

# STRIVE

## Report Series No.73

# Tracking Invasive Species in Ireland

## STRIVE

Environmental Protection  
Agency Programme

2007-2013

# Environmental Protection Agency

The Environmental Protection Agency (EPA) is a statutory body responsible for protecting the environment in Ireland. We regulate and police activities that might otherwise cause pollution. We ensure there is solid information on environmental trends so that necessary actions are taken. Our priorities are protecting the Irish environment and ensuring that development is sustainable.

The EPA is an independent public body established in July 1993 under the Environmental Protection Agency Act, 1992. Its sponsor in Government is the Department of the Environment, Heritage and Local Government.

## OUR RESPONSIBILITIES

### LICENSING

We license the following to ensure that their emissions do not endanger human health or harm the environment:

- waste facilities (e.g., landfills, incinerators, waste transfer stations);
- large scale industrial activities (e.g., pharmaceutical manufacturing, cement manufacturing, power plants);
- intensive agriculture;
- the contained use and controlled release of Genetically Modified Organisms (GMOs);
- large petrol storage facilities.
- Waste water discharges

### NATIONAL ENVIRONMENTAL ENFORCEMENT

- Conducting over 2,000 audits and inspections of EPA licensed facilities every year.
- Overseeing local authorities' environmental protection responsibilities in the areas of - air, noise, waste, waste-water and water quality.
- Working with local authorities and the Gardaí to stamp out illegal waste activity by co-ordinating a national enforcement network, targeting offenders, conducting investigations and overseeing remediation.
- Prosecuting those who flout environmental law and damage the environment as a result of their actions.

### MONITORING, ANALYSING AND REPORTING ON THE ENVIRONMENT

- Monitoring air quality and the quality of rivers, lakes, tidal waters and ground waters; measuring water levels and river flows.
- Independent reporting to inform decision making by national and local government.

### REGULATING IRELAND'S GREENHOUSE GAS EMISSIONS

- Quantifying Ireland's emissions of greenhouse gases in the context of our Kyoto commitments.
- Implementing the Emissions Trading Directive, involving over 100 companies who are major generators of carbon dioxide in Ireland.

### ENVIRONMENTAL RESEARCH AND DEVELOPMENT

- Co-ordinating research on environmental issues (including air and water quality, climate change, biodiversity, environmental technologies).

### STRATEGIC ENVIRONMENTAL ASSESSMENT

- Assessing the impact of plans and programmes on the Irish environment (such as waste management and development plans).

### ENVIRONMENTAL PLANNING, EDUCATION AND GUIDANCE

- Providing guidance to the public and to industry on various environmental topics (including licence applications, waste prevention and environmental regulations).
- Generating greater environmental awareness (through environmental television programmes and primary and secondary schools' resource packs).

### PROACTIVE WASTE MANAGEMENT

- Promoting waste prevention and minimisation projects through the co-ordination of the National Waste Prevention Programme, including input into the implementation of Producer Responsibility Initiatives.
- Enforcing Regulations such as Waste Electrical and Electronic Equipment (WEEE) and Restriction of Hazardous Substances (RoHS) and substances that deplete the ozone layer.
- Developing a National Hazardous Waste Management Plan to prevent and manage hazardous waste.

### MANAGEMENT AND STRUCTURE OF THE EPA

The organisation is managed by a full time Board, consisting of a Director General and four Directors.

The work of the EPA is carried out across four offices:

- Office of Climate, Licensing and Resource Use
- Office of Environmental Enforcement
- Office of Environmental Assessment
- Office of Communications and Corporate Services

The EPA is assisted by an Advisory Committee of twelve members who meet several times a year to discuss issues of concern and offer advice to the Board.

**EPA STRIVE Programme 2007–2013**

# **Tracking Invasive Species in Ireland**

Development of the National Invasive Species Database

**(2009-B-DS-3-S1)**

## **STRIVE Report**

Prepared for the Environmental Protection Agency

by

The National Biodiversity Data Centre

**Authors:**

**Colette O’Flynn and Liam Lysaght**

**ENVIRONMENTAL PROTECTION AGENCY**

An Ghníomhaireacht um Chaomhnú Comhshaoil  
PO Box 3000, Johnstown Castle, Co. Wexford, Ireland

Telephone: +353 53 916 0600 Fax: +353 53 916 0699

Email: [info@epa.ie](mailto:info@epa.ie) Website: [www.epa.ie](http://www.epa.ie)

## **ACKNOWLEDGEMENTS**

This report is published as part of the Science, Technology, Research and Innovation for the Environment (STRIVE) Programme 2007–2013. The programme is financed by the Irish Government under the National Development Plan 2007–2013. It is administered on behalf of the Department of the Environment, Heritage and Local Government by the Environmental Protection Agency which has the statutory function of co-ordinating and promoting environmental research.

The National Biodiversity Data Centre is grateful for the assistance and expert advice of a number of people in the development and support of the National Invasive Species Database project and associated website portal. Particular thanks are given to all who submitted species record information for inclusion on the database. Timely provision of such data is vital to the worth and use of the database and in Ireland, Europe and internationally.

Funding for this phase of work on the National Invasive Species Database project was kindly provided by the Environmental Protection Agency through the STRIVE 2007–2013 programme and the Heritage Council.

## **DISCLAIMER**

Although every effort has been made to ensure the accuracy of the material contained in this publication, complete accuracy cannot be guaranteed. Neither the Environmental Protection Agency nor the author(s) accept any responsibility whatsoever for loss or damage occasioned or claimed to have been occasioned, in part or in full, as a consequence of any person acting, or refraining from acting, as a result of a matter contained in this publication. All or part of this publication may be reproduced without further permission, provided the source is acknowledged.

The EPA STRIVE Programme addresses the need for research in Ireland to inform policy makers and other stakeholders on a range of questions in relation to environmental protection. These reports are intended as contributions to the necessary debate on the protection of the environment.

## **EPA STRIVE PROGRAMME 2007–2013**

Published by the Environmental Protection Agency, Ireland

ISBN: 978-1-84095-399-2

**Online version**

Price: Free

## Details of Project Partners

### **Heritage Council**

Áras na hOidhreachta

Church Lane

Kilkenny

Ireland

Tel.: +353 56 777 0777

Email: [cobrien@heritagecouncil.ie](mailto:cobrien@heritagecouncil.ie)

### **National Biodiversity Data Centre**

Beechfield House

Waterford Institute of Technology West Campus

Carriganore

Waterford

Ireland

Tel.: +353 51 306 240

Email: [coflynn@biodiversityireland.ie](mailto:coflynn@biodiversityireland.ie)



# Table of Contents

<b>Acknowledgements</b>	<b>ii</b>
<b>Disclaimer</b>	<b>ii</b>
<b>Details of Project Partners</b>	<b>iii</b>
<b>Executive Summary</b>	<b>vii</b>
<b>1 Introduction</b>	<b>1</b>
<b>2 Key Deliverables</b>	<b>4</b>
2.1 Further Develop the National Invasive Species Website	4
2.2 Continue to Populate and Manage the National Invasive Species Database	4
2.3 Develop Web-based Species Profiles	6
2.4 Liaise with and Provide National Coordination to State Agencies	6
2.5 Produce Priority Invasive Species Reports for Each Local Authority	9
2.6 Create a Distribution Database for Each Local Authority	13
2.7 Collaborate with European and International Networks	13
2.8 Manage Invasive Species Recording Scheme	15
2.9 Load Data onto Centre’s Mapping System	16
2.10 Develop Proposal for a National Baseline Survey	17
2.11 Added Value of the Work Programme	18
<b>3 Recommendations for Future Work</b>	<b>19</b>
3.1 Provision of Support to, and Continued Delivery of, Fundamental Database Work	19
3.2 Extension of Ireland’s Invasive Species Early Warning System	19
3.3 Support Existing Surveillance and Monitoring Programmes	19
3.4 Continued Liaison with and Support of Local Authorities	19
3.5 Meeting Legislative and Policy Needs	21
3.6 Development of a European Early Warning and Rapid Response System	21
3.7 Expansion of the Invasive Species Survey to Track the Spread of Invasive Species	21
<b>References</b>	<b>22</b>
<b>Acronyms and Annotations</b>	<b>24</b>



# Executive Summary

The National Biodiversity Data Centre has worked on the National Invasive Species Database initiative since 2008 to provide a national framework for the management and provision of information on invasive species in Ireland. A fundamental requirement for an effective strategy to deal with the problem of invasive species is the provision of information on the current and potential spread of the key invasive species, a coordinated national network for the dissemination of that information, and the establishment of an early warning system to alert for new arrivals.

The importance of the threat of invasive species is reflected in the suite of emerging national policy and legislative drivers, including the draft Second National Biodiversity Plan 2010–2015 and the draft European Communities (Birds and Natural Habitats) Regulations 2010. Invasive Species Strategies for the Republic of Ireland and Northern Ireland are in preparation, while the European Commission is also drafting a European Union Invasive Alien Species Strategy which Ms O'Flynn participates in.

The objective of the project was to continue the development of the National Invasive Species Database to include all priority invasive species. This will facilitate the communication of valuable distribution information on these species to local authorities, state bodies, non-governmental organisations (NGOs) and researchers. This can then be used to mobilise and inform invasive species action at local level, and policy at national level. In particular, the National Biodiversity Data Centre is promoting the development of an invasive species strategy at the county level and supporting this by providing tailored priority invasive species reports for each local authority.

Ten key tasks were identified to be undertaken in this project:

- 1 Develop website tools to enhance the filtering, display and access to the website content and accessibility to the database;
  - 2 Continue to populate and manage the database;
  - 3 Develop web-based species profiles;
  - 4 Liaise with and provide national coordination to state agencies;
  - 5 Provide a priority invasive species report specific to each local authority;
  - 6 Create a distribution database for each local authority;
  - 7 Collaborate with European and international networks;
  - 8 Manage the Invasive Species Recording Scheme;
  - 9 Load new data to the mapping system;
  - 10 Develop proposal for a national baseline survey.
- As a result of the data centre's work, the following components are now in place:
- **National Invasive Species Database.** As of March 2011, this contains 23,742 records of 95 invasive species on interactive geographic information system (GIS) distribution maps in a continually updated centralised system.
  - **National Invasive Species information portal** (<http://invasives.biodiversityireland.ie>). This dynamic portal provides easy access to up-to-date information on Ireland's invasive species with a central focus on their distribution.
  - **National Invasive Species mapping system.** This system includes dynamic distribution maps of all 95 invasive species; individual records can be queried to show full records and information. The ability to view these records, set against a variety of background layers, can support threat assessments for a species, habitat, designated site, etc. Tailored reports on the top 12 'Dirty Dozen' invasive species in each local authority region, including distribution maps and species profiles, were sent to the 34 local authorities in Ireland.
  - **Profiles for 100 invasive species.** Profiles include species details, pathways of introduction, sources of information, distribution maps and images.

- **Early warning system to alert for new species.**  
This was employed twice in 2010 to alert for the arrival of the Asian clam and the Siberian chipmunk (<http://invasives.biodiversityireland.ie/species-alerts/>). The importance of providing this facility cannot be overstated. Ireland is one of just a few countries to have such a system in place, although the need for it has been acknowledged widely at a European and international level.

## **Recommendations for Future Work**

Arising from the work undertaken to date, priorities for future work have been identified:

- 1 Ensure that the National Invasive Species Database is kept fully up to date;
- 2 Develop web services for Ireland's early warning system;

- 3 Provide support to, and integrate with, existing surveillance and monitoring programmes;
- 4 Provide continued support to and collaboration with state bodies, organisations, cross-border initiatives, European and international invasive species networks;
- 5 Meet legislative and policy needs;
- 6 Implement a national monitoring programme to track the spread of invasive species.

The completion of work as outlined in this report and in the 'Recommendations for Future Work' will place Ireland in a good position to fulfil many of the expected roles for a Member State in the EU Invasive Alien Species Strategy and in complying with the forthcoming Invasive Alien Species Directive.

# 1 Introduction

Globally, invasive alien species<sup>1</sup> are considered one of the most important direct drivers of biodiversity loss and ecosystem service changes (Millennium Ecosystem Assessment, 2005). Europe is particularly affected by alien species, which are invading the continent at an unprecedented rate: 10,822 alien species are listed for Europe, of which 10–15% are expected to have a negative economic or ecological impact (DAISIE, 2011). Negative impacts are categorised according to the mechanism by which native biota are affected – for example, through competition, herbivory, predation, alteration of habitat, introduction of parasites and pathogens or dilution of native gene pools (Stokes et al., 2006). The impact of invasive species not only affects biodiversity, the ecosystem functions and the services they provide, but they also have an impact on economic activities and human health. In 2008, invasive species were estimated to cost between €9.6 billion and €12.7 billion per year in Europe (Kettunen et al., 2008), but the European Commission (EC) has acknowledged that this is likely to be an underestimate (Commission of the European Communities, 2008).

It is now widely acknowledged that, together with preventing the arrival of potentially invasive species, early warning and rapid response (EWRR) are crucial to mitigating the impacts of biological invasions (Wittenberg and Cock, 2001; Genovesi and Shine, 2004). Failing such actions, containment and long-term control measures should be implemented, although this is a less desirable situation as it may be very costly to manage and not always possible. This three-stage hierarchical approach – (i) prevention, (ii) early detection and rapid response, (iii) containment and long-term control – is also reflected in the guiding principles of

the decisions adopted by the Convention on Biological Diversity's Conference of the Parties Decision VI/23 on alien species that threaten ecosystems, habitats or species (United Nations Environment Programme [UNEP], 2002; IUCN, 2000). The guiding principles encourage the development of an inventory of invasive species at the national level and sharing of that information as part of the process.

In light of the threat posed to Ireland's natural heritage by invasive species and their ability to undermine Irish achievement of its policy commitments, the need for a national inventory of these species was recognised. In response to this, the National Biodiversity Data Centre established the National Invasive Species Database and information portal in 2008. The National Invasive Species Database provides up-to-date centralised information on the distribution of invasive species in Ireland. The database project also functions as a resource to assist recording, monitoring and surveillance programmes, and provide the infrastructure for the development of an early warning system for invasive species.

Ireland, as a party to the Convention on Biological Diversity (CBD), has committed to its goal of reducing the loss of biodiversity by 2010 (which has not been achieved), and to taking action on key threats to deliver this – including threats from invasive species. The CBD Conference of the Parties (COP) adopted a revised and updated Strategic Plan for the Convention, including new biodiversity target(s) for the 2011–2020 period, at its tenth meeting in October 2010. Target 9 of the 20 targets within the Strategic Plan for Biodiversity 2011–2020 states that: 'By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated and measures are in place to manage pathways to prevent their introduction and establishment' (UNEP, 2011). The work of the National Invasive Species Database project can fulfil a fundamental role in reaching this target by contributing up-to-date distribution and temporal data for the identification and prioritisation of invasive alien species in Ireland and in aiding the prevention of future introductions, through the role of horizon scanning in Europe.

---

1 There are many definitions for both 'alien species' and 'invasive alien species' but, in general terms, alien species are species that are present in an area beyond their natural distribution range. Invasive alien species are alien species whose introduction and/or spread threaten biodiversity and can consequently also have direct or indirect socio-economic or human health impacts. The term alien species is interchangeable with other commonly used terms: non-native, non-indigenous, exotic. Please view formal definitions from the Convention on Biological Diversity (CBD) Glossary of Terms web page: <http://www.cbd.int/invasive/terms.shtml>

Under the EU Directive on the Conservation of Habitats, Flora and Fauna (92/43/EEC) (the 'Habitats Directive') and the Council Directive (79/409/EEC) on the Conservation of Wild Birds (the 'Birds Directive'), Ireland is required to achieve/maintain favourable status for listed species and habitats. Because invasive species are a direct or indirect threat to achieving such status for many of these protected species and habitats, the data collated and provided by the National Invasive Species Database is crucial to informing on the presence and location of invasive species in Ireland. It can also be used to assess the potential rate of spread and provide an early warning system – all crucial elements in tackling this threat. For example, under the EU Water Framework Directive, the presence of certain invasive species can prevent a water-body from achieving high ecological status (Environmental Protection Agency [EPA], 2004). Therefore, integrating the National Invasive Species Database into the Water Framework Directive monitoring and reporting mechanism could provide additional information on risks to water-bodies in a cost-effective manner ([Fig. 2.4](#) and [Box 3.1](#)).

Under Article 17 of the Habitats Directive, Ireland is obliged to report to the European Commission on the status of listed habitats and species every six years. Ireland's 2008 report listed invasive species as No. 8 of the major pressures (National Parks and Wildlife Service, 2008) but thanks to a great increase in data collection since then (supported by this database and outreach), a more robust analysis of its ranking for the next report to the EC should be possible.

The EC is currently developing an EU Strategy on Invasive Alien Species and is considering options to address and reduce these impacts. Key components for the strategy have been examined according to different levels of ambition and set out in a comprehensive report by the Institute for European Environmental Policy (Shine et al., 2010). Three working groups have been set up to guide development of the strategy and Ms O'Flynn will be representing Ireland as an expert for Working Group 2: Early Warning and Rapid Response.

In reflection of the need for clear policy and legislation on invasive species, amendments to existing, and the development of new, policies and legislative instruments are under way in Ireland. Amendments to the Draft European Communities (Birds and Natural

Habitats) Regulations 2010 (currently awaiting Dáil approval for passing into law) and work on identifying how a more effective information management system can assist legislative needs have been undertaken by the data centre, in conjunction with partners in the Invasive Species Ireland initiative; a submission on this has been made to the Department of the Environment, Heritage and Local Government (DoEHLG).

Ireland's National Biodiversity Plan (Government of Ireland, 2002) addresses the threat of alien species and promotes the necessity of documenting and reviewing introductions of species that have already taken place and the impacts they have had on, and continue to pose to, biodiversity. It is envisaged that the second draft of the National Biodiversity Plan 2010–2015, which is currently in consultation (as of October 2010), will include a strong policy statement on invasive species issues. There will be a particular emphasis on documenting, preventing the spread of and eradicating invasive species. These same issues are listed as priority actions for Ireland under the *Invasive Species in Ireland* report (Stokes et al., 2006).

The development of an Invasive Alien Species Strategy for the Republic of Ireland is also under way and at a recent stakeholder meeting (National Botanic Gardens, November 2010), the National Invasive Species Database was identified as being critical to delivering an effective strategy, particularly in the area of monitoring, recording, reporting and in providing an early warning system for Ireland. An Invasive Alien Species Strategy for Northern Ireland is also being developed, with the development of both strategies being mirrored as closely as possible to provide a harmonised approach to invasive species for the whole island. The National Invasive Species Database project should also help to answer policy questions, and potentially inform decisions on the allocation of resources and so on.

Engagement and active collaboration with state bodies, local authorities, NGOs in Ireland and European and international networks are central to tackling the threat of invasive species effectively. However, further development of the National Invasive Species Database, its associated website portal and direct engagement with the above-mentioned stakeholders

were identified as being necessary to progress the advantages that would be reaped from such work.

In September 2009, the Heritage Council and the EPA provided funding to undertake necessary tasks in moving forward in addressing the threat of invasive alien

species, over a 12-month period. Detailed descriptions of the key deliverables are presented in this report, along with other tasks undertaken that provide significant added value, over and beyond initial expectations for this time frame.

## 2 Key Deliverables

A work programme was devised in September 2009 with ten key deliverables. These are:

- 1 Develop website tools to enhance the filtering, display and access to the website content and accessibility to the database;
- 2 Continue to populate and manage the National Invasive Species Database;
- 3 Develop web-based species profiles;
- 4 Liaise with and provide national coordination to state agencies;
- 5 Produce priority invasive species report for each local authority;
- 6 Create a distribution database for each local authority;
- 7 Collaborate with European and international networks;
- 8 Manage Invasive Species Recording Scheme;
- 9 Load new data on the mapping system;
- 10 Develop proposal for a national baseline survey.

### 2.1 Further Develop the National Invasive Species Website

A dedicated website for use by public bodies, researchers and the general public is central to the establishment of a national infrastructure for managing and providing information on invasive species. The National Invasive Species website ([Fig. 2.1](#)), one of a suite of sites developed and managed by the National Biodiversity Data Centre, is a centralised source of detailed information on the historic and up-to-date distribution of all invasive species on the island of Ireland (<http://invasives.biodiversityireland.ie>). The core component of the website is a dynamic GIS mapping system which provides:

- Detailed access to all the data contained in the National Invasive Species Database;
- An information system built around this to assist interpretation of the maps; and

- An early warning system to alert for new arrivals.

The occurrence and spread of invasive species in Ireland is very dynamic, and the ability to update information quickly and efficiently is a prerequisite for an effective information-management system. Consequently, part of the work programme involved migrating the website to WordPress, a blog-style content publishing platform considered more appropriate for meeting the needs of immediate and flexible information dissemination. The development of the National Invasive Species website was created to ensure that it best meets the national needs for an information system on invasive species.

Other specific developments included:

- 1 **Species alerts system** to issue alerts to a network of key stakeholders and to the website when potentially invasive species are newly discovered in Ireland (e.g. Asian Clam, see Section 2.2 below for further details);
- 2 **Notification system** to the website, to data centre Twitter followers and the Invasive Species Ireland E-newsletter for when the National Invasive Species Database has been updated;
- 3 **'News in Brief' section** to disseminate notices of new developments;
- 4 **Species search application** to provide a platform for species profiles, direct access to each species interactive map and a facility to view species photos.

### 2.2 Continue to Populate and Manage the National Invasive Species Database

The National Invasive Species Database acts as the central repository for data on invasive species distribution in Ireland. It was established with the support of the National Parks and Wildlife Service, the Northern Ireland Environment Agency, Invasive Species Ireland and other key stakeholders as an imperative for providing high-quality up-to-date



Figure 2.1. Homepage of the National Invasive Species Database website.

information on the occurrence and spread of invasive species in the island of Ireland. The research officer, Colette O'Flynn, has been liaising with recorders, researchers and field staff of public bodies (such as National Parks and Wildlife Service Conservation Rangers) to obtain detailed information on the current distribution of invasive species. As a result of this work, an additional 5,041 species observations have been added to the National Invasive Species Database since September 2009, including data on 17 additional

invasive species. As of September 2010, the database contained 21,222 records for 92 species. The value of having a National Invasive Species Database as a centralised data source was exemplified in April 2010 when the submission of one record of the Asian clam (*Corbicula fluminea*), a species new to Ireland, triggered the data centre's early warning system, resulting in a species alert being issued and a rapid response to its find implemented. Inland Fisheries Ireland responded rapidly to the alert and went to the site to assess the

level of invasion. They found high densities of the species present. The Asian clam (Fig. 2.2) has since been recorded in locations in the River Nore, River Barrow, River Shannon in Carrick-on-Shannon and in Lough Derg (National Biodiversity Data Centre, 2011).



**Figure 2.2. Asian clam (*Corbicula fluminea*) Photo: C. O'Flynn.**

The establishment of a centralised national database for invasive species is a model promoted by the data centre and supported by the National Invasive Species Network in Ireland. It has proven to be a hugely effective and efficient means of managing information to support the work of the key partners engaged in action to tackle invasive species. Through the data centre's involvement in the European Network on Invasive Species (NOBANIS), this work has been identified as a model of best practice by the European Environment Agency (EEA) and this system is now being promoted in other European states (see Section 2.7 below).

### 2.3 Develop Web-based Species Profiles

An important element to the information-management system on invasive species is the availability of detailed information for each species to key stakeholders. Species profiles are needed to ensure that high-quality, up-to-date and consistent information is freely available to decision makers, researchers and the general public. Despite the global acknowledgement of the necessity of tackling the threat posed by invasive species, few systems worldwide have developed these profiles. The data centre has produced a searchable database of species profiles for 100 invasive species – this is significantly more than the 86 referred to in the original

project proposal. The information on each species is provided to a standard format, consistent with that promoted by NOBANIS to ensure that it can feed into emerging European and international initiatives. The profiles provide detailed information on each species, including a dynamic on-line distribution map and images. The species profile for *Azolla filiculoides* (water fern) is presented in Fig. 2.3 to demonstrate the nature of the information provided. All species profiles can be accessed through the search tool available at: <http://apps.biodiversityireland.ie/InvasivesBrowser/>

### 2.4 Liaise with and Provide National Coordination to State Agencies

Setting up the national framework for data management for invasive species is only one element; the other is ensuring that stakeholders can use it – in particular, that key state agencies can act to undertake control, eradication or preventative measures. To address this issue, the centre has engaged proactively with state agencies. In 2010, for example, it offered specific training workshops to staff of eight agencies/bodies. Of the eight, six expressed interest in the training but only three accepted the offer and training workshops have been provided. The eight agencies/bodies offered workshops were:

**Heritage Council:** chosen to target the heritage officers as their remit covers natural heritage and they are often the first point of contact and gateway to natural heritage awareness and actions with a local authority. **Workshop delivered;**

**Waterford City Council:** chosen as they have responsibility and influence over policies and action at a regional and local level. Staff from many different departments were targeted. **Workshop delivered;**

**Waterford County Council:** chosen as they have responsibility and influence over policies and action at a regional and local level. Staff from many different departments were targeted. **Workshop delivered;**

**Coillte:** chosen as they manage a large quantity of land in Ireland, have field staff and are actively involved in invasive species management;



NATIONAL  
BIODIVERSITY  
DATA CENTRE



NATIONAL INVASIVE SPECIES DATABASE

Home > Site > File > ...

### *Azolla filiculoides*

Common name: *Water Fern*  
Invasiveness: *High*



This map for the web

- All records displayed
- Missing some records
- Missing majority of records
- Unable to assess



*Azolla filiculoides*

◀
▶

#### About the species

**Synonyms:** *Asplenium*  
**Gaelic name:** *Kallthraeth uinn*  
**Taxon group:** ferns  
**First report:** 1977  
**Status:** Invasive

**Pathway of introduction:** Aquatic Ornamental  
**Impact:** Ecologic changes  
**Frequency:** Common, many sites in the country  
**Native distribution details:** S. America, N. America, West Indies, Central America, through Western North America including Alaska  
**Comments:** This species was one of eight recorded as posing a threat to the attainment of the environmental quality objectives of the WFD at the European Union Atlantic Ocean WFD  
**References:** 11, 112, 113, 114 >> [Download references](#) >> [Download to bibliography](#)

[Previous species](#)
[Next species](#)

The National Biodiversity Data Centre is an initiative of the Heritage Council and is operated under a license granted by the Corporation of Dublin. The website is funded by the Department of the Environment, Heritage and Local Government >> [National Biodiversity Data Centre 2011](#)

Figure 2.3. Species profile for water fern.

**Environmental Protection Agency:** chosen as they are co-funders of this stage of development of the National Invasive Species Database, they have expert field staff and undertake regular surveillance and monitoring programmes;

**Inland Fisheries Ireland:** chosen as they have expert field staff, undertake regular surveillance and monitoring programmes and are actively involved in invasive species management;

**National Parks and Wildlife Service:** chosen as they have an extensive network of field staff, many of whom undertake surveillance and monitoring work and are involved with invasive species control work;

**Waterways Ireland:** chosen as they actively manage large water corridors that have invasive species present in them or can be spread through them.

In addition to the direct offer of training to state agencies, the data centre also promotes the value of the National

Invasive Species Database as an important component of data management for specific areas of public policy. For instance, the research officer, Ms Colette O'Flynn, through her work as a key partner in Phase II of the Invasive Species Ireland (ISI) project, has identified opportunities for the database to be integrated into surveillance and monitoring programmes to deliver significant added value to ongoing work. One such example is its potential for integration into the Water Framework Directive monitoring and reporting mechanism, where it could provide additional information on risks to water bodies in a cost-effective manner (Fig. 2.4).

Work has also been carried out to identify how a more effective information-management system can assist legislative needs, and a submission has been made to the DoEHLG on the Draft European Communities (Birds and Natural Habitats) Regulations 2010 in this regard.

Ms O'Flynn has been invited to sit on the working group for the development of separate but harmonised

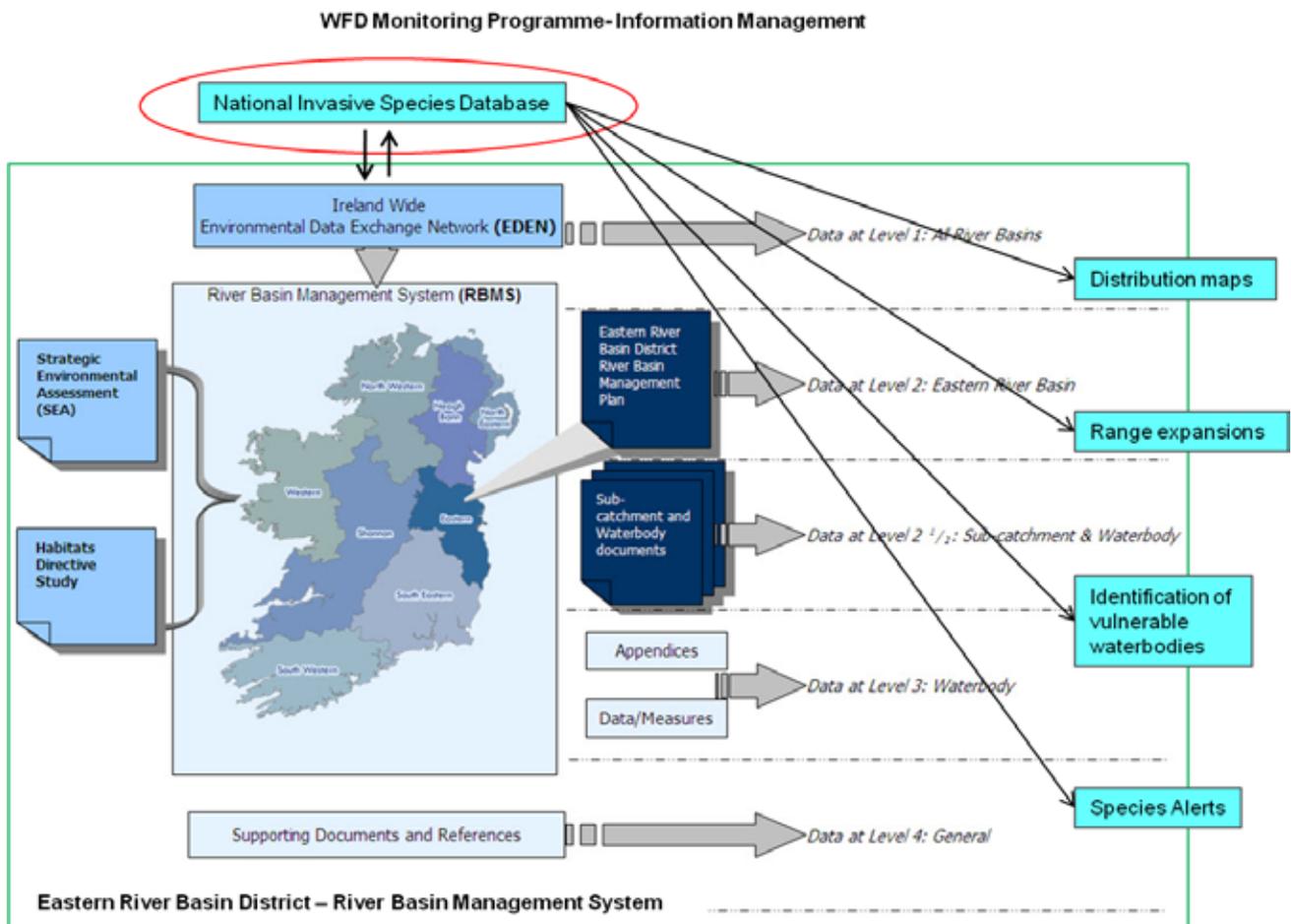


Figure 2.4. Potential integration of the National Invasive Species Database into the Water Framework Directive information management needs system. (Figure courtesy of C. Maguire 2010 with inserted image in green box taken from Eastern RBD 2009.)

Republic of Ireland and Northern Ireland Invasive alien species strategies. In addition, this heightened awareness of the National Invasive Species Database has brought a significant increase in requests to the centre for advice on all aspects of invasive species management, eradication and control. For instance, the centre has provided specific support to two Heritage Council-funded projects: to Dublin City Council as part of their survey of invasive species in waterways, and to the mapping of invasive species in a Donegal County Council initiative.

The National Biodiversity Data Centre has made significant progress in the development of an information-management system that will be of value to all bodies that are engaged in, or can influence, land management. As a result of the work of the research officer over the course of the 12 months, awareness and knowledge of this system have increased significantly. However, while the control, prevention or eradication of invasive species are important issues, few state agencies see these tasks as a core responsibility. As a result, the issue is not considered a priority in the allocation of resources or staff time. One future challenge in the data centre's work is to raise awareness within key state agencies and departments of the importance of invasive species, and to demonstrate the savings that can be made by prudent and timely mitigation and management issues.

## 2.5 Produce Priority Invasive Species Reports for Each Local Authority

Potentially, local authorities are among the most important bodies for instigating action for the tracking, control and eradication of invasive species. The National Biodiversity Data Centre has engaged with local authorities staff to explore how best it can provide a useful service to support their work. What data was most useful to local authorities (and in what format) was the subject of detailed discussions between the data centre and the heritage officer network at a seminar in June 2010. At this meeting, there was unanimous agreement that the provision of detailed information on key invasive species is an important service that should be provided by the National Biodiversity Data Centre to support the work of local authorities. As a start in this process, the data centre has provided tailored

reports to 34 local authorities with detailed information on the most significant invasive species within their jurisdiction. Each report was titled *Report on the Dirty Dozen Non-native Invasive Species - [local authority or county name]*. The use of the term 'Dirty Dozen' refers to the 12 species profiled in the report for that area. The 12 species chosen for each report were based on their presence in the area and their potential for impact and spread. The criteria for listing the species are detailed in each report. For those areas that did not have 12 high-impact invasive species reported from their area, then invasive species in nearby areas were profiled as potential invaders.

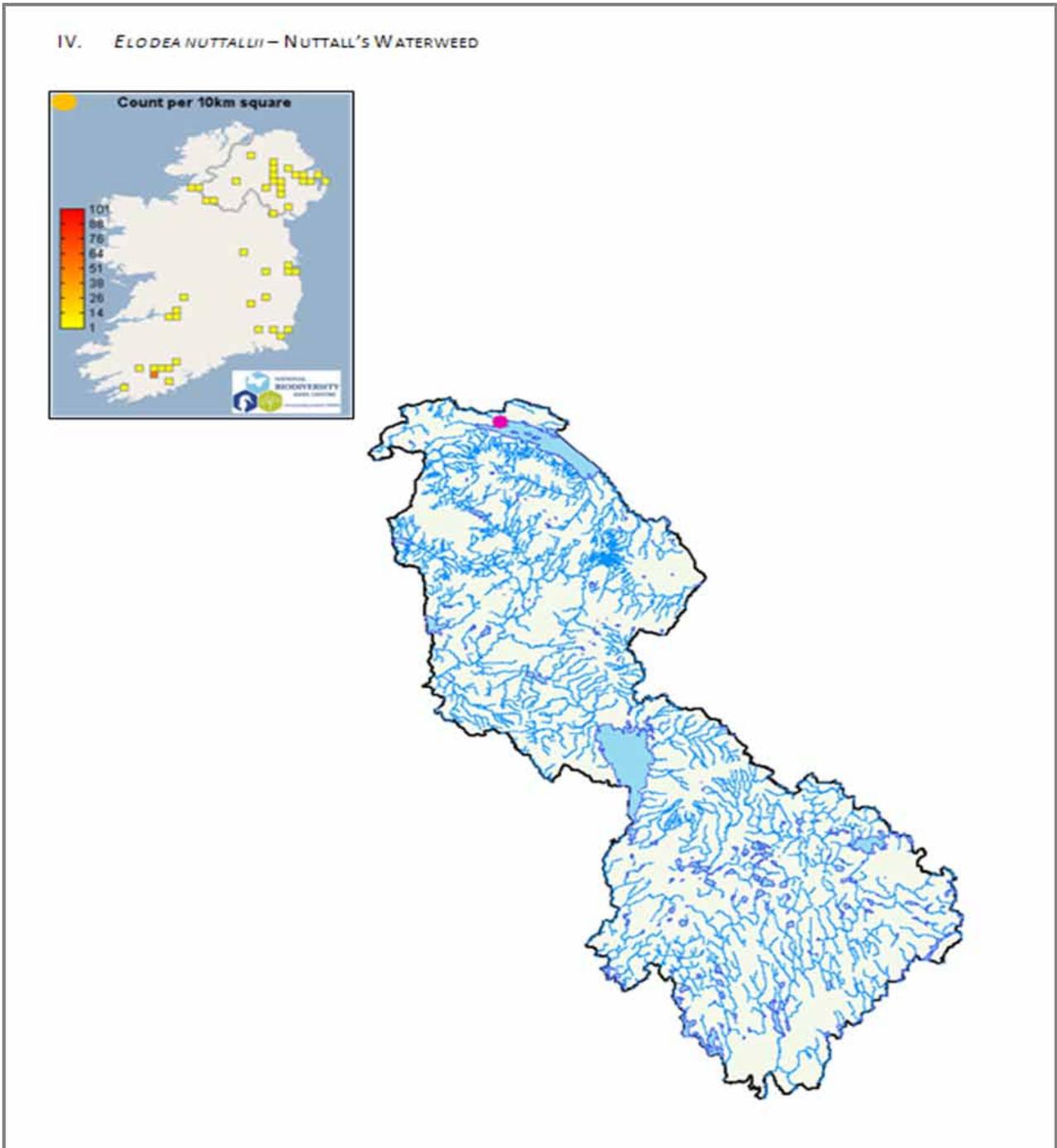
Each report contained:

- A profile of the top 12 'Dirty Dozen' most important invasive species within their area (see [Table 2.1](#) for example list);
- Distribution maps of the locations where they are known to occur within the county/ local authority region (see [Fig. 2.6](#) as an example);
- A 'Useful Resources and Reference' section in relation to invasive species;
- Relevant policy and legislation information.

A national and regional map of the distribution of each priority species is presented. The major river networks are also provided, if it is known that the species in question can be spread via a waterway (see [Fig. 2.6](#)).



**Figure 2.5. Muntjac deer (*Muntiacus reevesi*)**  
Photo: GB Non-native Species Secretariat © Crown Copyright 2009.



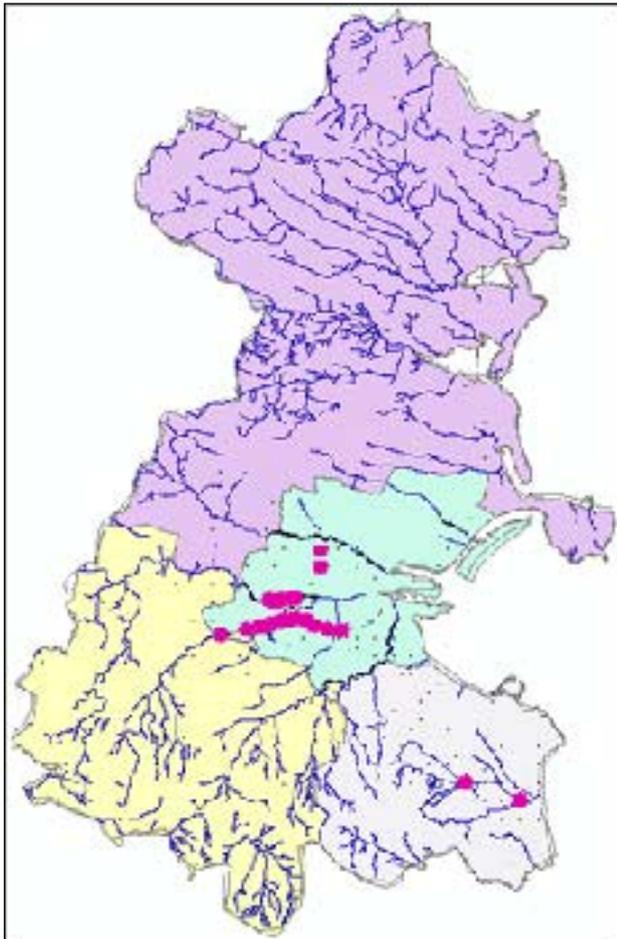
**Figure 2.6. Example distribution map for *Elodea nuttallii* (pink dot) taken from Co. Leitrim report. In this instance, prevention of spread throughout the lough and eradication of this species is recommended.**

Effective action for the control or eradication of an invasive species within a single local authority can be futile if a regional approach is not adopted. Therefore, communication and collaboration with adjacent councils in dealing with invasive-species management are critical elements of any effective action plan. To promote

a coordinated regional approach, where more than one local authority exists within a county, all regions were mapped together but shaded in different colours. This is to show the distribution of a species and the connectivity with waterbodies in adjacent local authorities within that county (Fig. 2.7).

**Table 2.1. 'Dirty Dozen' species list and potential invaders list, Co. Waterford.**

Dirty Dozen species				Potential invaders
1	Japanese knotweed	7	Rhododendron	Zebra mussel
2	Himalayan balsam	8	Common cord grass	Wireweed
3	Giant hogweed	9	Chinese mitten crab	Muntjac deer (Fig. 2.5)
4	Parrot's feather	10	Gammarus tigrinus	Asian clam (Fig. 2.2)
5	Curly waterweed	11	Dace	Wild boar
6	Hottentot fig	12	Grey squirrel	



**Figure 2.7. Distribution of *Elodea nuttallii* in Co. Dublin with the four local authorities highlighted in different colours.**

Species profiles were presented for each species listed in the reports (for an example profile, see Fig. 2.8). A total of 28 profiles was produced. Standard information in all profiles includes:

- Scientific, common and Irish names;
- Native distribution;
- Irish distribution frequency;
- Habitat information;

- Fossitt general habitat classification code<sup>2</sup>;
- Species impact;
- Identification features;
- Images of the species.

Many of the species profiles also have information unique to each county:

- Number of records in the county and number of those records over 1km<sup>2</sup> resolution;
- Priority tagging for each county (why that species was chosen for the region);
- Distribution comment.

Hard-copy and digital versions of the reports were sent to the county manager in each of the 34 county and city councils in Ireland. A GIS file with the raw record data was also provided. The objective of this was to provide data that could feed directly into the local authorities' GIS systems and to be available to inform each local authority's work (see Section 2.6 below). The reports and GIS data were sent with an offer from the data centre to provide regular updates on the occurrence of invasive species, if this was considered by the local authority to be worthwhile. To date, the majority of local authorities that have responded have requested this service, and it is hoped that this initial communication will lead to active and ongoing liaison between the data centre and the local authorities.

Another key audience for the locally generated data and reports is the field staff of National Parks and Wildlife Service (NPWS). Consequently, reports were also forwarded to the eight regional managers of NPWS. The intention is that the conservation rangers would be

<sup>2</sup> The general habitat classification code is one of the levels of classification of habitats in Ireland and is published in Fossitt (2000)

SPECIES PROFILE

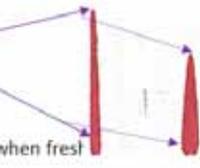
Species Name	Common Name	Irish Name	First recorded in Ireland
<i>Elodea nuttallii</i>	Nuttall's Waterweed	Tim uisce chaol	1984
Native Distribution	North America	Irish Distribution Frequency	<b>Common</b> – many sites in the country
No. of records in Co. Leitrim	1	No. of 1km <sup>2</sup> record squares or higher resolution	1
Distribution Comment	This species was recorded on the edge of Melvin Lough in 2007. As this species can easily disperse by fragmentation it is recommended that a re-visit to assess the level of invasion and if of concern, survey the rest of the Lough for other invaded sites.		
Priority Tagging	One of the 8 Invasive Species Survey plants Recent invader/Few locations In designated sites/Connected waterbodies High impact invasive species		
Habitat	Lakes, Watercourses. Nuttall's Waterweed has been found growing in a wide range of water bodies: lakes, reservoirs, ponds, rivers streams, canals and ditches. It favours still or slow flowing eutrophic water.	Fossitt (2000) general habitat code	FL, FW, CW
Impact	Competition, Socio-economic, Extinction. Nuttall's Waterweed tends to dominate native macrophyte communities which may lead to their local extinction. It is also known to replace other invasive species as the dominant species in an impacted ecosystem. It is tolerant of disturbance, oil pollution and salinity up to 14 parts per thousand (~ half seawater). All <i>Elodea</i> species tend to take up metals from the sediment and release them into the water. Dense growth can impede flow of water can exacerbate flooding. Research on Nuttall's Waterweed by the Central Fisheries Board in Carrigadrohid Reservoir has found that hectares of water are un-fishable and are unavailable for any water-based leisure pursuit. In Irl spreads vegetatively.		
Identification Features	Submerged perennial species usually rooted in mud and with very small white or red-tinged flowers that float on the end of a very fine long stalk. Upper leaves normally in whorls of 3, can b 4, rarely 5. Lower leaves may be in 2's and opposite. The leaf tapers to a point and is broadest at the base. Usually some leaves are strongly recurved and/or twisted. The density /closeness of the leaves along the stem can vary depending on its environment.		
Photos	<div style="display: flex; justify-content: space-between;"> <div style="width: 25%;">  <p>There are many species in Ireland that look similar to <i>Elodea nuttallii</i> so caution must be taken when identifying it. Please view a taxonomic key and/or get expert verification if in any doubt.</p> </div> <div style="width: 50%;"> <p><b>Key ID Features</b></p> <ul style="list-style-type: none"> <li>• Leaf tips taper to a point and the leaf is broadest at the base.</li> <li>• Usually some leaves are strongly recurved and/or twisted.</li> <li>• Root tips white to greyish-green when fresh</li> </ul>  </div> <div style="width: 20%;">  </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="width: 30%;"> <p>Leaves with marginal teeth 0.05-0.1mm long</p>  </div> <div style="width: 30%;"> <p>Sepals 1.6-2.5mm long</p>  </div> <div style="width: 30%;"> <p>The tiny white flowers float on the water surface at the end of long stalks</p>  </div> <div style="width: 30%;"> <p>Leaves are folded down the centre line</p>  </div> <div style="width: 30%;"> <p>Upper leaves normally in whorls of 3, can be 4 (rarely 5). Lower leaves may be in 2's and opposite.</p>  </div> </div>		

Figure 2.8. Example species profile page for *Elodea nuttallii* taken from Co. Leitrim report.

ID	Shape	QID	SPECIES NAME	START DATE	END DATE	STATUS	GRID EAST	GRID NORTH	COMMENTS
18	Point	2076	Fallopia spicosa	20/02/08	23/09/09	D	412041.7918	272304	Point on verge, Abundant, 5 to 20m squared.
19	Point	2102	Fallopia spicosa	20/02/08	23/09/09	D	408114.796204	270147	Abundant on wetland, 5 to 20m squared.
20	Point	2143	Fallopia spicosa	17/09/07	23/09/09	Y	407071	270433	Abundant
21	Point	2607	Heracleum mantegazzianum	17/09/07	23/09/09	Y	407071	270433	Point near Tynagh, abundant 1 to 2m
22	Point	2677	Heracleum mantegazzianum	20/02/08	23/09/09	D	406962	270355	Abundant on wetland, 5 to 20m squared.
23	Point	4013	Heracleum mantegazzianum	17/09/07	23/09/09	D	413474	273462	Abundant

**Figure 2.9.** Image of geographical information system (GIS) attribute box showing a sample of invasive species record data.

alerted to the presence of the most significant invasive species in their region, and it might also encourage them to report new sightings to the data centre for addition to the National Invasive Species Database.

## 2.6 Create a Distribution Database for Each Local Authority

To facilitate the work of the local authorities, the known records for the most high-impact invasive species in each local authority were also provided as a GIS point shapefile that could feed directly into the local authorities' GIS systems. They were produced for each of the 34 local authorities. Again, where more than one local authority occurred within a county, then the shapefile of records for the adjacent council was also provided.

The attributes associated with each species included:

- Species name (scientific and common);
- Irish Grid Reference in alpha numeric and easting/northing;
- Date of sightings;
- Any other attribute, such as abundance, where available.

An example of the invasive species records and attribute data contained in the GIS shapefiles is presented in [Fig. 2.9](#).

## 2.7 Collaborate with European and International Networks

Effective action to tackle the threat posed by invasive species requires not just a national, but also an international, perspective. Investigations were made as to how the work of the data centre might most effectively contribute to, and benefit from, the sharing of data for international surveillance and monitoring programmes. Through communication with the Global Invasive Species

Information Network (GISIN) and the Global Invasive Species Database (GISD), the most efficient mechanism for sharing of information is for all partners to feed data to the Global Biodiversity Information Facility (GBIF). The data centre is the national node for the GBIF in Ireland and significant development work by the Centre has provided the facility for Irish data to feed automatically into the GBIF portal. Work on metadata catalogues is currently being completed by the data centre, in conjunction with the GBIF, which will ensure that the data is INSPIRE Directive compliant (which requires that the spatial data infrastructures of the Member States are compatible and usable in a Community and transboundary context). As part of this process, the centre has also offered to provide data to the Delivering Alien Invasive Species Inventories for Europe (DAISIE) network.

The principal network dealing with invasive species in a European context, however, is NOBANIS. This network provides a mechanism for surveillance, information exchange and collaboration across Europe and works closely with the EEA and the EC. Ms O'Flynn has been appointed as a national focal point with NOBANIS to ensure the work of the data centre, and in Ireland generally, contributes to this European initiative. In particular, the online species profiles (described in Section 2.3 above) have been created to a standard and format compatible with NOBANIS, so that the Irish initiative contributes in this way to its work.

Along with the other 20 countries in the NOBANIS network, Ireland provides informed and coordinated support to the work of the EC through the NOBANIS platform. The Commission's Communication *Towards an EU strategy on Invasive Species* (COM (2008) 789 final), proposed the immediate establishment of a Europe-wide early warning and information system to report new and emerging alien species. The NOBANIS and EEA *Developing an Early Warning System for invasive alien species in Europe* workshop was a direct

response to this. Hosted by the National Biodiversity Data Centre in Waterford on 1–2 June 2010, this was arranged to coincide with the annual NOBANIS meeting on 3 June, also hosted by the data centre. Attended by 24 delegates representing 18 countries, the workshop allowed the showcasing and critical reviewing of the data centre's early warning system mechanism. An outcome of this review was that the model was presented to the EC as a template for the development of other national systems within the EU. The recommendations from that meeting are outlined in the following document: <http://invasives.biodiversityireland.ie/home/collaborations/nobanis>

Based on these recommendations, the NOBANIS network has begun work on pilot-testing an early warning

and rapid response information system for Europe. The early warning element will be based on invasion risk mapping in Europe using the EEA's bio-geographical maps (Fig. 2.10) instead of national boundaries. An example draft risk invasion map for redvein maple (*Acer rufinerve*) can be seen in Fig. 2.11. A preliminary report on this risk mapping project for 22 species has shown a good match between the limits of species distribution and those of the biogeographical regions (Branquart et al., 2010). However, because of some limitations to the methodology, the project has been extended to refine the methodology and increase the testing to 100 species. This is the best approach for tackling the threat posed by invasive species at the pan-European level. It is essential that Ireland continues to contribute to and benefit from this innovative method.

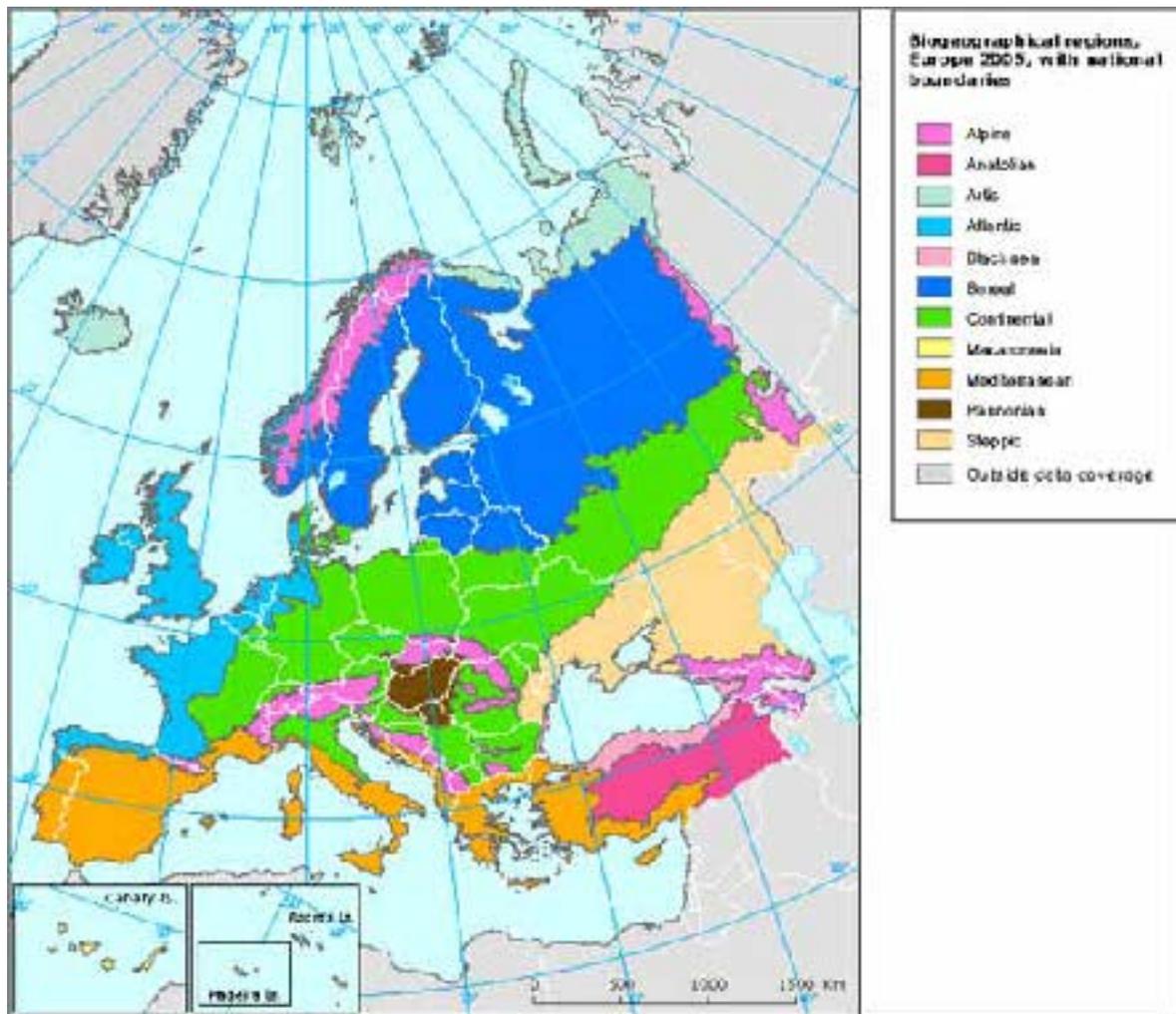


Figure 2.10. Environmental Environment Agency's bio-geographical regions of Europe 2005 map.

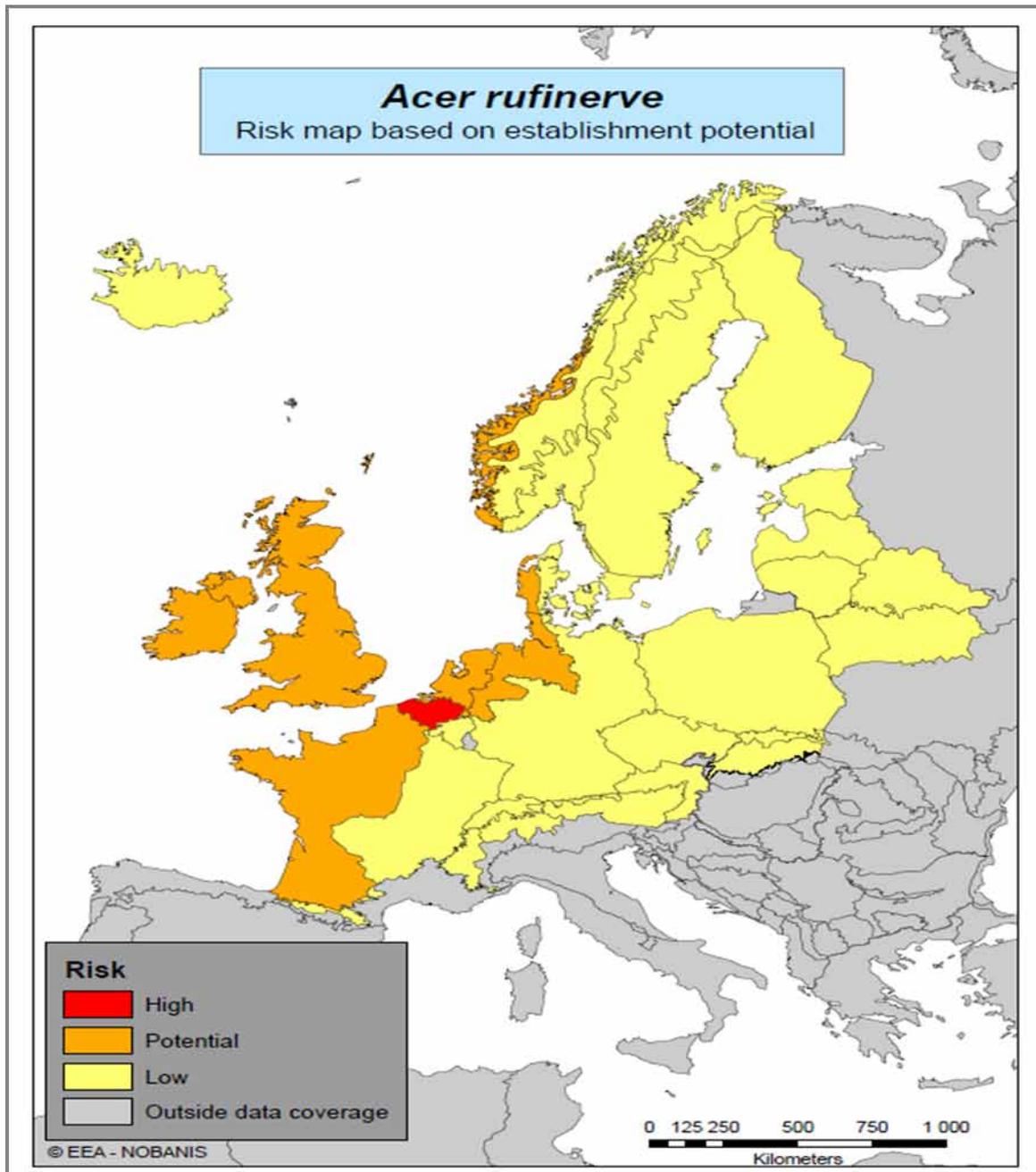


Figure 2.11. NOBANIS pilot project risk map for *Acer rufrinerve* (redvein maple).

## 2.8 Manage Invasive Species Recording Scheme

The National Invasive Species Survey was established by the data centre in Spring 2009. Its objective was to encourage the recording of eight of Ireland's most unwanted invasive plant species that pose a direct and indirect threat to the attainment of the environmental quality objectives of the Water Framework Directive (EPA, 2004). The eight target species are:

- 1 *Azolla filiculoides* – Water fern (direct threat);
- 2 *Crassula helmsii* – New Zealand pigmyweed (direct threat);
- 3 *Elodea nuttallii* – Nuttall's waterweed (direct threat);
- 4 *Hydrocotyle ranunculoides* – Floating pennywort (direct threat);

- 5 *Myriophyllum aquaticum* – Parrot’s feather (direct threat);
- 6 *Fallopia japonica* – Japanese knotweed (indirect threat);
- 7 *Heracleum mantegazzianum* – Giant hogweed (indirect threat);
- 8 *Impatiens glandulifera* – Himalayan balsam (indirect threat).

For this initiative, 2,856 recording cards were posted to over 175 individuals, including all local authority heritage and biodiversity officers (including those in Northern Ireland), all national parks and wildlife conservation rangers, staff in other key state bodies, some NGOs, naturalist field clubs and interested individual recorders. A section of the National Invasive Species Database website was also dedicated to the survey, which includes a specially designed online submission form; Excel template, identification sheets and promotion materials. Promotion and encouragement to participate in the survey have been presented at every opportunity through radio interviews, conferences and workshops.

To date, 564 records have been received for five of the eight target species (Fig. 2.12) and a further 407 records for other invasive species. The survey has proven to be a successful mechanism for collecting additional records

on key invasive species, and for raising awareness of invasive species. However, the return of records was not as great as expected and this may be due to the species not being present in the areas of the recorders or due to non-participation by some of those who received the survey pack. No records were received for three of the target species, namely *Crassula helmsii*, *Hydrocotyle ranunculoides* and *Myriophyllum aquaticum* and this is likely to be an actual reflection of those species not being present in the wild in the areas surveyed. There is capacity to expand the scope of the scheme to build a more extensive citizen science network for tracking change, perhaps building on a ‘local change’ type baseline (see Section 2.10 below).

## 2.9 Load Data onto Centre’s Mapping System

The key vehicle for the management and dissemination of information contained in the National Invasive Species Database is the loading of species data on the centre’s GIS mapping system, *Biodiversity Maps*. Invasive species data have been loaded onto the system on a regular basis through the term of the contract – usually every two months. Provision is made to load data sooner if, for instance, a species new to Ireland is recorded. The flexibility to make that information immediately

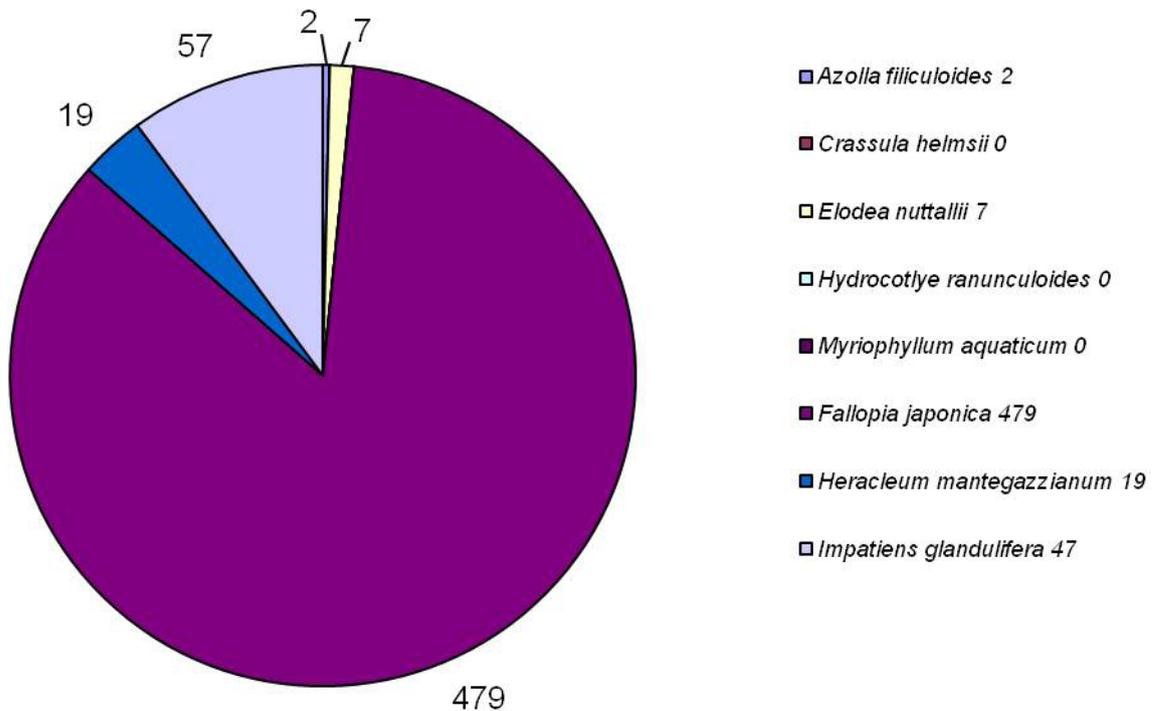


Figure 2.12. Number of records received for the eight target species.

available is a central feature of the data-management and core-mapping systems.

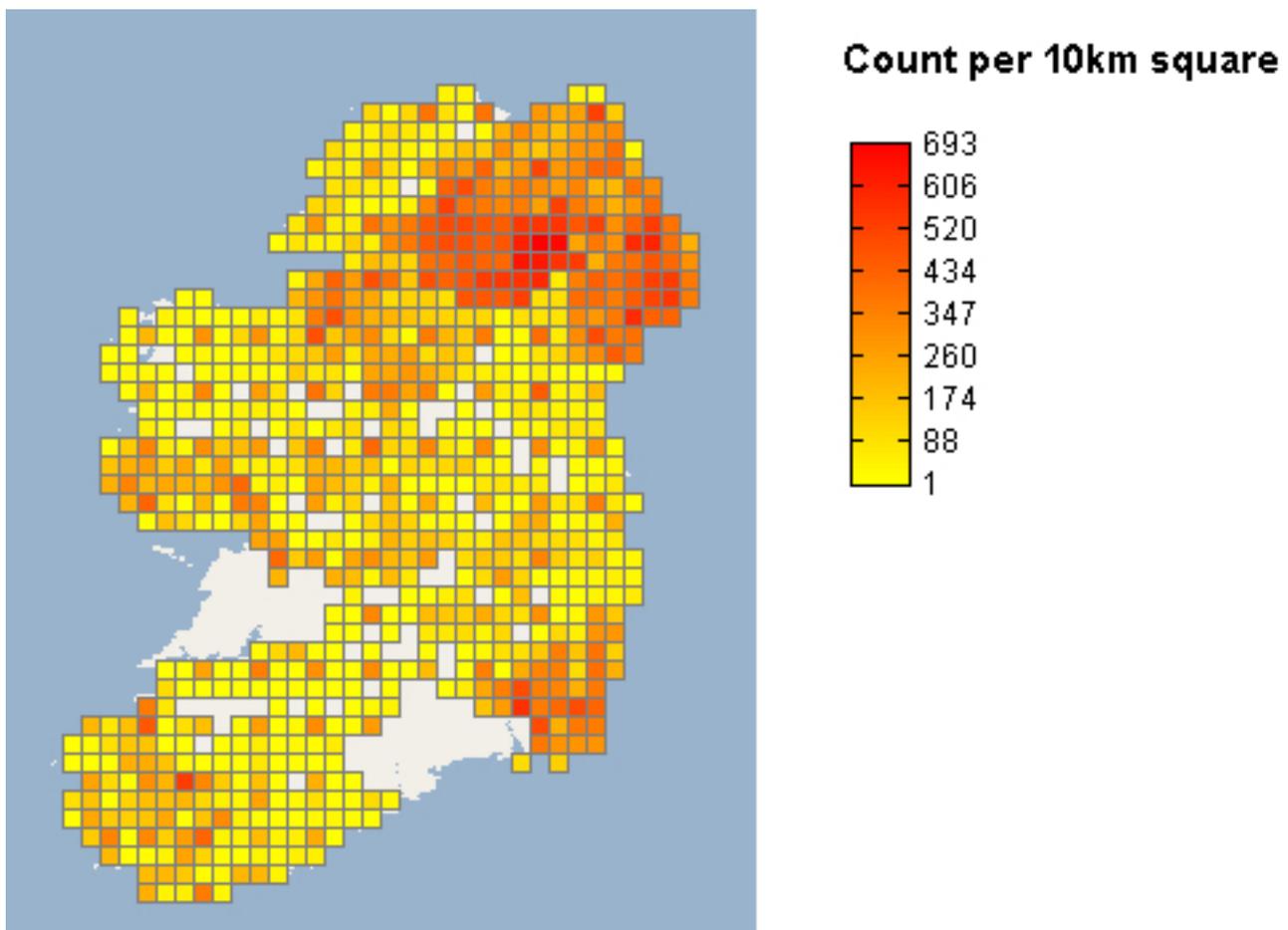
## 2.10 Develop Proposal for a National Baseline Survey

The undertaking of a systematic national baseline survey is required to provide comprehensive data on the status of invasive species in Ireland. As invasive species cover all taxon groups – terrestrial and aquatic – a single survey methodology could not capture the different taxon groups sufficiently. Therefore, the baseline survey proposed will focus on plant species and be based on the BSBI tetrad surveys previously undertaken in Ireland. Using existing methodology and building on past distributional information affords greater value to data analysis when investigating trends of invasive species-range expansion and distribution over time. The proposal for this baseline survey was discussed with key stakeholders at the Biodiversity Knowledge Quest meeting in August

2010, and a general consensus reached for its need and inclusion as part of the BSBI Local Change project.

### 2.10.1 BSBI Local Change

The BSBI Local Change project is an initiative that quantifies changes in the flora of Britain and Ireland. The project's key objective is to measure distributional changes in the individual species of the flora at tetrad level (2km x 2km). This is achieved by repeat surveys on a regular grid. In Ireland, 110 hectads (10km x 10km) were selected for survey using the National Grid. One in every nine hectads was selected by systematically starting with the first south-westerly square with land. Within each hectad, volunteers were asked to concentrate on three selected tetrads (A, J and W) and to make at least three visits to provide detailed data for monitoring in the future. In 1987–1988 data was collected from 264 of the 296 tetrads identified for survey (89%) (Fig. 2.13).



**Figure 2.13. Botanical Society of the British Isles (BSBI) tetrad survey – number of species per 10km<sup>2</sup> map. Note: data for Cos Waterford and Clare were removed due to overlap with county floras. (Image from data centre *Biodiversity Maps*, 2010.)**

The BSBI Local Change 1987–1988 represents an important national baseline. A repeat of the project would provide valuable data on changes in Irish flora – particularly on the spread of invasive species and the impacts of climate change. It would also provide a very cost-effective method of providing quantitative data on land-use change.

In Britain, Local Change sites surveyed in 1987–1988 were resurveyed in 2003–2004. These generated useful statistics on changes for 860 species, comprising 726 native species and long-established introductions, along with 134 more recent introductions. It also showed that southern England is being colonised by alien species to a greater extent than other areas.

## **2.11 Added Value of the Work Programme**

Significant added value has been generated from additional tasks undertaken to those outlined in the initial proposal, including:

- The aforementioned work on the development of an early warning system for Ireland;

- Pilot testing of an early warning and rapid response system for Europe;
- Developing risk maps for Europe;
- Informing Irish policy needs;
- Supporting national- and European-funded invasive-species related surveys and research programmes; and
- Directly contributing to and sharing Ireland's expertise on the EU Strategy on Invasive Alien Species through involvement in Working Group 2.

The work completed in this report and in the recommendations for future work will place Ireland in a good position to fulfil many of the expected roles for a Member State in the EU Strategy on Invasive Alien Species and in complying with the forthcoming Invasive Alien Species Directive.

Over the first 12 months of the project, awareness raising and encouragement to engage with the National Invasive Species Database project was delivered through ten radio interviews, twelve national newspaper articles and the delivery of four talks and three workshops.

## **3 Recommendations for Future Work**

The following areas of work have been identified as priority areas for the continued delivery of an effective information management system to assist the tracking and control of invasive species in Ireland.

### **3.1 Provision of Support to, and Continued Delivery of, Fundamental Database Work**

Over a relatively short timeframe, a national data management system for invasive species has been established. This includes the National Invasive Species Database, website portal and stakeholder support. However, keeping the data flow up to date is fundamental to maintaining and enhancing the good work that has been achieved thus far. Ongoing work is needed to encourage the submission of records, to expand the numbers of contributing recorders and to digitise publication data. This also includes engagement with the general public and key stakeholders through building media awareness and the delivery of talks and workshops. This work has been supported by the EPA and the Heritage Council, and funding is currently secure until the end of 2011.

### **3.2 Extension of Ireland's Invasive Species Early Warning System**

Further website and web services development are required to realise the full potential of this system. Web service development to issue automated species alerts based on database uploads and GIS layers relevant for reporting bodies are required. An automated system would greatly increase the system's utility and efficiency. The complexities arising for noticing a potential invader when reported for regions smaller than the all-island or national scale increase as the size of the geographical region decreases. However, an automated system can detect and alert to these records, which would be very valuable at the environmental or administrative level (e.g. river catchments, designated sites, within local authorities).

The early warning system will only be as effective as the network of stakeholders that use it. To support their needs, the development of user-defined receipt of species alerts relevant to their region, sector and interest is also proposed.

### **3.3 Support Existing Surveillance and Monitoring Programmes**

Different state agencies are tasked with the responsibility of surveying, monitoring and managing Ireland's species, habitats and natural resources. One of the future challenges is to raise the awareness within key state agencies of the threat posed by invasive species to the achievement of their objectives, and to demonstrate the savings that can be made by prudent and timely mitigation and management issues.

The National Invasive Species Database can support the work of those state bodies with the specific requirement of reporting on threats to protected species and habitats, by providing comprehensive distribution information through enhanced and tailored GIS applications. Future work is required to liaise with such bodies on their reporting needs and the service that can be provided through integration and information exchange with the Database project. One such example is the potential for integration into the Water Framework Directive monitoring and reporting mechanism, where the National Invasive Species Database initiative could provide additional information on risks to water bodies in a cost-effective manner (see Box 3.1).

### **3.4 Continued Liaison with and Support of Local Authorities**

Local authorities are potentially instrumental in the management of invasive species at a regional and local level. Through liaisons with local authorities over the year of the project, it has become evident that greater support and exchange of communication between the data centre and the authorities can lead to a significant

**Box 3.1 – Provision of invasive species distribution data/maps**

In the EPA 2004 report *Alien Species Risk Analysis (Republic of Ireland), Guidance for the Assessment of Pressures and Impacts in accordance with Article 5 of the Water Framework Directive*, data was compiled and a map generated for the distribution of eight aquatic alien species in Ireland (Fig. 3.1). These eight species were ‘identified as those posing most threat to the attainment of the environmental

quality objectives of the WFD within Ecoregion 17 and the Atlantic Ocean’. With the establishment of the National Invasive Species Database providing a centralised source of invasive species record information, this map can be quickly regenerated with up-to-date distributional information for these species (Fig. 3.2).

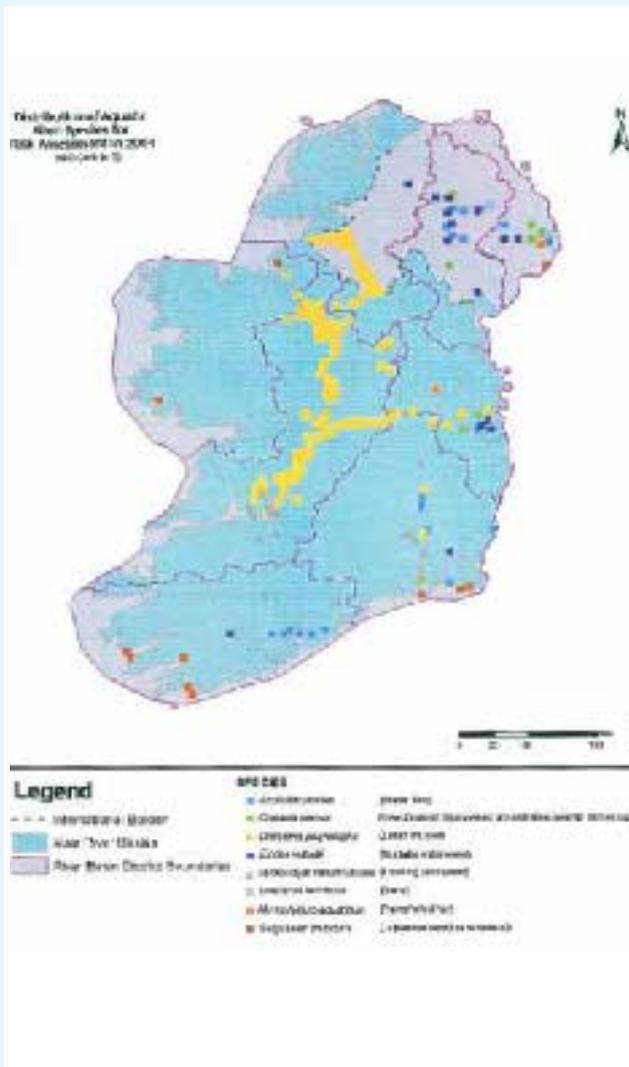


Figure 3.1. Distribution of Aquatic Alien Species for Risk Assessment in 2004 WFD (Article 5). (EPA, 2004).

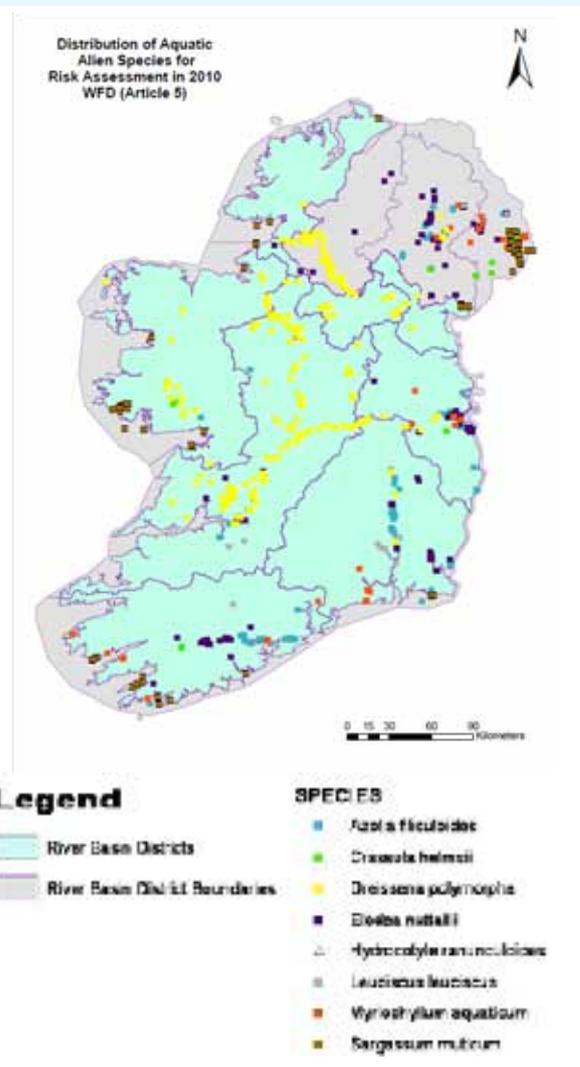


Figure 3.2. Updated distribution map for the same eight species shown in Fig. 3.1. Based on data in the National Invasive Species Database, 2010.

enhancement of the knowledge and management of invasive species in Ireland. The reports and GIS data were sent with an offer from the data centre to provide regular updates on the occurrence of invasive species if that was considered worthwhile. To date, the majority of local authorities that have responded have requested this service, and it is hoped that this initial communication will lead to active and ongoing liaison between the data centre and the local authorities.

### **3.5 Meeting Legislative and Policy Needs**

Invasive species is an emerging policy area in Ireland. Amendments to the Draft EC (Birds and Natural Habitats) Regulations 2010 with provision for alien invasive species were put out for public consultation in August/September 2010. A submission made by Invasive Species Ireland identified issues in relation to the delivery of invasive species information management that the data centre can deliver. Specifically:

- A lead agency tasked with the management of invasive species data;
- Delivery of notification obligations of species alerts to neighbouring countries;
- A central repository for invasive species data in Ireland, receipt and dissemination of information gathered as part of the surveillance for threats to the conservation status of protected habitats and species.

Significant contribution by Ireland to the European Invasive Alien Species Strategy can be made through Ms O'Flynn's involvement in Working Group 2 Early Warning and Rapid Response. As it is a working group, it will require attendance at meetings and writing and reviewing of sub-task reports.

### **3.6 Development of a European Early Warning and Rapid Response System**

The Convention on Biological Diversity guidelines recommend specifically that governments inform or alert neighbouring countries of introductions,

movements or even unlawful releases of highly invasive species. While there is currently no statutory obligation on Ireland to communicate invasive-species alerts to neighbouring countries, the data centre provides this service through its involvement with NOBANIS. Through this European network, the data centre also contributes to a pilot-testing project of an EWRR information system for Europe. The EC is prioritising the development of an EWRR system for Europe as a key step in combating the significant threat of invasive species to and within Europe. It is essential that Ireland continues to contribute to and benefit from this innovative approach. This will also be achieved through direct involvement in the EU Invasive Alien Species Strategy development, which is currently supported until the end of 2011.

### **3.7 Expansion of the Invasive Species Survey to Track the Spread of Invasive Species**

Baseline distribution and temporal data are central to understanding the current status, trends and threats of invasive species at a local and national scale. A national programme for tracking the spread of invasive species is required. As invasive species cover many taxon groups, a 'one-fits-all' survey and monitoring methodology is not feasible. However, the BSBI Local Change project offers an ideal systematic baseline methodology for plants. A repeat of the 1987–1988 survey would provide cost-effective fine-grained information on changes in vascular plant distribution (including alien and invasive species), associated changes in land use and the data for analysing the possible effects of climate change. This re-survey could be achieved very cost effectively as the data centre has the potential to mobilise a large volunteer network with the appropriate skill level to undertake the fieldwork.

## References

- Branquart, E., Barvaux, C., Booy, O., Helmisaari, H., Josefsson, M., Lammers, W., Linnamagi, M., Magnusson, S., Nyegaard Hvid, H., O'Flynn, C., Nehring, S., Priede, A., Rabitsch, W., Razlutskiy, V., Solarz, W. and Svart, H. 2010. Risk Mapping for non-native species in Europe – DRAFT REPORT. NOBANIS. Available online: [www.nobanis.org](http://www.nobanis.org). (Accessed: 30/09/2010)
- Commission of the European Communities. 2008. Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the regions. Towards an EU Strategy on Invasive Species. Brussels, 3.12.2008. COM(2008) 789 final.
- DAISIE (Delivering Alien Invasive Species Inventories for Europe). Available online: [www.europe-aliens.org](http://www.europe-aliens.org) (Accessed: 09/02/2010)
- Eastern River Basin District. 2006. Eastern River basin District – River Basin Management Plan 2009 – 2015. Available online: [http://www.erbd.ie/Docs/RBMP\\_2010/DG223%20RBMP%20Status%20V25+Minister\\_Iss.pdf](http://www.erbd.ie/Docs/RBMP_2010/DG223%20RBMP%20Status%20V25+Minister_Iss.pdf) (Accessed: 04/12/2010)
- Environmental Protection Agency. 2004. *Alien Species Risk Analysis (Republic of Ireland). Guidance for the Assessment of Pressures and Impacts in accordance with Article 5 of the Water Framework Directive (WFD)*. Environmental Protection Agency, Ireland.
- Fossitt, J.A. (2000) *A Guide to Habitats in Ireland*. The Heritage Council of Ireland Series.
- Genovesi, P. and Shine, C. 2004. 'European Strategy on Invasive Alien Species.' *Nature and Environment*, Council of Europe. No. 137, 1–66.
- Government of Ireland. 2002. National Biodiversity Plan. Department of Arts, Heritage, Gaeltacht and the Islands. Available online: <http://www.environ.ie/en/Heritage/NationalParksandWildlife/PublicationsDocuments/FileDownload.2188.en.pdf>
- IUCN (International Union for Conservation of Nature). 2000. *IUCN Guidelines for the Prevention of Biodiversity Loss caused by Alien Invasive Species*. Fifth Meeting of the Conference of the Parties to the Convention on Biological Diversity. (Nairobi, Kenya 15–26 May 2000).
- IUCN (International Union for Conservation of Nature). 2010. Position on CBD Strategic Plan and post 2010 target framework. (SBSTTA14, 10–21 May 2010. Nairobi, Kenya, WGR13, 24–28 May 2010, Nairobi, Kenya.)
- Kettunen, M., Genovesi, P., Gollasch, S., Pagad, S., Starfinger, U. ten Brink, P. and Shine, C. 2008. *Technical support to EU strategy on invasive species (IAS) – Assessment of the impacts of IAS in Europe and the EU (final module report for the European Commission)*. Institute for European Environmental Policy (IEEP), Brussels, Belgium. 44 pp. + Annexes. Available online: [http://www.ieep.eu/publications/pdfs/2009/ias\\_assessments.pdf](http://www.ieep.eu/publications/pdfs/2009/ias_assessments.pdf) (Accessed: 30/09/2010)
- Maguire, C. 2010. Latest developments in prevention, containment and monitoring aquatic IAS. Invasive Species Ireland Forum presentation. Presented 13/05/2010. Available online: <http://invasivespeciesireland.com/forum/2010-forum/> (Accessed: 04/12/2010)
- Miller, C. Kettunen, M. and Shine, C. 2006. *Scope Options for EU Action on Invasive Alien Species (IAS)*. Final report for the European Commission. Institute for European Environmental Policy (contract ref: ENV.B.2/SER/2005/0078r).
- Millennium Ecosystem Assessment. 2005. *Ecosystems and Human well-being: Biodiversity Synthesis*. World Resources Institute, Washington, DC.
- National Biodiversity Data Centre's mapping system. 2011. Data from the national Invasive Species Database held by the National Biodiversity Data Centre. Available online: [www.biodiversityireland.ie](http://www.biodiversityireland.ie) [Accessed: 07/02/2010]
- National Parks and Wildlife Service. 2008. *The Status of EU Protected Habitats and Species in Ireland*. National Parks and Wildlife Service. Department of Environment, Heritage and Local Government.
- Shine, C., Kettunen, M., Genovesi, P., Essl, F., Gollasch, S., Rabitsch, W., Scalera, R., Starfinger, U. and ten Brink, P. 2010. *Assessment to support continued development of the EU Strategy to combat invasive alien species*. Final Report for the European Commission. Institute for European Environmental Policy (IEEP), Brussels, Belgium.
- Stokes, K., O'Neill, K. & McDonald, R.A. 2006. *Invasive species in Ireland*. Report to Environment & Heritage Service and National Parks & Wildlife Service by Quercus, Queens University. Environment & Heritage Service, Belfast and National Parks & Wildlife Service, Dublin.
- UNEP (United Nations Environmental Programme) 2002. Sixth Meeting of the Conference of the Parties, Decision VI/23. Available online: <http://www.cbd.int/decision/cop/?id=7197> (Accessed: 03/12/2010)

UNEP (United Nations Environmental Programme) 2011. Report of the Tenth Meeting of the Conference of the Parties to the Convention on Biological Diversity. Nagoya, 18-29 October 2010. UNEP/CBD/COP/10/27\* 20 January 2011. Available online: <http://www.cbd.int/doc/meetings/cop/cop-10/official/cop-10-27-en.pdf>

Wittenberg, R. and Cock, M. 2001. *Invasive Alien Species: a Toolkit of Best Prevention and Management Practices*. GISP/CAB International, Wallingford, the United Kingdom.

## Acronyms and Annotations

BSBI	Botanical Society for the British Isles
CBD	Convention on Biological Diversity
COP	Conference of the Parties
DAISIE	Delivering Alien Invasive Species Inventories for Europe
EEA	European Environment Agency
EU	European Union
GBIF	Global Biodiversity Information Facility
GIS	Geographic Information System
GISID	Global Invasive Species Database
GISIN	Global Invasive Species Information Network
INSPIRE	Infrastructure for Spatial Information in Europe Directive
ISI	Invasive Species Ireland
IUCN	International Union for Conservation of Nature
NGO	Non-governmental organisation
NOBANIS	European Network on Invasive Alien Species
NPWS	National Parks and Wildlife Service
SCBD	Secretariat of the Convention of Biological Diversity
UNEP	United Nations Environment Programme

# An Gníomhaireacht um Chaomhnú Comhshaoil

Is í an Gníomhaireacht um Chaomhnú Comhshaoil (EPA) comhlachta reachtúil a chosnaíonn an comhshaoil do mhuintir na tíre go léir. Rialaímid agus déanaimid maoirsiú ar ghníomhaíochtaí a d'fhéadfadh truailliú a chruthú murach sin. Cinntímid go bhfuil eolas cruinn ann ar threochtaí comhshaoil ionas go nglactar aon chéim is gá. Is iad na príomh-nithe a bhfuilimid gníomhach leo ná comhshaoil na hÉireann a chosaint agus cinntiú go bhfuil forbairt inbhuanaithe.

Is comhlacht poiblí neamhspleách í an Gníomhaireacht um Chaomhnú Comhshaoil (EPA) a bunaíodh i mí Iúil 1993 faoin Acht fán nGníomhaireacht um Chaomhnú Comhshaoil 1992. Ó thaobh an Rialtais, is í an Roinn Comhshaoil agus Rialtais Áitiúil a dhéanann urraíocht uirthi.

## ÁR bhFREAGRACHTAÍ

### CEADÚNÚ

Bíonn ceadúnais á n-eisiúint againn i gcomhair na nithe seo a leanas chun a chinntiú nach mbíonn astuithe uathu ag cur sláinte an phobail ná an comhshaoil i mbaol:

- áiseanna dramhaíola (m.sh., líonadh talún, loisceoirí, stáisiúin aistrithe dramhaíola);
- gníomhaíochtaí tionsclaíocha ar scála mór (m.sh., déantúsaíocht cógaisíochta, déantúsaíocht stroighne, stáisiúin chumhachta);
- diantalmhaíocht;
- úsáid faoi shrian agus scaoileadh smachtaithe Orgánach Géinathraithe (GMO);
- mór-áiseanna stórais peitreal.
- Scardadh dramhúisce

### FEIDHMIÚ COMHSHAOIL NÁISIÚNTA

- Stiúradh os cionn 2,000 iniúchadh agus cigireacht de áiseanna a fuair ceadúnas ón nGníomhaireacht gach bliain.
- Maoirsiú freagrachtaí cosanta comhshaoil údarás áitiúla thar sé earnáil - aer, fuaim, dramhaíl, dramhúisce agus caighdeán uisce.
- Obair le húdaráis áitiúla agus leis na Gardaí chun stop a chur le gníomhaíocht mhídhleathach dramhaíola trí chomhordú a dhéanamh ar líonra forfheidhmithe náisiúnta, díriú isteach ar chiontóirí, stiúradh fiosrúcháin agus maoirsiú leigheas na bhfadhbanna.
- An dlí a chur orthu siúd a bhriseann dlí comhshaoil agus a dhéanann dochar don chomhshaoil mar thoradh ar a gníomhaíochtaí.

### MONATÓIREACHT, ANAILÍS AGUS TUAIRISCIÚ AR AN GCOMHSHAOIL

- Monatóireacht ar chaighdeán aer agus caighdeán aibhneacha, locha, uisce taoide agus uisce talaimh; leibhéil agus sruth aibhneacha a thomhas.
- Tuairisciú neamhspleách chun cabhrú le rialtais náisiúnta agus áitiúla cinntiú a dhéanamh.

### RIALÚ ASTUITHE GÁIS CEAPTHA TEASA NA HÉIREANN

- Cainníochtú astuithe gáis ceaptha teasa na hÉireann i gcomhthéacs ár dtiomantas Kyoto.
- Cur i bhfeidhm na Treorach um Thrádáil Astuithe, a bhfuil baint aige le hos cionn 100 cuideachta atá ina mór-ghineadóirí dé-ocsaíd charbóin in Éirinn.

### TAIGHDE AGUS FORBAIRT COMHSHAOIL

- Taighde ar shaincheisteanna comhshaoil a chomhordú (cosúil le caighdeán aer agus uisce, athrú aeráide, bithéagsúlacht, teicneolaíochtaí comhshaoil).

### MEASÚNÚ STRAITÉISEACH COMHSHAOIL

- Ag déanamh measúnú ar thionchar phleananna agus chláracha ar chomhshaoil na hÉireann (cosúil le plannanna bainistíochta dramhaíola agus forbartha).

### PLEANÁIL, OIDEACHAS AGUS TREOIR CHOMHSHAOIL

- Treoir a thabhairt don phobal agus do thionscal ar cheisteanna comhshaoil éagsúla (m.sh., iarratais ar cheadúnais, seachaint dramhaíola agus rialacháin chomhshaoil).
- Eolas níos fearr ar an gcomhshaoil a scaipeadh (trí cláracha teilifíse comhshaoil agus pacáistí acmhainne do bhunscoileanna agus do mheánscoileanna).

### BAINISTÍOCHT DRAMHAÍOLA FHORGHNÍOMHACH

- Cur chun cinn seachaint agus laghdú dramhaíola trí chomhordú An Chláir Náisiúnta um Chosc Dramhaíola, lena n-áirítear cur i bhfeidhm na dTionscnamh Freagrachta Táirgeoirí.
- Cur i bhfeidhm Rialachán ar nós na treoracha maidir le Trealamh Leictreach agus Leictreonach Caite agus le Srianadh Substaintí Guaiseacha agus substaintí a dhéanann ídiú ar an gcrios ózóin.
- Plean Náisiúnta Bainistíochta um Dramhaíl Ghuaiseach a fhorbairt chun dramhaíl ghuaiseach a sheachaint agus a bhainistiú.

### STRUCHTÚR NA GNÍOMHAIREACHTA

Bunaíodh an Gníomhaireacht i 1993 chun comhshaoil na hÉireann a chosaint. Tá an eagraíocht á bhainistiú ag Bord lánaímseartha, ar a bhfuil Príomhstíúrthóir agus ceithre Stíúrthóir.

Tá obair na Gníomhaireachta ar siúl trí ceithre Oifig:

- An Oifig Aeráide, Ceadúnaithe agus Úsáide Acmhainní
- An Oifig um Fhorfheidhmiúchán Comhshaoil
- An Oifig um Measúnacht Comhshaoil
- An Oifig Cumarsáide agus Seirbhísí Corparáide

Tá Coiste Comhairleach ag an nGníomhaireacht le cabhrú léi. Tá dáréag ball air agus tagann siad le chéile cúpla uair in aghaidh na bliana le plé a dhéanamh ar cheisteanna ar ábhar imní iad agus le comhairle a thabhairt don Bhord.

### **Science, Technology, Research and Innovation for the Environment (STRIVE) 2007-2013**

The Science, Technology, Research and Innovation for the Environment (STRIVE) programme covers the period 2007 to 2013.

The programme comprises three key measures: Sustainable Development, Cleaner Production and Environmental Technologies, and A Healthy Environment; together with two supporting measures: EPA Environmental Research Centre (ERC) and Capacity & Capability Building. The seven principal thematic areas for the programme are Climate Change; Waste, Resource Management and Chemicals; Water Quality and the Aquatic Environment; Air Quality, Atmospheric Deposition and Noise; Impacts on Biodiversity; Soils and Land-use; and Socio-economic Considerations. In addition, other emerging issues will be addressed as the need arises.

The funding for the programme (approximately €100 million) comes from the Environmental Research Sub-Programme of the National Development Plan (NDP), the Inter-Departmental Committee for the Strategy for Science, Technology and Innovation (IDC-SSTI); and EPA core funding and co-funding by economic sectors.

The EPA has a statutory role to co-ordinate environmental research in Ireland and is organising and administering the STRIVE programme on behalf of the Department of the Environment, Heritage and Local Government.