice and support.

6.3 Commitments and achievements to date

When prioritising species for management actions including the development of exclusion and contingency plans, efforts focused on those species that are high risk with relatively restricted distributions and for which effective control measures exist. Plans were developed and implemented for species such as chub (*Leuciscus cephalus*), floating pennywort (*Hydrocotyle ranunculoides*), curly leaved waterweed (*Lagarosiphon major*), parrot's feather (*Myriophyllum aquaticum*) and fringed waterlily (*Nymphoides peltata*). Through the Invasive Species Ireland Project a range of new plans are being developed for additional high risk species based on the updated risk assessment outputs.



Fringed waterlily (*Nymphaoides peltata*) is a floating invasive aquatic plant which can grow in water up to 1.5 metres deep. It was introduced before 1866. In recent years it has spread and is causing problems in waters which are usually static or very slow moving such as those shown at a site in Belfast, pictured here.

(Photograph by John Early)

6.4 Objective 4

To put in place an integrated management framework that prevents further spread of invasive alien species and prioritises species for eradication in a timely manner.

6.5 Priority Actions

- 4.1 Develop and agree protocols for eradication, control and containment of high risk species.
- 4.2 Develop and support action programmes in partnership with the Republic of Ireland (ROI).

7. Management, mitigation and restoration

7.1 Introduction

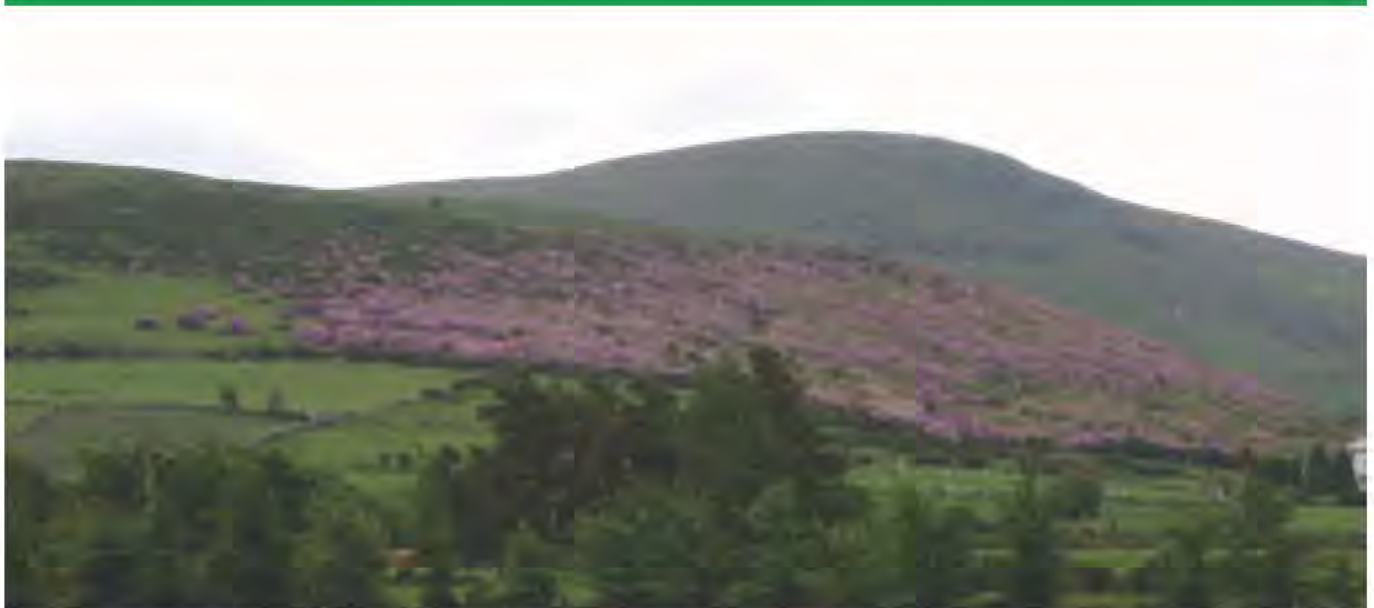
Effective management and mitigation of the impacts of invasive species will involve appropriate management responses at the relevant geographical scale and measures to restore native biodiversity will need to be considered. Invasive alien species management planning must be built upon a framework which takes into account numerous and sometimes complex considerations. These include operating under Government policies and guidelines; adhering to best practice and legislation; working with multiple landowners and partners; selecting control methods that are effective in a particular environment; and where relevant, working in cross-border situations. Implementing management plans for many species is an ongoing process

requiring commitment over many years until the invasive alien species management objectives are achieved. Any management programme should be underpinned by education, training and the development of an evidence base for policy and decision making.

7.2 Challenges

There are numerous invasive alien species and vectors which require management to reduce the threat to native biodiversity and the economy. However, it will not be possible to have national management programmes for all of these. The challenge is how to best use the limited resources to manage invasive alien species and vectors to achieve the most effective outcome.

Rhododendron (*Rhododendron x superponticum*) - Mournes (Photograph by John Early)



Controlling priority Invasive Species and Restoring native Biodiversity (CIRB) Project

In 2011, Queen's University Belfast (QUB) launched the Controlling priority Invasive Species and Restoring native Biodiversity (CIRB) Project.

The CIRB project comprises a range of project partners including, Queen's University Belfast, Inland Fisheries Ireland, Rivers and Fisheries Trusts Scotland, University of Ulster, Argyll Fishiers Trust, Ayrshire Rivers Trust, Galloway Fisheries Trust and the Tweed Forum and engages a wide range of stakeholders.

The Project, which runs until December 2014, is part financed by the European Union's European Regional Development Fund through the InterReg IVA Cross- border Programme, managed by the Special EU Programmes Body and part financed by the Department of the Environment (NI) and the Department of the Environment Community and Local Government (Republic of Ireland).

The project aims to control and, if possible, eradicate the invasive species giant hogweed (*Heracleum mantegazzianum*), Japanese knotweed (*Fallopia japonica*), Himalayan balsam (*Impatiens glandulifera*) and rhododendron (*Rhododendron x superponticum*) on a river catchment scale in Northern Ireland, Republic of Ireland and Scotland. In Northern Ireland two river catchments are included in this project namely, the River Faughan in the North West and the Clanrye River / Newry Canal in the South East as highlighted on the map below.

All four species were originally introduced as ornamental garden plants but now threaten the riparian (and broader) habitat due to their ability to rapidly and effectively exploit these habitats

by outcompeting native species. Seasonal die back of three of these invasive species in winter leaves extensive areas of riverbank bare and more susceptible to erosion. In addition, giant hogweed (*Heracleum mantegazzianum*), contains toxic sap that is considered to be a serious and significant danger to public health. Further information on the CIRB project can be found on the project website at <http://www.qub.ac.uk/research-centres/cirb/>



7.3 Commitments and achievements to date

In cases where invasive alien species are widely established and national management programmes are unfeasible, efforts to date have focused on the development of best practice management guidelines and template management plans which can be used at a more local level on a case by case basis. Examples which have been prepared include plans for Japanese knotweed (*Fallopia japonica*), Himalayan balsam (*Impatiens glandulifera*), giant hogweed (*Heracleum mantegazzianum*) and rhododendron (*Rhododendron x superponticum*). Invasive Species Action Plans have been prepared for high risk species in partnership with key stakeholders and some of these are currently being implemented. These plans are updated as new information becomes available. A range of new plans are being developed for additional species based on the updated risk assessment outputs.

Under the EC Water Framework Directive, Local Management Area Plans will be developed for 27 river catchments

across Northern Ireland. These Plans will ensure linkages between invasive alien species management and River Basin District activities to deliver more effective management of aquatic invasive alien species.

The Invasive Species Ireland website contains a 'Projects' section which provides information on ongoing research and control programmes across the island of Ireland. The section is regularly updated as details of new projects are provided by stakeholders.

7.4 Objective 5

To minimise and mitigate against the negative impacts of established invasive alien species in a cost effective manner.

7.5 Priority Actions

- 5.1 Develop and encourage implementation of Invasive Alien Species Action Plans.
- 5.2 Develop an online toolkit of invasive alien species management methods.

8. Governance and co-ordination

8.1 Introduction

Regulatory and operational roles with relevance to invasive alien species are split across a number of Government Departments and Public Bodies. The need for effective co-ordination, governance and joint resourcing is particularly important if control programmes are to be integrated and effective. There is a need for initiatives to be inclusive of all stakeholder groups and facilitate effective communication between relevant Government Departments and Agencies, Local Government, non-governmental organisations, academia, private and voluntary sectors. Any national programmes will need to be supplemented with industry and voluntary programmes. There needs to be a well structured approach to ensuring that these are encouraged and supported and that information from the programmes informs decision making and progress on minimising invasive alien species threats.

8.2 Challenges

An important element of work undertaken to date has been the partnership approach and this underpins the approach taken in the Strategy. A vital relationship is that between the environment and agriculture (including plant and animal health protection) Government Departments and Agencies. Clarifying and agreeing roles and responsibilities is a key challenge along with mainstreaming invasive alien species into other policy areas and the work programmes of other stakeholders.

8.3 Commitments and achievements to date

Effective partnership working arrangements have been established between key agencies on the island of Ireland and between the relevant Northern Ireland Departments on invasive alien species. The Invasive Species Ireland Steering Group has operated as an informal co-ordinating mechanism and has representatives from key Departments and agencies in Northern Ireland, the Republic of Ireland and the GB Programme. The membership of the Steering Group is regularly reviewed to improve co-ordination, information exchange and opportunities for partnership working.

8.4 Objective 6

To maximise organisational effectiveness and collaboration on invasive alien species issues among Government Departments and Agencies, Local Government, non-governmental organisations, industry and individuals.

8.5 Priority Actions

- 6.1 Establish a co-ordination mechanism for joined up working across Government.
- 6.2 Develop and deliver training for local authorities.
- 6.3 Continue commitment to provide a central co-ordination and information resource on invasive alien species.
- 6.4 Continue partnership working with GB Programme the European Network on Invasive Alien Species (NOBANIS) to maximise the effective use of resources to address shared threats.

9. Communications, awareness raising and capacity building

9.1 Introduction

There is a limited understanding of the threats posed by invasive alien species. Improved awareness and understanding of the issues surrounding invasive alien species is vital to gain support for the relevant policies and programmes and to engage the public in decision-making. As well as raising general awareness, there is a need for initiatives targeted at key groups whose activities can contribute to the problem or be part of minimising the risk from invasive alien species. An effective stakeholder engagement programme which identifies these groups and the most effective means of engaging with them is vital for success.

9.2 Challenges

The aim of communications, awareness raising and capacity building activities is more than providing information. It encourages behaviour change, capacity building and provides practical skills. Given the limited resources available for tackling invasive alien species it is vital to build capacity of a wide range of individuals and organisations to lead, contribute to and support any national programme.

9.3 Commitments and achievements to date

Although there is always scope for improvement, efforts to date have been successful in getting stakeholder engagement and participation in education and awareness activities that have been co-ordinated through the Invasive Species Ireland Project. Stakeholders have been involved in shaping many of the activities and identifying priorities. Communications, awareness raising and capacity building actions which will be delivered include the annual All-Ireland Invasive Species Forum; further development of the Invasive Species Ireland website as a central information resource; and continued provision of advice upon request on invasive alien species. To date specific stakeholder groups such as port authorities, garden centres and the wider horticultural sector have been targeted with the development of dedicated materials and training.

In order to facilitate and support invasive alien species education and awareness activities, template lesson plans will be developed for schools. To help increase the capacity of action on the ground, support and advice on preparing funding applications is being provided through Invasive Species Ireland Project as part of its work programme.

‘Be Plant Wise’

Since the 1980s increasing numbers of high risk invasive aquatic plants have been detected in rivers and lakes across Northern Ireland. Many of these plants were initially brought in intentionally as ornamental garden pond plants. Some have unfortunately escaped from garden ponds into the wider environment where they have had significant impacts on our native biodiversity, society and economy.

The ‘Be Plant Wise’ campaign was launched by the Minister of the Environment, Alex Attwood MLA in 2012. The campaign aims to raise awareness amongst garden pond owners and the horticultural industry of the dangers posed by invasive aquatic plants.

As part of the campaign information materials were sent to garden centres across Northern Ireland and presentations on the key campaign messages delivered at industry events. The Republic of Ireland and Great Britain also participated in this campaign.



Minister of the Environment, Alex Attwood MLA and John Early, Northern Ireland Environment Agency at the launch of the Northern Ireland ‘Be Plant Wise’ campaign.

‘Check, Clean, Dry’ campaign

In recent decades there has been an increasing number of invasive species being introduced or further spread in Northern Ireland as a result of unintentional ‘hitchhiker’ introductions. Well known examples include zebra mussels (*Dreissena polymorpha*) which were first unintentionally introduced into the Shannon-Erne system from Great Britain in the mid 1990s but have now spread to a number of unconnected sites as a result of further hitchhiker introductions. Recreational water users in particular were identified as being at a high risk of introducing or spreading invasive aquatic species ranging from invasive aquatic plants to invasive aquatic invertebrates.

In an effort to raise awareness amongst recreational water users of the need to clean equipment before moving to a new waterbody the ‘Check, Clean, Dry’ biosecurity campaign was launched in Northern Ireland in 2012 following its successful launch in Great Britain. The campaign has been widely supported in Northern Ireland by key stakeholders and industry representatives from across Northern Ireland. As part of the campaign awareness materials were sent to over 400 organisations and outlets across Northern Ireland.

9.4 Objective 7

To raise awareness of invasive alien species amongst the general public and the capacity for action amongst key stakeholders to increase their understanding of the risks that invasive alien species can pose to our native wildlife, economy, environment, society and the actions that minimise these risks.

9.5 Priority Actions

- 7.1 Develop an invasive alien species communications plan to underpin prevention and management actions.
- 7.2 Continue commitment to building effective partnerships through the Invasive Species Ireland stakeholder engagement programme including the annual Forum and website.
- 7.3 Increase awareness of the importance of the preventative approach in minimising threats from invasive alien species.
- 7.4 Further develop capacity of stakeholders to increase action on the ground to minimise the risks from invasive alien species

10. Improving the legislative framework

10.1 Introduction

The initiation of regulatory and legal gap analysis is a first step in the development of an effective legislative framework. This has already been completed for Northern Ireland and the main gaps and needs have been identified, including inconsistent application of the polluter pays principle and the need to harmonise provisions with the Republic of Ireland (Turner, 2008).

10.2 Challenges

Some of the main challenges ahead include the enforcement of legislation and ensuring that any forthcoming legislative provisions on ban on sale of invasive alien species are in compliance with EU free trade rules. There is already an extensive range of legislative provisions relating to invasive alien species. However, awareness and enforcement



Himalayan balsam (*Impatiens grandulifera*) was first introduced into the UK in 1839 as an ornamental garden plant. Soon after it was recorded as having escaped into the wild. It commonly grows in areas of damp soil such as river banks and adjacent woodlands. Each Himalayan balsam (*Impatiens grandulifera*) plant can produce hundreds of seeds, which are projected from exploding seed pods, enabling it to quickly take over a habitat (Photograph by John Early)

of these remains a key challenge. The European Commission is currently finalising its proposals for a legislative instrument on invasive alien species which it expects to publish during 2013. Once the details have been finalised and agreed the implications for Northern Ireland legislation will need to be assessed.

Different countries take different approaches to listing invasive alien species. Currently Northern Ireland produces a 'black list' of species which are known to be invasive, whereas other countries use a mix of white listing and grey listing approaches. There may be scope for the use of targeted white listing for specific taxa or groups of species. This approach has been taken in the Republic of Ireland for some aquatic species such as freshwater crayfish.

10.3 Commitments and achievements to date

Many of the recommendations from the legislation review undertaken as part of the Invasive Species Ireland Project have been incorporated into the Wildlife (Northern Ireland) Order 1985 (as amended) by the Wildlife and Natural Environment (Northern Ireland) Act 2011.

<http://www.legislation.gov.uk/nia/2011/15/data.pdf>

All jurisdictions are in favour of introducing a ban on sale of high risk invasive alien species.

England and Wales

The the Department for Environment, Food and Rural Affairs has announced that the sale of five invasive non-native aquatic plant species is to be banned in order to protect wildlife and vulnerable habitats. The ban which only relates to England and Wales will come into force in April 2014. This will give retailers enough notice to conform to the new measures and identify and stock alternative plants.

The plants to be banned are water fern (*Azolla filiculoides*), parrot's feather (*Myriophyllum aquaticum*), floating pennywort (*Hydrocotyle ranunculoides*), Australian swamp stone-crop (also known as New Zealand pygmyweed) (*Crassula helmsii*) and water primrose (*Ludwigia spp.*).

Scotland

A similar ban on sale for these plant species along with a possible ban on the keeping of the plants is currently being considered in Scotland. The intention would be that ban on keeping would come into force a year or two after the ban on the sale.

The Wildlife and Countryside Act 1981 is the principal domestic legislation concerning non-native species. In Scotland, the Wildlife and Natural Environment (Scotland) Act 2011 most recently amended the 1981 Act as it applies in Scotland.

<http://www.legislation.gov.uk/asp/2011/6/data.pdf>

The 2011 Act changed the non-native species release offences in the Wildlife and Countryside Act 1981 and added new sections on keeping, notification and control of invasive species.

Under the 1981 Act Scottish Ministers now have the powers to prohibit by order the sale or keeping of invasive animals or plants unless under a licence issued by Scottish Natural Heritage.

In addition, Scottish Ministers, as well as, Scottish Natural Heritage, Scottish Environment Protection Agency and the Forestry Commission Scotland, now have powers with regards to the control of invasive species, to require action to be taken by individual land managers or, where that fails, for Ministers/Agencies to take action themselves and recuperate the costs on the polluter pays principle.

Republic of Ireland

In the Republic of Ireland, the Government updated its nature protection legislation in September 2011 with the introduction of the European Communities (Birds and Natural Habitats) Regulations 2011.

<http://www.irishstatutebook.ie/pdf/2011/en.si.2011.0477.pdf>

These Regulations contain important new provisions to address the problem of invasive species, generally non – native species that can take over or destroy habitats of native species. A black list of unwanted species is set out in the Regulations. It will be an offence to release or allow to escape, to breed, propagate, import, transport, sell or advertise such species.

Northern Ireland

In Northern Ireland, the Minister has given approval for commencement of a process that will bring forward subordinate legislation which will ban the sale of high risk invasive species.

10.4 Objective 8

To ensure that the legislative framework in Northern Ireland which regulates for invasive alien species issues is coherent, comprehensive, fit for purpose and ‘proportionate’.

10.5 Priority Actions

- 8.1 Liaise with the Republic of Ireland and Great Britain on legislation.
- 8.2 Contribute to the development of EU policy and initiatives.

11. Research and development

11.1 Introduction

It is vital that we underpin policy decisions with strong scientific evidence. Research outcomes are often a key component helping to inform risk assessment; surveillance; detection; monitoring; control; and eradication strategies. Applied research is particularly important to help inform and refine control methods as well as assessing the feasibility of proposed action (for example, eradication attempts). Feasibility studies, often involving modelling, are a key tool for assessing the likely costs and probability of success for larger-scale control or eradication efforts. Research could provide technological or biological control solutions to help address problems that have previously seemed intractable.

11.2 Challenges

There is a growing amount of research on invasive alien species underway in Universities, Institutes, Government and by other stakeholders. The research topics covered range from highly applied through to fundamental research on invasion biology. A key challenge is ensuring that this research informs management and that scientific research is accessible to all stakeholders.

11.3 Commitments and achievements to date

Work undertaken to date has been based on best practice and scientific rigour. The highest quality science has underpinned the risk assessment, prevention, detection, surveillance, monitoring and management activities. Developments in research nationally and internationally are monitored to identify technological or biological advances and to ensure any research undertaken is cutting edge and avoids any duplication.

11.4 Objective 9

To encourage a strategic and coherent research programme to underpin Northern Ireland invasive alien species policy. This research will inform management and the implementation of the Strategy.

11.5 Priority Action

9.1 Identify research priorities and needs.

12. Implementation, reporting and review

12.1 Implementation

The Strategy is a non-statutory document and its implementation will depend upon effective cooperation, co-ordination and communication between those involved in delivering its objectives. The partnership approach which has underpinned work to date will be key to implementing the Strategy. It is intended that the Implementation Plan will improve the way the different bodies, both within and outside Government, work together and share information. To this end, it is proposed to have a partnership approach to delivery so that the actions are not all by Government and for Government.

Currently, there are no specific resources set aside for the implementation of the objectives of this Strategy. The majority of these will be taken forward as part of the normal business duties/activities and programmes of the responsible organisations and partners.

12.2 Reporting

The Implementation Plan will be the basis on which progress is monitored and reported on. Progress will be reported by the Department of the Environment in liaison with the various organisations. It is anticipated that the reporting cycle for progress will be every five years in order to align with the Northern Ireland Biodiversity Group's Report to Government.

12.3 Review

The first review of the Strategy will be carried out in 2016 and thereafter, on a five-yearly basis. This will enable the Strategy to be amended to reflect any changes emerging from the proposed EC legislative instrument on invasive alien species; any recommendations arising from the Invasive Species Ireland Project and any other relevant developments. However, the long term success will depend on the ability of the Strategy to respond to new or changing circumstances and it will therefore be a 'living' document.

Key Action	Delivery Mechanism	Associated Action(s)	Lead	Partner(s)	Timeframe
Objective 1: To minimise the risk of invasive alien species entering and becoming established in Northern Ireland and reduce the risks associated with the activities which may cause the further spread of invasive alien species already established within Northern Ireland.					
1.1 Update risk assessments and carry out horizon scanning exercise.	Invasive Species Ireland (ISI) Project	In addition, to listing those invasive alien species already established, carry out exercise to identify invasive alien species that could potentially arrive in Northern Ireland. Using results of scanning exercise undertake risk assessments of species identified and update existing assessment as required.	DOE (Northern Ireland Environment Agency (NIEA) Natural Heritage)	Department of Arts, Heritage and the Gaeltacht (DAHG) GB non-Native Species Secretariat (GB-NNSS)	Ongoing Complete initial tranche of risk assessments by December 2013.
1.2 Develop and implement exclusion and action plans for high risk species and pathways.	Invasive Species Ireland (ISI) Project	Develop contingency plans for high risk invasive alien species which are not yet known to occur in Northern Ireland and update as required. Implement contingency plans in the event of the arrival of a highly invasive alien species.	NIEA-Natural Heritage Veterinary Service Loughs Agency	NIEA - Water Management Unit (WMU) DOE (Marine Division) DARD (Countryside Management) DARD (Fisheries Division) Rivers Agency Forest Service Agri-Food and Biosciences Institute (AFBI) Roads Service NI Water DCAL (Inland Fisheries)	Suite of 25 plans for species developed by December 2013. Ongoing as and when required.

Key Action	Delivery Mechanism	Associated Action(s)	Lead	Partner(s)	Timeframe
1.3 Introduce subordinate legislation prohibiting sale of high risk species.	Article 15 A Wildlife (Northern Ireland) Order 1985	<p>Commission a project to carry out risk assessments for the purposes of ban for sale.</p> <p>Using the results of the risk assessments identify candidate species to ban for sale.</p> <p>Establish expert panel to review the results of the risk assessments.</p> <p>Engage with industry representatives.</p> <p>Bring forward subordinate legislation.</p>	<p>DOE - (Environmental Policy Division (EPD))</p> <p>DAHG</p>	<p>NIEA-Natural Heritage</p> <p>Defra</p>	<p>Risk assessments to be completed by December 2013.</p> <p>Ban for sale candidate species to be identified by June 2014.</p> <p>Expert panel to be in place by September 2014.</p> <p>Engage with industry representatives by December 2014.</p> <p>Subordinate legislation to be in place by December 2015.</p>
1.4 Develop Codes of Practice with key sectors and integrate invasive alien species into industry standards.	Invasive Species Ireland (ISI) Project	<p>Identify and develop Codes of Practice for key sectors considered to be at a high risk of introducing or spreading invasive alien species through ISI project.</p> <p>In partnership with key stakeholders review and update Codes of Practice on an annual basis and as new information becomes available.</p> <p>Engage with relevant stakeholders to encourage uptake and compliance with Codes of Practice relevant to their industry.</p>	NIEA-Natural Heritage	<p>NIEA – Water Management Unit</p> <p>DOE (Marine Division)</p> <p>DAHG</p> <p>Department of Agriculture, Fisheries and Food (DAFF)</p> <p>GB-NNSS</p> <p>DARD (Fisheries Division)</p> <p>DARD (Agri-food Inspection Branch)</p> <p>Veterinary Service</p> <p>Loughs Agency</p> <p>AFBI</p> <p>Roads Service</p> <p>NI Water</p>	<p>Develop at least 4 Codes of Practice by December 2014.</p> <p>First review to take place by December 2013.</p>

Key Action	Delivery Mechanism	Associated Action(s)	Lead	Partner(s)	Timeframe
1.5 Provide information for public on the threats from invasive alien species.	Invasive Species Ireland (ISI) Project	<p>Highlight the threats from invasive alien species and provide information, through :- contact with stakeholders during site visits, surveys, public meetings and events;</p> <p>- poster/leaflet awareness campaigns;</p> <p>- articles in publications, press releases etc;</p> <p>- use of plasma screens, information boards etc in Government properties;</p> <p>- Government/ Agency websites; and</p> <p>- posters at all points of entry.</p>	<p>NIEA-Natural Heritage</p> <p>Forest Service</p>	<p>DAHG</p> <p>GB-NNSS</p> <p>NIEA – Water Management Unit</p> <p>DOE (Marine Division)</p> <p>DARD (Agri-food Inspection Branch)</p> <p>DARD (Countryside Management)</p> <p>DARD (Fisheries Division)</p> <p>Veterinary Service</p> <p>Rivers Agency</p> <p>Loughs Agency</p> <p>AFBI</p> <p>NI Water</p> <p>DCAL (Inland Fisheries)</p>	Ongoing.
1.6 Consider mechanisms to control the import and possession of high risk invasive alien species at all points of entry.		<p>Explore legislative options to regulate the importation ; and possession of invasive alien species.</p> <p>Develop procedures for control of high risk species at all points of entry.</p>	<p>DOE – (EPD)</p> <p>Veterinary Service</p>	<p>NIEA-Natural Heritage</p> <p>DARD (Fisheries Division)</p> <p>Forest Service</p> <p>Loughs Agency</p> <p>AFBI</p> <p>DCAL (Inland Fisheries)</p>	<p>Options paper to be drafted by 2014/15.</p> <p>2014/15.</p>

Key Action	Delivery Mechanism	Associated Action(s)	Lead	Partner(s)	Timeframe
Objective 2: To develop an effective mechanism for detection, surveillance and responding to threats posed by both new and established invasive alien species through the establishment of an early warning and rapid response system.					
2.1 Further develop an early warning system.	Invasive Species Ireland (ISI) Project	<p>Identify and agree a list of highest risk species.</p> <p>Encourage staff to sign up to and participate in Expert Registry.</p> <p>Feed in records of species detected during fieldwork into online invasive species data/recording systems.</p> <p>Issue alerts in the event of newly recorded high risk invasive alien species being confirmed.</p> <p>Encourage staff to sign up to and participate in Species Alert Network.</p>	NIEA-Natural Heritage	<p>DAHG</p> <p>Centre for Environmental Data and Recording (CEDaR)</p> <p>National Biodiversity Data Centre (NBDC)</p> <p>NIEA-Water Management Unit</p> <p>DOE – (Marine Division)</p> <p>DCAL (Inland Fisheries)</p> <p>Waterways Ireland</p> <p>DARD (Agri-food Inspection Branch)</p> <p>DARD (Countryside Management)</p> <p>DARD (Fisheries Division)</p> <p>Veterinary Service</p> <p>Rivers Agency</p> <p>Forest Service</p> <p>Loughs Agency</p> <p>AFBI</p> <p>Roads Service</p> <p>NI Water</p>	<p>Finalise and agree list by December 2013.</p> <p>Ongoing.</p> <p>Ongoing. As and when available.</p> <p>Ongoing.</p> <p>Ongoing.</p>

Key Action	Delivery Mechanism	Associated Action(s)	Lead	Partner(s)	Timeframe
2.2 Maximise the potential of ongoing surveillance programmes.	Invasive Species Ireland (ISI) Project	<p>Identify and agree a list of the highest risk species in monitoring programme which could be included in existing monitoring programmes and identify monitoring gaps requiring action.</p> <p>Identify and record invasive alien species during monitoring and survey programmes.</p> <p>Include check list for invasive alien species on monitoring and survey sheets.</p>	<p>NIEA-Natural Heritage</p> <p>NIEA-Water Management Unit</p>	<p>DOE – Marine Division</p> <p>DARD (Agri-food Inspection Branch)</p> <p>DARD (Countryside Management)</p> <p>DARD (Fisheries Division)</p> <p>Veterinary Service</p> <p>Rivers Agency</p> <p>Forest Service</p> <p>Loughs Agency</p> <p>AFBI</p> <p>NI Water</p> <p>Roads Service</p> <p>DCAL (Inland Fisheries)</p>	<p>Agree list by June 2014.</p> <p>Ongoing.</p> <p>Reference to Invasive Alien Species to be include by December 2014.</p>
2.3 Develop and implement a rapid response mechanism.	Invasive Species Ireland (ISI) Project	<p>Identify and agree list of resources available (staff, equipment etc.) to carry out rapid response to contingences.</p> <p>Develop and agree a Memorandum of Understanding (MOU) between Departments to provide resources to assist with rapid response.</p> <p>Provide staff resources and/ or equipment, if required and feasible, to enable rapid response to be carried out.</p>	<p>NIEA-Natural Heritage</p> <p>NIEA-Water Management Unit</p>	<p>DOE – (Marine Division)</p> <p>DARD (Fisheries Division)</p> <p>Rivers Agency</p> <p>Forest Service</p> <p>Loughs Agency</p> <p>AFBI</p> <p>Roads Service</p> <p>NI Water</p> <p>DCAL (Inland Fisheries)</p>	<p>Agree resource list by December 2014.</p> <p>MOU to be in place by March 2015.</p> <p>As and when required.</p>

Key Action	Delivery Mechanism	Associated Action	Lead	Partner(s)	Timeframe
2.4 Develop and implement contingency and eradication plans for high risk species.	Invasive Species Ireland (ISI) Project	<p>Develop plans through ISI Project.</p> <p>Assist in the implementation of plans through</p> <ul style="list-style-type: none"> - the provision of funding and setting of regulatory conditions; - management agreements for designated sites; - provision of advice and staff and equipment; and - the control of high risk invasive alien species on public owned land. 	<p>NIEA-Natural Heritage</p> <p>NIEA-Water Management Unit</p>	<p>DOE (Marine Division)</p> <p>DARD (Fisheries Division)</p> <p>DARD (Countryside Management)</p> <p>Veterinary Service</p> <p>Forest Service</p> <p>Rivers Agency</p> <p>Loughs Agency</p> <p>AFBI</p> <p>Roads Service</p> <p>NI Water</p> <p>DCAL (Inland Fisheries)</p> <p>District Councils (SOLACE)</p>	Suite of 25 plans for species developed by December 2013.

Key Action	Delivery Mechanism	Associated Action	Lead	Partner(s)	Timeframe
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Objective 3: To develop an effective mechanism for monitoring, reporting and recording invasive alien species to inform the response to threats posed by new and established invasive alien species.

<p>3.1 Develop and establish protocols for invasive alien species monitoring.</p>	<p>Invasive Species Ireland (ISI) Project</p>	<p>Develop and agree protocols for recording of invasive alien species.</p> <p>Ensure protocols become normal practice when staff are undertaking inspections, monitoring, surveillance and survey programmes including electro fishing surveys, habitat mapping surveys etc.</p> <p>Establish a mechanism on how records should be fed into the Centre for Environmental Data and Recording (CEDaR) and National Biodiversity Data Centre (NBDC) databases.</p>	<p>NIEA-Natural Heritage</p> <p>NIEA-Water Management Unit</p>	<p>CEDaR</p> <p>NBDC</p> <p>DOE (Marine Division)</p> <p>DARD (Fisheries Division)</p> <p>DARD (Agri-food Inspection Branch)</p> <p>DARD (Countryside Management)</p> <p>Veterinary Service</p> <p>Forest Service</p> <p>Loughs Agency</p> <p>AFBI</p> <p>Roads Service</p> <p>NI Water</p> <p>DCAL (Inland Fisheries)</p>	<p>Introduce recording protocols by December 2013.</p> <p>To have compliance by December 2014.</p> <p>Mechanism to be place by December 2013.</p>
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Key Action	Delivery Mechanism	Associated Action	Lead	Partner(s)	Timeframe
3.2 Maximise potential of ongoing monitoring programmes.	Invasive Species Ireland (ISI) Project	<p>Identify a list of invasive alien species which can be introduced into monitoring programme.</p> <p>Establish a standard procedure for contracts for all survey and monitoring work to include a requirement to record and report on high risk invasive alien species where they are detected.</p>	<p>NIEA-Natural Heritage</p> <p>NIEA-Water Management Unit</p> <p>DOE - (EPD)</p>	<p>DOE (Marine Division)</p> <p>DARD (Environmental Policy)</p> <p>DARD (Fisheries Division)</p> <p>DARD (Countryside Management)</p> <p>DARD (Agri-food Inspection Branch)</p> <p>Forest Service</p> <p>Veterinary Service</p> <p>Rivers Agency</p> <p>Loughs Agency</p> <p>AFBI</p> <p>Roads Service</p> <p>NI Water</p> <p>DCAL (Inland Fisheries)</p> <p>DFP (Central Procurement)</p>	<p>Finalise and agree list by June 2014.</p> <p>Procedure to be in place by December 2015.</p>

Key Action	Delivery Mechanism	Associated Action	Lead	Partner(s)	Timeframe
3.3 Provide a mechanism to allow stakeholders to monitor, record and report invasive alien species.	Invasive Species Ireland Project	<p>Continue to monitor ISI website Alien Watch facility.</p> <p>Provide identification guidance on ISI website.</p> <p>Provide a reporting mechanism on ISI website.</p> <p>Ensure records are shared with CEDaR and NDBC.</p> <p>Promote and encourage use of the ISI website facility with stakeholders.</p>	NIEA-Natural Heritage	<p>CEDaR</p> <p>NBDC</p> <p>DHAG</p> <p>NIEA – Water Management Unit</p> <p>District Councils (SOLACE)</p> <p>DARD (Fisheries Division)</p> <p>DARD (Countryside Management)</p> <p>Veterinary Service</p> <p>Loughs Agency</p> <p>AFBI</p> <p>NI Water</p> <p>DCAL (Inland Fisheries)</p>	<p>Ongoing.</p> <p>Available online by June 2013.</p> <p>Available online by June 2013.</p> <p>Ongoing.</p> <p>Ongoing.</p>
3.4 Further development of databases.	Invasive Species Ireland (ISI) Project	<p>Encourage the need to feed records into the ISI website, CEDaR and NDBC databases through engagement with stakeholders.</p> <p>Provide annual update to NOBANIS on status of invasive alien species.</p>	NIEA-Natural Heritage	<p>CEDaR</p> <p>NBDC</p> <p>DHAG</p> <p>NIEA-Water Management Unit</p> <p>DOE (Marine Division)</p> <p>DARD (Fisheries Division)</p> <p>Loughs Agency</p> <p>AFBI</p> <p>Roads Service</p> <p>NI Water</p> <p>DCAL (Inland Fisheries)</p>	<p>Ongoing.</p> <p>First annual update due by December 2013.</p>

Key Action	Delivery Mechanism	Associated Action	Lead	Partner(s)	Timeframe
3.5 Investigate the possibility, of including a clause in the terms and conditions of all Government contracts to make it a requirement for contractors to submit datasets where Invasive Alien Species may be involved.		All Government awarded contracts to include a requirement for the contractor to submit any data gathered on invasive alien species recordings to CEDaR and NDBC.	DOE – (EPD)	NIEA – Natural Heritage Roads Service DCAL (Inland Fisheries) DFP (Central Procurement)	Procedure to be in place by December 2015.

Key Action	Delivery Mechanism	Associated Action	Lead	Partner(s)	Timeframe
Objective 4: To put in place an integrated management framework that prevents further spread of invasive alien species and prioritises species for eradication in a timely manner.					
4.1 Develop and agree protocols for eradication, control and containment of high risk species.	Invasive Species Ireland (ISI) Project	Develop management guidance through the Invasive Species Ireland Project. Encourage staff and contractors to use ISI website including Best Practice Management Guidance.	NIEA-Natural Heritage	District Councils (SOLACE) NIEA-Water Management Unit DARD (Countryside Management) DARD (Fisheries Division) Rivers Agency Forest Service Loughs Agency AFBI Roads Service NI Water	Management guidance for 25 high risk species to be developed by December 2013. Ongoing.
4.2 Develop and support action programmes in partnership with Republic of Ireland (ROI).	Invasive Species Ireland Project	Identify potential projects. Support and engage with cross border projects which deliver national and local measures. Seek EU funding opportunities e.g. LIFE+; Interreg etc.	NIEA-Natural Heritage	NIEA – Water Management Unit DARD (Fisheries Division) Veterinary Service Forest Service Loughs Agency Roads Service DAHG Inland Fisheries Ireland National Botanic Gardens (Dublin) Universities/ Academia	Ongoing.

Key Action	Delivery Mechanism	Associated Action	Lead	Partner(s)	Timeframe
Objective 5: To minimise and mitigate against the negative impacts of established invasive alien species in a cost effective manner.					
5.1 Develop and encourage implementation of Invasive Species Action Plans.	Invasive Species Ireland (ISI) Project	<p>Develop plans through ISI Project.</p> <p>Assist in the implementation of plans through</p> <ul style="list-style-type: none"> - the provision of funding and setting of regulatory conditions; - management agreements for designated sites; - provision of advice and staff and equipment; and - the control of high risk invasive alien species on public owned land. <p>Incorporate biosecurity protocols into operating procedures such as boatworking and diving works.</p> <p>Encourage contractors working on Government funded projects to put biosecurity plans in place on work sites.</p> <p>Review existing plans on an annual basis and/or when new information becomes available to ensure any references to invasive alien species are up to date and follow current best practice.</p>	<p>NIEA-Natural Heritage</p> <p>NIEA-Water Management Unit</p> <p>Forest Service</p>	<p>DARD (Fisheries Division)</p> <p>DARD (Countryside Management)</p> <p>DARD (Agri-food Inspection Branch)</p> <p>Veterinary Service</p> <p>Rivers Agency</p> <p>Loughs Agency</p> <p>AFBI</p> <p>Roads Service</p> <p>NI Water</p> <p>DCAL (Inland Fisheries)</p>	<p>Suite of 25 plans for species developed by December 2013.</p> <p>Biosecurity protocols to be in place by December 2014.</p> <p>Ongoing.</p> <p>First review to take place by December 2013.</p>

Key Action	Delivery Mechanism	Associated Action	Lead	Partner(s)	Timeframe
5.2 Develop an online toolkit of invasive alien species management methods.	Invasive Species Ireland (ISI) Project	<p>Deliver in partnership through Invasive Species Ireland project and GB Non- Native Species Programme.</p> <p>Feed in case study examples of projects undertaken.</p> <p>Encourage use of online Management Toolkit.</p>	NIEA-Natural Heritage	<p>NIEA-Water Management Unit</p> <p>DOE (Marine Division)</p> <p>DARD (Fisheries Division)</p> <p>DARD (Countryside Management)</p> <p>DARD (Agri-food Inspection Branch)</p> <p>Veterinary Service</p> <p>Forest Service</p> <p>Loughs Agency</p> <p>AFBI</p> <p>Roads Service</p> <p>NI Water</p> <p>DCAL (Inland Fisheries)</p>	<p>Online management toolkit to be in place by June 2013.</p> <p>Ongoing.</p> <p>Ongoing.</p>

Key Action	Delivery Mechanism	Associated Action	Lead	Partner(s)	Timeframe
Objective 6: To maximise organisational effectiveness and collaboration on invasive alien species issues among Government Departments and Agencies, Local Government, non-governmental organisations, industry and individuals.					
6.1 Establish a co-ordination mechanism for joined up working across Government.	Monitor progress on action taken through email updates from departmental contacts.	Provide annual update on progress made on key actions.	DOE – (EPD)	All Departments/ Agencies	First update to be requested June 2014. First formal report to Assembly - by December 2016.
6.2 Develop and deliver training for local authorities.	NIEA in house	Work in partnership with district councils to provide training and advice on invasive alien species. Explore options to expand training sessions to include other Government bodies and local community groups.	NIEA-Natural Heritage	District Councils (SOLACE)	Deliver 4 training sessions by December 2013. Options paper by June 2013.
6.3 Continue commitment to provide a central co-ordination and information resource on invasive alien species.	Invasive Species Ireland (ISI) Project	Work in partnership with NPWS to continue ISI project through a Phase 3 contract.	NIEA-Natural Heritage DAHG NPWS		Ongoing. Commence advertisement process by June 2013.
6.4 Continue partnership working with GB Programme, the European Network on Invasive Alien Species (NOBANIS) to maximise the effective use of resources to address shared threats.	Invasive Species Ireland (ISI) Project	Liaise with Defra, other devolved administrations and ROI colleagues to share information.	NIEA-Natural Heritage	GB – NNSS NOBANIS NBDC DAHG	Ongoing.

Key Action	Delivery Mechanism	Associated Action	Lead	Partner(s)	Timeframe
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Objective 7: To raise awareness of invasive alien species amongst the general public and the capacity for action amongst key stakeholders to increase their understanding of the risks that invasive alien species can pose to our native wildlife, economy, environment, society and the actions that minimise these risks.

7.1 Develop an invasive alien species communications plan to underpin prevention and management actions.	Invasive Species Ireland (ISI) Project Formalise key messages across Government.	Develop a Communications Plan as part of the ISI Project. Facilitate Education and Technical Awareness Working Group through ISI Project.	NIEA-Natural Heritage NIEA – Corporate Communications	NIEA - Water Management Unit DARD (Fisheries Division) Rivers Agency Forest Service Loughs Agency Roads Service DRD Water Policy NI Water DAHG Inland Fisheries Ireland District Councils (SOLACE)	Draft Communications Plan to be developed - by December 2014. Final Communications Plan to be published – by December 2015.
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Key Action	Delivery Mechanism	Associated Action	Lead	Partner(s)	Timeframe
7.2 Continue commitment to building effective partnerships through Invasive Species Ireland stakeholder engagement programme including annual forum and website.	Invasive Species Ireland (ISI) Project	<p>Hold ISI Forum on an annual basis.</p> <p>Review and update list of stakeholders.</p> <p>Encourage attendance at ISI Forum.</p>	<p>NIEA-Natural Heritage</p> <p>DAHG</p>	<p>NIEA – Water Management Unit</p> <p>DOE (Marine Division)</p> <p>DARD (Fisheries Division)</p> <p>DARD (Countryside Management)</p> <p>DARD (Agri-food Inspection Branch)</p> <p>Rivers Agency</p> <p>Veterinary Service</p> <p>Forest Service</p> <p>Loughs Agency</p> <p>AFBI</p> <p>Roads Service</p> <p>NI Water</p> <p>DCAL (Inland Fisheries)</p>	ISI Forum to be held by June 2013

Key Action	Delivery Mechanism	Associated Action	Lead	Partner(s)	Timeframe
7.3 Increase awareness of the importance of the preventative approach in minimising threats from invasive alien species.	Invasive Species Ireland (ISI) Project	<p>Develop report on the economic cost of invasive alien species through ISI Project.</p> <p>Increase awareness through talks, stakeholder meetings and events, guides, permits/licences, poster campaigns, websites and publications.</p> <p>Promote the 'Be Plant Wise' and 'Check, Clean, Dry' campaigns.</p>	NIEA-Natural Heritage	<p>NIEA-Water Management Unit</p> <p>DOE (Marine Division)</p> <p>DARD (Fisheries Division)</p> <p>DARD (Countryside Management)</p> <p>DARD (Agri-food Inspection Branch)</p> <p>Veterinary Service</p> <p>Rivers Agency</p> <p>Forest Service</p> <p>Loughs Agency</p> <p>Roads Service</p> <p>NI Water</p> <p>DCAL (Inland Fisheries)</p>	<p>Complete report and publish findings by April 2013.</p> <p>Run new campaign by December 2013.</p>
7.4 Further develop capacity of stakeholders to help increase action on the ground to minimise the risks from invasive alien species.	Invasive Species Ireland (ISI) Project	<p>Provide information and advice to organisations and landowners seeking to undertake invasive species control programmes.</p> <p>Encourage distribution of information/ leaflets, at topical events, stakeholder meetings, retail outlets and Government properties etc.</p>	<p>NIEA-Natural Heritage</p> <p>NIEA-Water Management Unit</p>	<p>Forest Service</p> <p>NI Water</p> <p>DARD (Fisheries Division)</p> <p>Loughs Agency</p> <p>AFBI</p> <p>DCAL (Inland Fisheries)</p>	<p>Ongoing.</p> <p>Make best practice guidance available on ISI website by June 2013.</p> <p>Ongoing.</p>

Key Action	Delivery Mechanism	Associated Action	Lead	Partner(s)	Timeframe
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Objective 8: To ensure that the legislative framework in Northern Ireland which regulates for invasive alien species issues is coherent, comprehensive, fit for purpose and 'proportionate'.

8.1 Liaise with the Republic of Ireland and GB on legislation.	DOE – (EPD)	Liaise with Defra, other devolved administrations and ROI colleagues to share information.	DOE – (EPD)	DAHG Defra	Ongoing.
8.2 Contribute to the development of EU policy and initiatives.	DOE – (EPD)	Liaise with Defra, GN –NNSS and ROI colleagues.	DOE – (EPD)	Defra GB-NNSS DAHG	Ongoing.

Objective 9: To encourage a strategic and coherent research programme to underpin Northern Ireland invasive alien species policy. This research will inform management and the implementation of the Strategy

9.1 Identify research priorities and needs.	Invasive Species Ireland (ISI) Project	Arrange workshop to identify IAS research themes and priorities.	NIEA-Natural Heritage	NIEA-Water Management Unit DOE (Marine Division) DARD (Programme Management Boards) Forest Service Loughs Agency AFBI Roads Service NI Water DCAL (Inland Fisheries)	Arrange workshop by December 2014. Publish research priorities arising from workshop by March 2015.
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Annex A

References

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Annex B

Glossary

Alien species	A species, subspecies or lower taxon, introduced outside its natural past or present distribution; includes any part, gametes, seeds, eggs, or propagules of such species that might survive and subsequently reproduce.
Aquaculture	The cultivation of aquatic organisms by human effort for commercial purposes. For the cultivation of marine organisms, often molluscs and crustaceans, in seawater the term 'mariculture' is also used.
Bern Convention	Convention on the Conservation of European Wildlife and Natural Resources.
Biodiversity	The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems.
BIP	Biodiversity Implementation Plan
Birds Directive	Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (codified version of Council Directive 79/409/EEC)
Black list	Identifies prohibited or strictly regulated species
CBD	Convention on Biological Diversity (Rio de Janeiro 1992)
CEDaR	Centre for Environmental Data and Recording
DAISIE	Delivering Alien Invasive Species Inventories for Europe
Establishment	The process of an alien species in a new habitat successfully producing viable offspring with the likelihood of continued survival.
EU	European Union

GB NNSPB	Great Britain Non-Native Species Programme Board
GISP	Global Invasive Species Programme
Grey list	Species whose potential is not yet known and has yet to be assessed for risks, these would be subject to regulation or precautionary measures until such time as they could be assigned to either of the other lists.
Guiding Principles	Guiding Principles for the prevention, introduction and mitigation of impacts of alien species that threaten ecosystems, habitats or species (annexed to Decision VI/23 adopted at CBD COP6 in 2002 (The Hague, Netherlands)).
Habitats Directive	Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora
Introduced species	Any species introduced by human agency into a geographical region outside its natural range. The term includes non-established ('alien') species and established non-natives, but excludes hybrid taxa derived from introductions ('derivatives').
IAS	Invasive Alien Species
ICES	International Council for the Exploration of the Sea
Introduction	The movement by human agency, indirect or direct, of an alien species outside of its natural range (past or present). This movement can be either within a country or between countries or areas beyond national jurisdiction.
Intentional introduction	The deliberate movement and/or release by humans of an alien species outside its natural range.
Invasive alien species	A non-native species which becomes established in natural or semi-natural ecosystems or habitats, is an agent of changes, and threatens native biological diversity (or has the potential to do so). An alien species whose introduction and/or spread threaten biological diversity.
MSFD	Marine Strategy Framework Directive (2008/56/EC)
NBDC	National Biodiversity Data Centre
NIBS	Northern Ireland Biodiversity Strategy
NIEA	Northern Ireland Environment Agency

NISD	National Invasive Species Database
NOBANIS	European Network on Invasive Species (formerly North European and Baltic Network on Invasive Alien Species)
Non-native species	A species that has been introduced directly by human agency (deliberately or otherwise) to an area where it has not occurred in historical times and which is separate from, and lies outside, the area where natural range extension could be expected. The species has become established in the wild and has self-maintaining populations.
NPWS	National Parks and Wildlife Service.
Pathway	The routes by which invasive alien species enter new habitats.
Ramsar Convention	The Convention on Wetlands of International Importance, especially as Waterfowl Habitat. (Ramsar, Iran, 1971)
Strategy	An Invasive Alien Species Strategy for Northern Ireland
Unintentional introduction	An unintended introduction made as a result of a species utilising humans or human delivery systems as vectors for dispersal outside its natural range.
Vector	The means by which invasive alien species travel to new destinations.
WFD	Water Framework Directive. (Directive 2000/60/EC, October 2000)
White list	Identifies low risk or benign species for which perhaps no more than a basic standard of behaviour or good practice might be appropriate

Annex C

Screening for Equality Impact Assessment

Under Section 75 of the Northern Ireland Act 1998, public authorities have a statutory duty to promote equality of opportunity. As a result of screening exercises undertaken prior to consultation on 'An Invasive Alien Species Strategy for Northern Ireland' it was considered that there were no significant implications for equality of opportunity and a full Equality Impact Assessment was not required. As the contents of this Strategy reflect how the Department plans to take forward the issue of Invasive Alien Species a further screening exercise is not required.

Annex D

Rural Proofing Statement

Rural proofing is a process to ensure that all relevant Government policies are carefully and objectively examined to assess whether or not they have a different impact in rural areas from that elsewhere, because of the particular circumstances of rural areas; and where necessary, what policy adjustments might be made to reflect rural needs and in particular to ensure that, as far as possible, public services are accessible on a fair basis to the rural community.

With regard to any policies/procedures/actions emerging from the Strategy these will apply equally to all rural and urban areas in Northern Ireland. It is considered that there are no negative impacts on rural productivity or the provision of services to the rural community as a result of these proposals.