Report on the Dirty Dozen non-native invasive species
- Co. Leitrim

Report compiled by Colette O’ Flynn, National Biodiversity Data Centre
to Leitrim County Council, 2010
# Table of Contents

1. Introduction ................................................................................................................................. 3
   Setting the scene ........................................................................................................................... 3
   Policy context ............................................................................................................................... 3
   Key Legislation – Republic of Ireland ......................................................................................... 4
   The National Invasive Species Database .................................................................................... 4

2. Criteria for choosing the dirty dozen invasive species ................................................................. 5

3. The maps and coverage assessment ............................................................................................ 5
   Two maps are given for each species ......................................................................................... 5
   Cover age assessment .................................................................................................................. 6

4. Species distribution and profiles ................................................................................................. 7

5. Digitized records for Co. Leitrim ............................................................................................... 31

6. Potential Invaders ....................................................................................................................... 31

7. Submitting data to the National Invasive Species Database ....................................................... 31

APPENDIX I – Useful Resources .................................................................................................. 33

APPENDIX II - Bibliography ........................................................................................................ 34

APPENDIX III – Species list ........................................................................................................... 41

APPENDIX IV – Key obligations and legislation ......................................................................... 42
1. **INTRODUCTION**

The National Biodiversity Data Centre established the National Invasive Species Database in 2008 to provide up to date distribution information on invasive species in Ireland. Emerging invasive species policy at the European and national level and amendments to national legislation are expected to result in enhanced responsibilities for state bodies, traders and individuals. As local authorities are a key body with responsibility for invasive species issues, this report is provided to support the work of the Local Authority to take a more active role in the management of invasive species in their region.

The report provides detailed information, including distribution maps and species profiles, for the top twelve invasive species in the region. This includes not only species that already occur within the local authority area, but also potential invaders. Invasive species are a serious threat and up to date information on their distribution and potential for spread into new sites is vital to support a strategic response to mitigate further spread, establishment and impact. The information contained in this report can assist local authorities to prioritise control action especially where funds may be limited. The report is based on data extracted from the National Invasive Species Database which currently contains information on 90 invasive species. All of this data is freely available through the Centre’s data portal, Biodiversity Maps [http://invasives.biodiversityireland.ie](http://invasives.biodiversityireland.ie) for use by the Local Authority. A copy of the data is contained in the enclosed CD Rom for adding to the Local Authorities’s GIS system.

Some Local Authorities already have very comprehensive data on invasive species within their area and the use of this information to develop a county/city invasive species strategy is strongly recommended. The National Biodiversity Data Centre also would encourage all local authorities to submit their data to the National Invasive Species Database to build a comprehensive picture of the knowledge of the species at a national and international level.

**SETTING THE SCENE**

Globally, invasive alien species are considered to be one of the most important direct drivers of biodiversity loss and ecosystem service changes (Millennium Ecosystem Assessment, 2005). In Ireland the greatest negative impacts are direct competition with native biota, but alteration to habitats and the influence of parasites and pathogens are also important. There are also significant socio-economic and human health impacts; in Europe, impact of invasive species is estimated to cost at least €10 billion per year. Therefore, there is a strong financial incentive to prevent invasive species arriving into new areas and failing that, to effectively control or eradicate them as early in their invasion as possible.

At present in Ireland, several of our Priority Annex 1 habitats are in ‘unfavourable conservation status’ due to the presence of a non-native species (Stokes et al, 2006). This in itself poses a risk of infraction proceedings been taken by the European Commission. A variety of our native priority species are also under threat from non-native species. Examples of these include the Red Squirrel and White Clawed Crayfish, for which Ireland holds Europe’s stronghold population.

**POLICY CONTEXT**

The Irish State is a contracting party to a number of international instruments requiring action on non-native and invasive species. There are also key obligations under legislative drivers such as regulations transposed from European Directives and national legislation (See APPENDIX IV).
Ireland’s National Biodiversity Plan (Government of Ireland, 2002) addresses the threat of alien species and promotes the necessity to document and review introductions that have already taken place and the impacts they have had, and continue to pose, to biodiversity. It is envisaged that the second National Biodiversity Plan for Ireland, which is currently in draft, will include a strong policy statement on invasive species issues. There will be a particular emphasis on documenting, preventing spread and eradication of invasive species. These same issues are listed as priority actions for Ireland under the Invasive Species in Ireland report (Stokes et al, 2006).

**KEY LEGISLATION – REPUBLIC OF IRELAND**

**It is an offense** under Section 52 of the Wildlife Act, 1976 as amended by the Wildlife (Amendment) Act, 2000 (subsection (7)) to release or allow any exotic (i.e. non-native) species, or to attempt to establish it in the wild, other than in accordance with a license given under the Act to do so. See: [http://www.irishstatutebook.ie/2000/en/act/pub/0038/index.html](http://www.irishstatutebook.ie/2000/en/act/pub/0038/index.html).

Under the Live Fish (restriction of importation) Order 1972 of the Fisheries Acts, it is also an prohibited to import live fish, (including crayfish) and of the eggs or young of such fish, save under and in accordance with a licence in that behalf issued under section 17 (4) of the Fisheries (Consolidation) Act, 1959 (No. 14 of 1959). [http://www.irishstatutebook.ie/1972/en/si/0004.html](http://www.irishstatutebook.ie/1972/en/si/0004.html)


Please see APPENDIX IV for a comprehensive list of key obligations and legislation in relation to non-native species.

**THE NATIONAL INVASIVE SPECIES DATABASE**

In response to the threat of invasive species the National Invasive Species Database was established by the National Biodiversity Data Centre in 2008. The National Invasive Species Database provides up to date centralised information on the distribution of invasive species in Ireland. It answers the questions: What invasive species do we have in Ireland? And where do they occur? The database has been developed as a resource to assist recording, monitoring and surveillance programmes, and provides the infrastructure for development of an early warning system for invasive species.

Tracking invasive species in a globalised world requires knowledge of what potentially invasive species are arriving into Europe and which are likely to arrive in Ireland. The National Invasive Species Database project is linked to the European Invasive Species Network (NOBANIS) to track changes across Europe and to provides a mechanism for surveillance, information exchange, and collaboration on projects to support the work of the European Commission.

The National Invasive Species Database website is a portal to the searchable database that is linked to interactive GIS distribution maps with full record information on invasive species sightings. The website also contains Species Alerts that are issued when confirmed sightings of potentially invasive species arrive in Ireland, a list of the Most Unwanted invasive species, database up-dates, and record submission facilities.

[http://invasives.biodiversityireland.ie](http://invasives.biodiversityireland.ie)
2. **CRITERIA FOR CHOOSING THE DIRTY DOZEN INVASIVE SPECIES**

In December 2007, Invasive Species Ireland carried out a risk assessment to determine which non-native species are the most invasive (highest impact) for those established in Ireland and for potential invaders. Twenty six of the highest impact species were labelled as being the ‘Most Unwanted’. These along with recent potential high impact invaders now found in Ireland and species listed under an Environmental Protection Agency (EPA) STRIVE funded project\(^1\), were considered for inclusion in this report (see Appendix III). To select the Dirty Dozen from this list a set of criteria were used and are listed in box 1.

### Box 1. Criteria for choosing the Dirty Dozen species

- One of the 8 Invasive Species Survey plants
- Recent invader
- Few locations
- Connected waterbodies
- In designated sites
- In close proximity to a natural corridor leading to designated sites
- High impact invasive species

3. **THE MAPS AND COVERAGE ASSESSMENT**

**TWO MAPS ARE GIVEN FOR EACH SPECIES**

1. National distribution – each record square shown at the 10km\(^2\) resolution

2. Regional distribution – using GIS Local Authority file. Species record highlighted in pink.

Each square represents a record of where that species was seen. At the national level the squares are shown at the 10km\(^2\) resolution. There may be many records for this species within that square area but just one square is shown at that resolution. As an area is zoomed in on, greater detail is available to view on the mapping system. The highest resolution a record square is displayed on the mapping system is 100m\(^2\). Please note; just because a record is not shown on the map does not mean it is not present, it may not be in the database or not have been recorded.

If records of species are accessed online through the mapping system then each will contain at least the following information: species name, grid reference, date of sighting, recorder name and site name. Additional information such as abundance, description of site, actions taken if any may also be included. Functionality of the interactive GIS mapping system available if accessed online includes ‘turning on or off’ various GIS layers such as designated sites (areas of high nature conservation value), bedrock geology, soils data, rivers and lakes etc. The Ordnance Survey Ireland Discovery maps and aerial photography layers are also present and accessible when zooming in. Species maps can be accessed via [http://invasives.biodiversityireland.ie](http://invasives.biodiversityireland.ie) and click on species search or by visiting Biodiversity Maps on [http://maps.biodiversityireland.ie](http://maps.biodiversityireland.ie).

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\(^1\) Environmental Protection Agency Strive project ‘Alien species in Irish waterbodies’. See project website [http://invasives.biodiversityireland.ie](http://invasives.biodiversityireland.ie) for more information.
A coverage assessment is given for each of the species at the national level. The records shown in the map are the records are currently available in the National Invasive Species Database at the time of producing this report. It is important to know if it is likely that the distribution shown is reflective of the species known distribution or is deficient. This assessment is based on knowledge of a species being recorded elsewhere but the records are not in the database. Unless a detailed systematic survey were done for the species it would be very difficult to say if the distribution mapped is an accurate reflection of the species actual distribution.

The system used to give the coverage assessment is based on a traffic light system. See Figure 3 below.

### FIGURE 3. EXAMPLE COVERAGE ASSESSMENT
4. **SPECIES DISTRIBUTION AND PROFILES**

I. *Fallopia japonica* – Japanese Knotweed
## SPECIES PROFILE

<table>
<thead>
<tr>
<th>Species Name</th>
<th>Common Name</th>
<th>Irish Name</th>
<th>First Recorded in Ireland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fallopia japonica</td>
<td>Japanese Knotweed</td>
<td>Glúineach bhiorach</td>
<td>1902</td>
</tr>
</tbody>
</table>

### Native Distribution
Asia: Japan, Sakhalin Island, the Kurile Islands, Korea, SW China, Taiwan, and Vietnam

<table>
<thead>
<tr>
<th>Irish Distribution</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very Common – many sites and many individuals</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. of records in Co. Leitrim</th>
<th>125</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of 1km² record squares or higher resolution</td>
<td>majority</td>
</tr>
</tbody>
</table>

### Priority Tagging
- One of the 8 Invasive Species Survey plants
- In designated sites
- Connected waterbodies
- High impact invasive species

### Habitat
Riparian zones, Disturbed areas, Urban areas. Often found growing by riverbanks and roadsides. Also found growing on waste ground, rubbish tips, gardens and parks.

<table>
<thead>
<tr>
<th>Fossitt (2000) general habitat code</th>
</tr>
</thead>
<tbody>
<tr>
<td>FW,GA,GS,SB,WL,ED,BC,CL,CD</td>
</tr>
</tbody>
</table>

### Impact
Competition and abiotic change impacts. Shading out of native species and destabilization of river banks and man-made structures such as buildings, walls and flood defence structures.

### Identification Features
Herbaceous perennial plant with hollow bamboo-like stems that are speckled red. Grows to 3m in height. Leaves are 10-15cm long and up to 13cm wide, are shield shaped with a flat base and are arranged along zig-zag stems. Roots are bright orange inside. Flowers are very small, white, grouped and hanging. Flowering from July to October. It dies back in winter leaving dead stems. Can be confused with other non-native Knotweed species.

### Photos
![Colette O’Flynn](https://example.com/colette_photo1.jpg)

![Colette O’Flynn](https://example.com/colette_photo2.jpg)

![Japanese Knotweed](https://example.com/japanese_knotweed.jpg)

![Hybrid Knotweed](https://example.com/hybrid_knotweed.jpg)

![Giant Knotweed](https://example.com/giant_knotweed.jpg)

![Himalayan Knotweed](https://example.com/himalayan_knotweed.jpg)

![Japanese Knotweed](https://example.com/japanese_knotweed.jpg)

![Hybrid Knotweed](https://example.com/hybrid_knotweed.jpg)

![Giant Knotweed](https://example.com/giant_knotweed.jpg)

![Himalayan Knotweed](https://example.com/himalayan_knotweed.jpg)

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www.cornwall.gov.gif
### SPECIES PROFILE

<table>
<thead>
<tr>
<th>Species Name</th>
<th>Common Name</th>
<th>Irish Name</th>
<th>First Recorded in Ireland</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Impatiens glandulifera</em></td>
<td>Himalayan Balsam</td>
<td>Lus no pléisce</td>
<td>1906</td>
</tr>
</tbody>
</table>

### Native Distribution

**Asia:** Western Himalayas

### Irish Distribution Frequency

Very Common – many sites and many individuals

### No. of records in Co. Leitrim

29

### No. of 1km² record squares or higher resolution

19

### Comment

Given the quick growth and excellent dispersal capabilities of this plant, a targeted survey for this species is highly recommended especially along the river corridors where they have been recorded. *Fallopia japonica* and *Heracleum mantegazzianum* could also be easily surveyed for at the same time along riparian areas.

### Priority Tagging

- One of the 8 Invasive Species Survey plants
- In designated sites
- Connected waterbodies
- High impact invasive species

### Habitat

Riparian zones, Disturbed areas, Urban areas.

It grows well on moist, nutrient rich ground especially by river, stream and lake margins. Also found growing along hedgerows, roadsides, ditches, damp woodland and grasslands.

### Impact

Competition and abiotic change impacts. Shading out of native species and increased soil erosion along river banks.

### Identification Features

Herbaceous annual plant with hollow brittle stems that are pink to red in colour in summer. It grows to 2m in height. Leaves are distinctive with finely serrated edges that can be red tinged and normally arranged in whorls of three. The flowers are ‘trumpet’ shaped and can vary in colour from white to pink to purple. It flowers from July to October. A distinctive feature is the seed capsule which explodes and ejects the seed when mature. Roots are shallow and plant is easily pulled from the ground.

### Photos

[Images of Impatiens glandulifera]
III. **Heracleum mantegazzianum – Giant Hogweed**
### Species Name
*Heracleum mantegazzianum*

### Common Name
Giant Knotweed

### Irish Name
Feabhrán capaill

### First Recorded in Ireland
1902

### Native Distribution
Asia: Russian Caucasus

### Irish Distribution
Common – many sites in the country

### Priority Tagging
- One of the 8 Invasive Species Survey plants
- Recent invader
- Few locations
- High impact invasive species

### Habitat
Riparian zones, Disturbed areas, Urban areas.

Found on moist ground along river, stream, and lake margins. Also in grassland and roadsides.

### Impact
Competition, abiotic changes and human health impacts. Shading out of native species and increases soil erosion along river banks. It produces a hazardous sap that can cause severe burns and scarring by sensitising the skin to light (UV radiation).

### Identification Features
The feature that distinguishes this Giant Hogweed from other umbel species is its size. It can grow to 5m in height, the flowering head up to 80cm across and the sharply divided leaves can grow to 3m in length and 1.5 m wide. The stem usually has purple blotches, is hollow, can have hairy bristles and be 5-10cm in diameter. Its flowers are white or rarely ink and it flowers from June to August. Can be up to 50,000 (1.5cm long) seeds per plant!

### Distribution Comment
This species has been recorded for just one location in Co. Leitrim. This species produces a high volume of seed that can be dispersed via the river system. It is highly recommended that this species is removed to prevent further spread and risk of human health impact. A survey along this waterway is also recommended.

### No. of records in Co. Leitrim
1

### No. of 1km² record squares or higher resolution
1

### Fossitt (2000) general habitat code
FW, GS, WL

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**Species Profile**

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### Photos

![Image of Giant Knotweed](image1)

![Image of Giant Knotweed](image2)

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Seamus Forde

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Joe Caffrey
IV. *Eloea nuttallii* — Nutall’s Waterweed
**Species Profile**

<table>
<thead>
<tr>
<th>Species Name</th>
<th>Common Name</th>
<th>Irish Name</th>
<th>First recorded in Ireland</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Elodea nuttallii</em></td>
<td>Nuttall’s Waterweed</td>
<td>Tím uisce chaol</td>
<td>1984</td>
</tr>
</tbody>
</table>

**Native Distribution**

<table>
<thead>
<tr>
<th>Irish Distribution</th>
<th>Frequency</th>
<th>Common – many sites in the country</th>
</tr>
</thead>
</table>

**No. of records in Co. Leitrim**

| 1 | 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.

**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 Elodea 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 Ireland 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 be 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**

[Image of *Elodea nuttallii* in Carrigadrohid Reservoir, August 2006. © Central Fisheries Board, 2000-2009]

**Key ID Features**

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

- Leaves with marginal teeth 0.05-0.1mm long.
- Sepals 1.6-2.5mm long.
- The tiny white flowers float on the water surface at the end of long stalks.
- Leaves are folded down the centre line.
- Upper leaves normally in whorls of 3, can be 4 rarely 5. Lower leaves may be in 2’s and opposite.

There are many species in Ireland that look similar to *Elodea nuttallii* so caution must be taken when identifying it. Please view a taxonomic key and/or get expert verification if in any doubt.
## Species Profile

<table>
<thead>
<tr>
<th>Species Name</th>
<th>Common Name</th>
<th>Irish Name</th>
<th>First recorded in Ireland</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Gunnera tinctoria</em></td>
<td>Giant Rhubarb</td>
<td>Gunnaire</td>
<td>Mid-1930’s</td>
</tr>
</tbody>
</table>

### Native Distribution
- South America, Chile

### Irish Distribution
- **Irish Distribution Frequency**: Local - many individuals in some areas of the country

### No. of records in Co. Leitrim
- 2

### No. of 1km² record squares or higher resolution
- 2

#### Distribution Comment
Invasive in the west of Ireland. Not yet known to be invasive in other areas of the country which may be due to environmental & climatic conditions or reflect early stages of invasion. These plants should be removed to prevent future potential spread.

#### Priority Tagging
- Recent invader
- Few locations
- In close proximity to a natural corridor leading to a designated site
- High impact invasive species (currently just for west of Ireland)

#### Habitat
- Riparian zones, wet grasslands, quarries, roadsides, coastal cliffs
- **Fossitt (2000) general habitat code**: GS, FW, GS, ED, CS

#### Impact
- Competition, socio-economic, abiotic changes. Species reduction and species displacement. On coastal cliffs increased erosion and maritime species loss. Large areas of infestation can make areas no longer suitable for agriculture or amenity use.

#### Identification Features
*G. tinctoria* is a large herbaceous perennial plant which can grow to 2m tall. It has a large rhizome which can grow up to 2m in length along the ground and is visible when exposed after the leaves die back in winter. When only in leaf it can be confused with *Gunnera manicata*. Care must be taken when recording this species. *G. tinctoria*: (Inflorescence: <1m, stout branches <8cm, petiole: ≤1.5m, with pale bristles & weak spines, leaf: <2m across, cordate at base). *G. manicata*: Inflorescence: ≤1.2m, slender branches >108cm, petiole: ≤2m, with reddish bristles & spines, leaf: often >2m across, peltate base).

### Photos

![Gunnera tinctoria Inflorescence](Image1)

![Gunnera manicata Inflorescence](Image2)

![Leaf of Gunnera tinctoria](Image3)

![Inflorescence of Gunnera manicata](Image4)

![Gunnera tinctoria Leaf](Image5)
VI. **Rhododendron ponticum** - *Rhododendron*
### SPECIES PROFILE

<table>
<thead>
<tr>
<th>Species Name</th>
<th>Common Name</th>
<th>Irish Name</th>
<th>First Recorded in Ireland</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Rhododendron ponticum</em></td>
<td>Rhododendron</td>
<td>Róslabhras</td>
<td>1800</td>
</tr>
</tbody>
</table>

**Native Distribution**
South-west Europe and south-west Asia.

**Irish Distribution**

**Frequency**
Very Common – many sites and many individuals

**No. of records in Co. Leitrim** | 80
**No. of 1km² record squares or higher resolution** | majority

**Comment**
Targeted control and eradication is required for this species.

**Priority Tagging**
- In designated sites
- In close proximity to a natural corridor leading to designated sites
- High impact invasive species

**Habitat**
It thrives in acidic soils in woodlands and also found on heathland, bogs, rocky hillsides, gardens and parks.

**Fossitt (2000) general habitat code**
GS, HH, PB, ED, BC, WN, WD, WS

**Impact**
Competition, abiotic change, toxic and socio-economic impacts. Shading out of native species, reduced biodiversity and it is a vector for Sudden Oak Death fungus. It is also costly to infested forest plantations. Hundreds of thousands of Euro are spent each year trying to control it in Ireland.

**Identification Features**
Evergreen leathery leaves with dull green leaf with paler underside. Leaves arranged in a spiral at the end of stem. Flowers have 5 petals, grow in ‘bunches’ and appear May to June. Usually pink/purple, occasionally whiteish. Seeds pods approx 3cm. Woody trunks can be dense and twisted and usually to 5m tall. Can grow to 10m.

**Photos**

![Image 1](image1.png)
![Image 2](image2.png)
![Image 3](image3.png)
![Image 4](image4.png)
VII. *Arthurdendyus triangulata* – New Zealand Flatworm

[Map showing distribution with a color-coded scale for count per 10km square]
### SPECIES PROFILE

<table>
<thead>
<tr>
<th>Species Name</th>
<th>Common Name</th>
<th>Irish Name</th>
<th>First recorded in Ireland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arthurdendyus triangulata</td>
<td>New Zealand Flatworm</td>
<td></td>
<td>1963</td>
</tr>
</tbody>
</table>

#### Native Distribution
- Oceania. Native to New Zealand.

#### Irish Distribution
- **Frequency**: Local many individuals in some areas of the country

### No. of records in Co. Leitrim
- **5**

### No. of 1km² record squares or higher resolution
- **5**

### Comment
- Awareness and preventative measures to avert further introductions of this species are recommended. Garden centers, nurseries and soil transport are the main ways this many may be introduced and spread.

### Priority Tagging
- Few locations
- High impact invasive species

### Habitat
- In forest soils and cultivated soils such as gardens and plant nurseries in its native range. It has been found in gardens, nurseries, garden centres, parks, pasture and wasteland in its introduced range. Found in relatively undisturbed soils near the soil surface under coverage such as stones, tiles, pots and old wood that create damp conditions. Also has been found surviving under lining of garden ponds and hanging baskets. Optimal temperatures 12-15°C, temperatures above 20°C appears to be lethal for the animals.

### Impact
- Predation, human health. Predation on native earthworms and thus possible secondary impact on reduced soil fertility. Human health concern that mucus that surrounds the flatworm may irritate skin and cause allergic reactions. The impacts associated with this Flatworm are more evident in Northern Ireland where they have a more prevalent population.

### Identification Features
- Distinctive. Very flat, not segmented and pointed at both ends. Brown upper body (often dark brown to purplish) with pale speckled edges. Underside, pale buff colour with grey-brown specks. Entire body covered by a sticky mucus. The size of a mature flatworm may vary from 5 to 20cm in length and to 1 cm in width. Coiled when rested.

### Photos
- NZF underside - Heather McDonald
- Healer McDonald
- Roy Anderson

### Fossitt (2000) general habitat code
- GA, BC
VIII. **Dreissena polymorpha – Zebra Mussel**
**SPECIES PROFILE**

<table>
<thead>
<tr>
<th>Species Name</th>
<th>Common Name</th>
<th>Irish Name</th>
<th>First recorded in Ireland</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Dreissena polymorpha</em></td>
<td>Zebra Mussel</td>
<td></td>
<td>1997</td>
</tr>
</tbody>
</table>

**Native Distribution**
Asia. From the drainage basins of the Black, Caspian and Aral Seas.

**Irish Distribution**

**Frequency**
Common – many sites in the country

<table>
<thead>
<tr>
<th>No. of records in Co. Leitrim</th>
<th>No. of 1km² record squares or higher resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 in GIS database</td>
<td>11</td>
</tr>
</tbody>
</table>

**Distribution Comment**
This species has so far only been recorded in the south of Co. Leitrim. Other Co. Leitrim locations of Zebra Mussel were statically mapped. As they do not have any other associated information it is more difficult to interpret the data. Precautionary measures should be taken to help prevent spread of this highly invasive species.

**Priority Tagging**
- Recent invader
- Connected waterbodies
- High impact invasive species

**Habitat**
Watercourses and estuaries and brackish areas. Their preferred habitats include calm waters with suitable substrate for attachment such as stones, shells, tree roots, other larger invertebrates and pipework.

**Impact**
Competition, abiotic changes, herbivory, socio-economic. The Zebra Mussel out-competes the native species for space and food. They can settle on the native species smothering them and they rapidly filter out nutrients from the water column increasing clarity. This can also alter the ecosystem by making conditions more favorable for benthic macro-vegetation and changing the food-web dynamics. Zebra Mussels also cause pipe blockages, foul ship hulls and leisure craft, settle on navigation constructions and injuries to bathers from the sharp edged shells have also been documented.

**Identification Features**
It has a distinctive ‘D’ shape with sharply pointed shell hinge-ends (umbos). It does not have any teeth on its hinge. It can vary in colouration depending on its inhabiting environment, it can be blue, brown or yellow-white. It has a characteristic series of dark and light banding on the shell in waves or a zig-zag pattern. It can grow to 5cm.

**Photos**

Amy Benson, U.S. Geological Survey, Bugwood.org
Randy Westbrooks, U.S. Geological Survey, United States

Distinctive ‘D’ shape
IX. *Sciurus carolinensis* – Grey Squirrel

**Map Legend**
- Light pink: *Sciurus carolinensis*
- Light yellow: Red Squirrel
- Pink: Both species

**Count per 10km square**

![Map showing distribution of *Sciurus carolinensis* and Red Squirrel in Ireland](image-url)
### SPECIES PROFILE

<table>
<thead>
<tr>
<th>Species Name</th>
<th>Common Name</th>
<th>Irish Name</th>
<th>First recorded in Ireland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sciurus carolinensis</td>
<td>Grey/American</td>
<td>Iora Glas</td>
<td>Introduced in 1911</td>
</tr>
</tbody>
</table>

### Native Distribution
Eastern part of North America, from Mexican gulf to southern part of Quebec and Ontario.

### Irish Distribution

<table>
<thead>
<tr>
<th>Irish Distribution Frequency</th>
<th>Common – many sites in the country</th>
</tr>
</thead>
</table>

| No. of records in Co. Leitrim | 11 |
| No. of 1km² record squares or higher resolution | 11 |

### Distribution Comment
Priority areas for Grey Squirrel control and the native Red Squirrel (Sciurus vulgaris) protection are clearly seen when these species distribution are coincidence mapped. As a priority protection of the Red Squirrel by surveillance for the Grey Squirrel and its removal if seen is recommend in the areas where no Grey Squirrel has yet been recorded (yellow Squares). Control/eradication is highly recommended in the areas where both Squirrel species have been recorded (orange squares). It is also important to control/eradicate the Grey Squirrel from the areas where it alone has been recorded as these sites can be a source of animals which may invade other areas.

### Priority Tagging
- Recent invader
- High impact invasive species

### Habitat
Well adapted to live in broadleaved woods. Can colonize conifer and mixed forests. It will travel short distances over open ground to reach woodland areas. Spends most of its time on the ground. They will also inhabit urban areas such as parks and gardens.

### Impact
Competition, disease transmission, socio-economic. The spread of the Grey Squirrel has been associated with a decline in Red Squirrel populations especially in broadleaved woodland. It outcompetes the Red Squirrel in and is a known vector for the parapox virus that can also be fatal to it. At times of food shortages the Grey Squirrel will strip bark from trees which can be detrimental to the trees and have serious economic impacts.

### Identification Features
It is not always easy to distinguish between Grey and Red squirrels by visual appearance alone as fur colour can vary particularly in summer when Grey squirrels can have large patches of red fur. As adults, the Grey Squirrel is about a third larger than the Red and they never develop tufts which the Red has in winter. The Grey squirrel is more likely to be seen on the ground and the Red is more likely to be seen in the trees.

### Photos

**RED SQUIRREL (SCIURUS VULGARIS)**
- Tail: 14-19.5cm
- Head and Body length: 18-24cm

**GREY SQUIRREL (SCIURUS CAROLINENSIS)**
- Tail: 19.5-24cm
- Head and Body length: 24-28.5cm

[Link to photos](http://newsimg.bbc.co.uk/media/images/44927000/gif/_44927752_red_grey_compare466.gif)
The current known distribution of *Corbicula fluminea* in Ireland is from the River Nore, the River Barrow and Carrick-on-Shannon (not shown here).

The thick black line is the county border.
### SPECIES PROFILE

<table>
<thead>
<tr>
<th>Species Name</th>
<th>Common Name</th>
<th>Irish Name</th>
<th>First recorded in Ireland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corbicula fluminea</td>
<td>Asian Clam</td>
<td>none</td>
<td>2010</td>
</tr>
</tbody>
</table>

#### Native Distribution

- Asia, Oceania (Australia), Africa.

#### Irish Distribution

**Frequency**
- Rare – few sites where it is found in the country

#### Native Distribution

- Asia, Oceania (Australia), Africa.

#### Irish Distribution

**Frequency**
- Rare – few sites where it is found in the country

#### No. of records in Co. Leitrim

- No. of 1km² record squares or higher resolution

#### Priority Tagging

- High impact invasive species – potential invader

#### Habitat

- Lakes, Watercourses. This species lives in a range of substrates preferring sand and gravel to mud. It tolerate water temperature from 2-34°C and salinities to ~ 5‰ with short period of up to 14psu. Intolerant of areas with high nutrient loads.

#### Impact

- Competition, abiotic changes, socio-economic. Competes with other invertebrates including the protected Fresh Water Pearl Mussel by outcompeting them for space & food. At high densities they can change their local environment by increasing water clarity thus increasing light penetration & enhancing macrophyte growth. They can also cover a gravelly substrate with pseudofaeces which is not ideal for salmonoid spawning grounds.

#### Identification Features

- Very distinctive species. Usually less than 3cm in length and a rounded triangular outline shape. Rounded umbos and a conspicuous raised external ligament. Olive green to tan brown in colour with rigid, prominent raised and regular concentric rings on the shell. The internal hinge of the shell is very thick with 3 cardinal teeth in each valve and with serrated lateral teeth.

#### Photos

- [Image 1](image1)
- [Image 2](image2)

---

*Colette O'Flynn*

*Evelyn Moorkens*
Warning!
Potential Invader

FIGURE 4. DISTRIBUTION OF HEMIMYSIS ANOMALA IN NEARBY CONNECTED RIVER/LAKE SYSTEM
## SPECIES PROFILE

<table>
<thead>
<tr>
<th>Species Name</th>
<th>Common Name</th>
<th>Irish Name</th>
<th>First recorded in Ireland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemimysis anomala</td>
<td>Bloody-red Shrimp</td>
<td>none</td>
<td>2008</td>
</tr>
</tbody>
</table>

### Native Distribution
Europe, Asia. This species is known from the Ponto Caspian region.

### Irish Distribution

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Rare – few sites where it is found in the country</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>No. of records in Co. Leitrim</th>
<th>-</th>
</tr>
</thead>
</table>

### Distribution Comment
This species was first recorded from Lough Derg and Lough Ree and now is known to occur in many areas of the Shannon River catchment.

### Priority Tagging
- High impact invasive species – **potential invader**

### Habitat
Lakes, Watercourses, Estuaries, Brackish waters. Water temperature preference between 9-20°C and can tolerate salinity up to 19psu.

### Fossitt (2000) general habitat code
FL, FW

### Impact
Predation, herbivory, resource allocation, competition. Bloody-red Shrimp are omnivorous and have a wide ranging diet. As yet, there are no documented impacts of this species in Ireland. This in large, is due to it being a very recent invader and often there is a lag phase between occurrence, establishment and significant/noticeable impact. However, as these species occur in very large swarms from 2,000 to 6,000 individuals per cubic meter and females have been recorded with brood from March to September, their likelihood to reach high densities quickly means there is a high probability of them having an impact.

### Identification Features
Distinctive orange/red transparent when alive. The posterior part of the telson is un-notched and bears two prominent posterior-lateral spines which distinguishes it from the native *Mysis relicta*. Look out for patches of red near the surface of the water during the daytime in winter which are swarms of the Bloody-red Shrimp. The species tends to be near the surface of the water at nighttime in the summer.

### Photos

![Marcin Penk](image1)

![Marcin Penk](image2)
Warning!
Potential Invader

Muntiacus reevesi – Muntjac Deer

- Confirmed sightings
- Unconfirmed sightings
<table>
<thead>
<tr>
<th>Species Name</th>
<th>Common Name</th>
<th>Irish Name</th>
<th>First recorded in Ireland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muntiacus reevesi</td>
<td>Muntjac Deer</td>
<td></td>
<td>2008 (2009 for NI but may be as early as 2000)</td>
</tr>
</tbody>
</table>

**Native Distribution**
Asia. China and Taiwan.

**Irish Distribution**
Rare

**No. of records in Co. Leitrim**
- No. of 1km² record squares or higher resolution
- **Priority Tagging**
  - High impact invasive species – potential invader

**Habitat**
Temperate forests, coniferous and broadleaf. In introduced range it also inhabits scrub and grassland and marginal urban areas.

**Impact**
Competition, herbivory, socio-economic impact. Muntjac may compete with native deer species for food resources. Muntjac are concentrate feeders selecting buds, leaves, stem tips of woody browse, fungi, flowers and developing seed heads but also graze species mostly avoided by other deer species e.g. Bluebell (British Wildlife, 2010). They have a negative economic impact by bark stripping in forest plantations and by browsing of coppice woodlands.

**Identification Features**
Muntjac deer are very small and size is comparable to that of a Red Fox. Males measure approximately 50cm and females 47cm at the shoulder and they have a hunched back. Colour is reddish-brown with buff under parts and white on the inside of the thigh and chin. Winter coat can be a greyer-brown colour. They have distinctive black facial markings, V shaped in males and U shaped in females. Male Muntjac have short antlers which are cast is May and long canines/tusks. Short tail (about 10cm) with white underside.

**Photos**

All photos of Muntjac deer shown here are courtesy of GB NNSS and are taxidermy specimens.
5. **DIGITIZED RECORDS FOR CO. LEITRIM**

A GIS supporting Dbase file is also supplied with this report. The file contains all records of the high impact invasive species found within this Local Authority region. The records were extracted from the National Invasive Species Database in 2010. Each record contains the following information: species scientific name, date, Irish grid reference in alpha numeric and Irish grid easting/northing. Any submitted comments are also shown. Additional information such as Recorder name and site name can be accessed directly on Biodiversity Maps via [http://invasives.biodiversityireland.ie](http://invasives.biodiversityireland.ie). These digitized records can be incorporated into the Council’s GIS system and viewed against a variety of layers to give

6. **POTENTIAL INVADES**

Prevention of an invasive species arriving into Ireland or to a new area within Ireland is the ideal and key to the ‘prevention is better than cure’ scenario where a lot of money, time and resources are needed to control or eradicate a species, if feasible, after establishment. Awareness, surveillance and preventative measures to avert a potential invader arriving are recommended.

The National Invasive Species Database website lists potential invaders to Ireland and issues species alerts for those that have recently been recorded in Ireland. Awareness of these species and of those found in neighbouring regions, counties, connected waterways etc is recommended.

7. **SUBMITTING DATA TO THE NATIONAL INVASIVE SPECIES DATABASE**

Our biodiversity, ecosystem functioning, ecosystem services, socio-economy and human health can all be negatively impacted by invasive species. It is vitally important to know what invasive species we have and where exactly they are at a local, regional and national level. Such information can inform an understanding of the extent of the invasion, their threat, potential for spread and control and management options.

Contributing records compiled at a local or regional basis to the National Invasive Species Database provides a centralised source of up-to-date information on the geographical and temporal distribution of those species in Ireland. The freely available and easily accessible information held in the database is an invaluable resource for supporting surveillance and monitoring programmes as well as supporting Ireland’s invasive species early warning system. This data also feeds into global information networks. Please submit any invasive species records you may have to the National Invasive Species Database. The minimum amount of data required with each record is shown in Table 1 below.

**TABLE 1. MINIMUM DATA ITEMS REQUIRED WHEN SUBMITTING AN INVASIVE SPECIES RECORD**

<table>
<thead>
<tr>
<th>Data Items</th>
<th>Notes</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recorder(s) Name</td>
<td>First name initial period surname</td>
<td>Mary Murphy  or Mary Murphy, John N. Doe for more than one Recorder</td>
</tr>
<tr>
<td>Species Name</td>
<td>Latin name</td>
<td>Fallopia japonica</td>
</tr>
<tr>
<td>Coordinates</td>
<td>Record coordinates in Irish Grid, Irish Transverse Mercator or Latitude/Longitude</td>
<td>S583001</td>
</tr>
<tr>
<td>Location Name</td>
<td>Location of observation</td>
<td>Tramore Strand, Tramore, Co. Waterford</td>
</tr>
<tr>
<td>Date</td>
<td>DD/MM/YYYY</td>
<td>20/06/2009</td>
</tr>
</tbody>
</table>

Other data items may also be included with the biological record e.g. abundance, comment, habitat, determiner name.
HOW TO SUBMIT THE RECORDS

- Preferably submit the records in Excel or Recorder 6 format
- A pre-formatted excel template is available for download from http://invasives.biodiversityireland.ie/submit-records
- Casual records (one or a few) can be submitted through the online submission form: http://onlinerecording.biodiversityireland.ie or http://www.invasivespeciesireland.com/sighting
- Other digitized formats are also accepted Microsoft Access, Dbase, GIS shapefile, Text file or SQL. Please liaise with the Data Centre if you have data in any of these formats.

WHERE TO SUBMIT THE RECORDS

Email: info@biodiversityireland.ie and enter ‘invasive species records’ in the subject field. For more information on formatting and submitting data view the Guidance Note for Contributors of Species Data document available from the National Biodiversity Data Centre website: www.biodiversityireland.ie or contact the Data Centre directly.
APPENDIX I – USEFUL RESOURCES

REFERENCE BOOKS


WEBSITES

IRELAND

National Invasive Species Database http://invasives.biodiversityireland.ie
Invasive Species Ireland www.invasivespeciesireland.com
BioChange – alien plants in Ireland www.biochange.ie/alienplants/
CAISIE – Control of Aquatic Invasive Species in Ireland http://caisie.ie
Aquatic Invasions – online journal (global) http://www.aquaticinvasions.ru

BRITAIN

GB Non-native Species Secretariat www.nonnativespecies.org

EUROPEAN IAS NETWORKS

NOBANIS – European Network on Invasive Alien Species www.nobanis.org
DAISIE – Delivering Alien Invasive Species Inventories for Europe www.europe-aliens.org

INTERNATIONAL IAS NETWORKS

GISID – Global Invasive Species Database www.issg.org/database/welcome
GISIN – Global Invasive Species Information Network www.gisinetwork.org
ISSG – Invasive Species Specialist Group www.issg.org

LEGISLATION

Convention on Biological Diversity – www.cbd.int
IUCN/UNEP tematea – www.tematea.org/?q=node/224
APPENDIX II - BIBLIOGRAPHY

ANIMALS

**Arthurdendyus triangulata**– New Zealand Flatworm


**Corbicula fluminea** – Asian Clam


**Didemnum species**


**Dreissena polymorpha – Zebra Mussel**


**Eriocheir sinensis – Chinese Mitten Crab**


**Gammarus pulex**


**Gammarus tigrinus**


*Hemimysis anomala* – Bloody-red Shrimp


*Leuciscus cephalus* – Chub


*Leuciscus leuciscus* – Dace


*Muntiacus reevesi* - Muntjac Deer


Oxyura jamaicensis - Ruddy Duck


Sciurus carolinensis – Grey Squirrel


Sus scrofa – Wild Boar


Kelly, J. Maguire, C.M. and Cosgrove, P.J. Exclusion strategy and contingency plan for Wild boar (Sus scrofa), Chinese water deer (Hydropotes inermis), Muntjac deer (Muntiacus reevesi) and Roe deer (Capreolus capreolus). Prepared for NIEA and NPWS as part of Invasive Species Ireland.

PLANTS

Azolla filiculoides – Water Fern


Carpobrotus edulis – Hottentot-fig


Elodea nuttallii – Nuttall’s Waterweed


**Fallopia japonica – Japanese Knotweed**


**Gunnera tinctoria – Giant Rhubarb**


**Heracleum mantegazzianum – Giant Hogweed**


**Impatiens glandulifera – Himalayan Balsam**


Lagarosiphon major – African Curly Waterweed


Lemna minuta – Least Duckweed


Myriophyllum aquaticum – Parrots Feather


Nymphoides peltata – Fringed Water-lily


Rhododendron ponticum – Rhododendron


Sargassum muticum – Wire Weed


Irish Seaweed Centre (2007). Distribution of *Sargassum muticum* in Ireland. Irish Seaweed Centre Martin Ryan Institute, National University of Ireland, Galway. Available online: [www.irishseaweed.com](http://www.irishseaweed.com) [Accessed 17/06/2010]

**Spartina anglica** – Common Cord-grass


JNCC. Joint Nature Conservation Committee. (no year). *Spartina anglica*. Available online: [www.jncc.gov.uk/page-1680](http://www.jncc.gov.uk/page-1680) [Accessed: 10/08/2010]


## APPENDIX III – SPECIES LIST

<table>
<thead>
<tr>
<th>Scientific name</th>
<th>Common name</th>
<th>Source list</th>
<th>Habitat</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ameiurus nebulosus</td>
<td>Brown Bullhead Catfish</td>
<td>ISI Most Unwanted</td>
<td>Freshwater</td>
<td></td>
</tr>
<tr>
<td>Arthurdendyus triangulata</td>
<td>New Zealand Flatworm</td>
<td>ISI Most Unwanted</td>
<td>Terrestrial</td>
<td></td>
</tr>
<tr>
<td>Azolla filiculoides</td>
<td>Water Fern</td>
<td>ISI Most unwanted</td>
<td>Freshwater</td>
<td></td>
</tr>
<tr>
<td>Carpoprotus edulis</td>
<td>Hottentot-fg</td>
<td>ISI Most unwanted</td>
<td>Terrestrial</td>
<td></td>
</tr>
<tr>
<td>Corbicula fluminea</td>
<td>Asian Clam</td>
<td>ISI Most unwanted</td>
<td>Freshwater</td>
<td>Species Alert issued 2010</td>
</tr>
<tr>
<td>Crassula helmsii</td>
<td>New Zealand Pigmyweed</td>
<td>ISI Most unwanted</td>
<td>Freshwater</td>
<td></td>
</tr>
<tr>
<td>Didemnum species</td>
<td>none</td>
<td>ISI Most Unwanted</td>
<td>Marine</td>
<td></td>
</tr>
<tr>
<td>Dreissena polymorpha</td>
<td>Zebra Mussel</td>
<td>ISI Most Unwanted</td>
<td>Freshwater</td>
<td></td>
</tr>
<tr>
<td>Elodea nuttallii</td>
<td>Nottall’s Waterweed</td>
<td>ISI Most unwanted</td>
<td>Freshwater</td>
<td></td>
</tr>
<tr>
<td>Eriocheir sinensis</td>
<td>Chinese Mitten Crab</td>
<td>ISI Most Unwanted</td>
<td>Freshwater</td>
<td></td>
</tr>
<tr>
<td>Fallopia japonica</td>
<td>Japanese Knotweed</td>
<td>ISI Most unwanted</td>
<td>Terrestrial</td>
<td></td>
</tr>
<tr>
<td>Gammarus pulex</td>
<td>none</td>
<td>EPA STRIVE</td>
<td>Freshwater</td>
<td></td>
</tr>
<tr>
<td>Gammarus tigrinus</td>
<td>none</td>
<td>EPA STRIVE</td>
<td>Freshwater</td>
<td></td>
</tr>
<tr>
<td>Gunnera tinctoria</td>
<td>Giant-rhubarb</td>
<td>ISI Most unwanted</td>
<td>Terrestrial</td>
<td></td>
</tr>
<tr>
<td>Harmonia axyridis</td>
<td>Harlequin Ladybird</td>
<td>ISI Most Unwanted</td>
<td>Terrestrial</td>
<td>Species Alert issued 2009</td>
</tr>
<tr>
<td>Hemimysis anomala</td>
<td>Bloody Red Shrimp</td>
<td>Listed as a potential invader in STRIVE only</td>
<td>Freshwater</td>
<td>Species Alert issued 2009</td>
</tr>
<tr>
<td>Heracleum mantegazzianum</td>
<td>Giant Hogweed</td>
<td>ISI Most unwanted</td>
<td>Terrestrial</td>
<td></td>
</tr>
<tr>
<td>Hydrocotyle ranunculoides</td>
<td>Floating Pennywort</td>
<td>ISI Most unwanted</td>
<td>Freshwater</td>
<td></td>
</tr>
<tr>
<td>Impatiens glandulifera</td>
<td>Himalayan Balsam</td>
<td>ISI Most unwanted</td>
<td>Terrestrial</td>
<td></td>
</tr>
<tr>
<td>Lagarosiphon major</td>
<td>Curly Waterweed</td>
<td>ISI Most unwanted</td>
<td>Freshwater</td>
<td></td>
</tr>
<tr>
<td>Lemna minuta</td>
<td>Least Duckweed</td>
<td>EPA STRIVE</td>
<td>Freshwater</td>
<td></td>
</tr>
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<td>Leuciscus cephalus</td>
<td>Chub</td>
<td>ISI Most Unwanted</td>
<td>Freshwater</td>
<td>Eradicated</td>
</tr>
<tr>
<td>Leuciscus leuciscus</td>
<td>Dace</td>
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<td>Freshwater</td>
<td></td>
</tr>
<tr>
<td>Muntiacus reevesi</td>
<td>Muntjac Deer</td>
<td>ISI Most Unwanted</td>
<td>Terrestrial</td>
<td>Species Alert issued 2009</td>
</tr>
<tr>
<td>Mustela furo</td>
<td>Feral Ferret</td>
<td>ISI Most Unwanted</td>
<td>Terrestrial</td>
<td></td>
</tr>
<tr>
<td>Myriophillum aquaticum</td>
<td>Parrot’s Feather</td>
<td>ISI Most unwanted</td>
<td>Freshwater</td>
<td></td>
</tr>
<tr>
<td>Nymphoides peltata</td>
<td>Fringed Water Lily</td>
<td>EPA STRIVE</td>
<td>Freshwater</td>
<td></td>
</tr>
<tr>
<td>Oxyura jamaicensis</td>
<td>Ruddy Duck</td>
<td>ISI Most Unwanted</td>
<td>Terrestrial</td>
<td></td>
</tr>
<tr>
<td>Rattus norvegicus</td>
<td>Brown Rat</td>
<td>ISI Most Unwanted</td>
<td>Terrestrial</td>
<td>Distribution not mapped – only known from Lambay Island</td>
</tr>
<tr>
<td>Rattus rattus</td>
<td>Ship Rat</td>
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<td>Terrestrial</td>
<td>Distribution not mapped – common widespread species</td>
</tr>
<tr>
<td>Rhododendron ponticum</td>
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<td></td>
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<tr>
<td>Sargassum muticum</td>
<td>Wire Weed</td>
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<td>Marine</td>
<td></td>
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<tr>
<td>Sciurus carolinensis</td>
<td>Grey Squirrel</td>
<td>ISI Most Unwanted</td>
<td>Terrestrial</td>
<td></td>
</tr>
<tr>
<td>Spartina anglica</td>
<td>Common Cord-grass</td>
<td>ISI Most unwanted</td>
<td>Terrestrial</td>
<td></td>
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<tr>
<td>Sus scrofa</td>
<td>Wild Boar</td>
<td>ISI Most Unwanted</td>
<td>Terrestrial</td>
<td>Species Alert issued 2009</td>
</tr>
<tr>
<td>Trachemys scripta elegans</td>
<td>Red-eared Slider</td>
<td>ISI Amber List</td>
<td>Terrestrial</td>
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## APPENDIX IV – KEY OBLIGATIONS AND LEGISLATION

<table>
<thead>
<tr>
<th>European legislation relevant to non-native species</th>
<th></th>
<th></th>
<th></th>
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<tbody>
<tr>
<td>Wildlife Trade Regulation: Council Regulation (EC) No 338/97 on the protection of species of wild fauna and flora by regulating trade therein</td>
<td>1997</td>
<td>Trade-related agreements/Biodiversity conservation</td>
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<tr>
<td>Commission Regulation (EC) No 191/2001 suspending the introduction into the Community of specimens of certain species of wild fauna and flora</td>
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<tr>
<td>Environmental Impact Assessment Directive</td>
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<td>Forest Reproductive Material Directive</td>
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<td>Council Directive 1999/105/EC, on the marketing of forest reproductive material</td>
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<td>Plant Health Directive: Council Directive 2000/29/EC on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community</td>
<td>2000</td>
<td>Phytosanitary measures &amp; biodiversity conservation</td>
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<td>Plant Protection Products Directive</td>
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<tr>
<th>Domestic legislation relevant to non-native species</th>
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<tr>
<td>Wildlife (Amendment) Act</td>
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<td>Environmental Protection Agency Act</td>
<td>1992</td>
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<td>Heritage Act</td>
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<td>Marketing of ornamental plant propagating material (Amended 1999)</td>
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<td>Marketing of Forest Reproductive Material Regulations S.I. 2002/618</td>
<td>2002</td>
<td>Forestry</td>
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<td>The Foot and Mouth Disease (Hay, Straw and Peat Moss Litter) Order</td>
<td>2001</td>
<td>Sanitary Measures</td>
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<td>Forestry Act</td>
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<td>Fisheries Act</td>
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<td>Dumping at Sea Act</td>
<td>1996</td>
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<th>International instruments concerning non-native species relevant to Ireland</th>
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<tr>
<td>Convention on Biological Diversity (CBD)</td>
<td>1993</td>
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<td>Bern Convention on conservation of European wildlife and Natural Habitats</td>
<td>1982</td>
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<td>Bonn Convention on the Conservation of Migratory Species of Wild Animals</td>
<td>1983</td>
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<td>IUCN Guidelines for the prevention of Biodiversity loss caused by alien invasive species</td>
<td>2000</td>
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<td>Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention)</td>
<td>1975</td>
<td>Biodiversity Conservation</td>
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<td>Agenda 21</td>
<td>1992</td>
<td>Biodiversity Conservation</td>
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<td>Ministerial Conference for the Protection of Forest in Europe</td>
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<td>International Maritime Organisation (IMO) Guidelines for the control and management of ships’ ballast water to minimise the transfer of harmful aquatic organisms and pathogens</td>
<td>1997</td>
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<td>Food and Agriculture Organisation (FAO) Code of Conduct for Responsible Fisheries</td>
<td>1995</td>
<td>Phytosanitary measures</td>
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<td>International Plant Protection Convention (IPPC)</td>
<td>1951</td>
<td>Phytosanitary measures</td>
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<td>Convention on International Trade in Endangered species of wild fauna and flora (CITES)</td>
<td>1975</td>
<td>Trade-related agreements</td>
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<td>WTO Agreement on Sanitary and Phytosanitary measures (SPS Agreement)</td>
<td>1995</td>
<td>Trade-related agreements</td>
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<td>International Civil Aviation Organisation (ICAO) Resolution on Preventing the Introduction of Invasive Alien Species</td>
<td>1998</td>
<td>Transport</td>
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Table taken directly from the Eastern River Basin District Programme of Measures, 2009 – 2015.