

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



Report compiled by Colette O' Flynn, National Biodiversity Data Centre  
to North Tipperary County Council and South Tipperary County Council, 2010

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## 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> 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).



FIGURE 1. *LEMNA MINUTA* & *MYRIOPHYLLUM AQUATICUM* COVERING POND - COLETTE O' FLYNN

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>.

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](http://www.irishstatutebook.ie/1972/en/si/0004.html) (No. 14 of 1959). <http://www.irishstatutebook.ie/1972/en/si/0004.html>

Proposals for amendments to the European Communities (Birds and Natural Habitats) Regulations and to the existing Wildlife (Amendment) Act, 2000 make provisions in relation to non-native invasive. The regulations are currently out for consultation by the Department of Environment, Heritage and Local Government: <http://www.environ.ie/en/Heritage/NationalParksandWildlife/PublicConsultations>.

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.

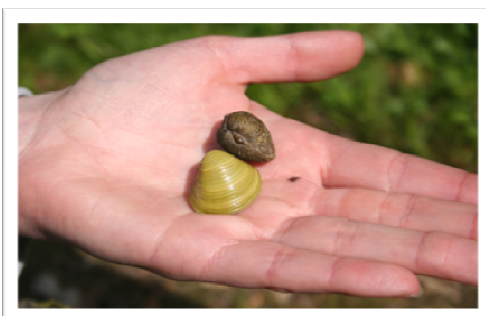


FIGURE 2. RECENT SPECIES ALERT ISSUED FOR *CORBICULA FLUMINEA* ON 15/04/2010 – COLETTE O' FLYNN

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>

## 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<sup>1</sup>, 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<sup>2</sup> 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<sup>2</sup> 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<sup>2</sup>. 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> and click on species search or by visiting Biodiversity Maps on <http://maps.biodiversityireland.ie>.

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<sup>1</sup> Environmental Protection Agency Strive project 'Alien species in Irish waterbodies'. See project website <http://invasives.biodiversityireland.ie> for more information.

A tutorial on using the interactive GIS mapping system 'Biodiversity Maps' is available from:

[www.biodiversityireland.ie/biodiversity-data/access-biodiversity-data/](http://www.biodiversityireland.ie/biodiversity-data/access-biodiversity-data/)

## COVER AGE ASSESSMENT

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.

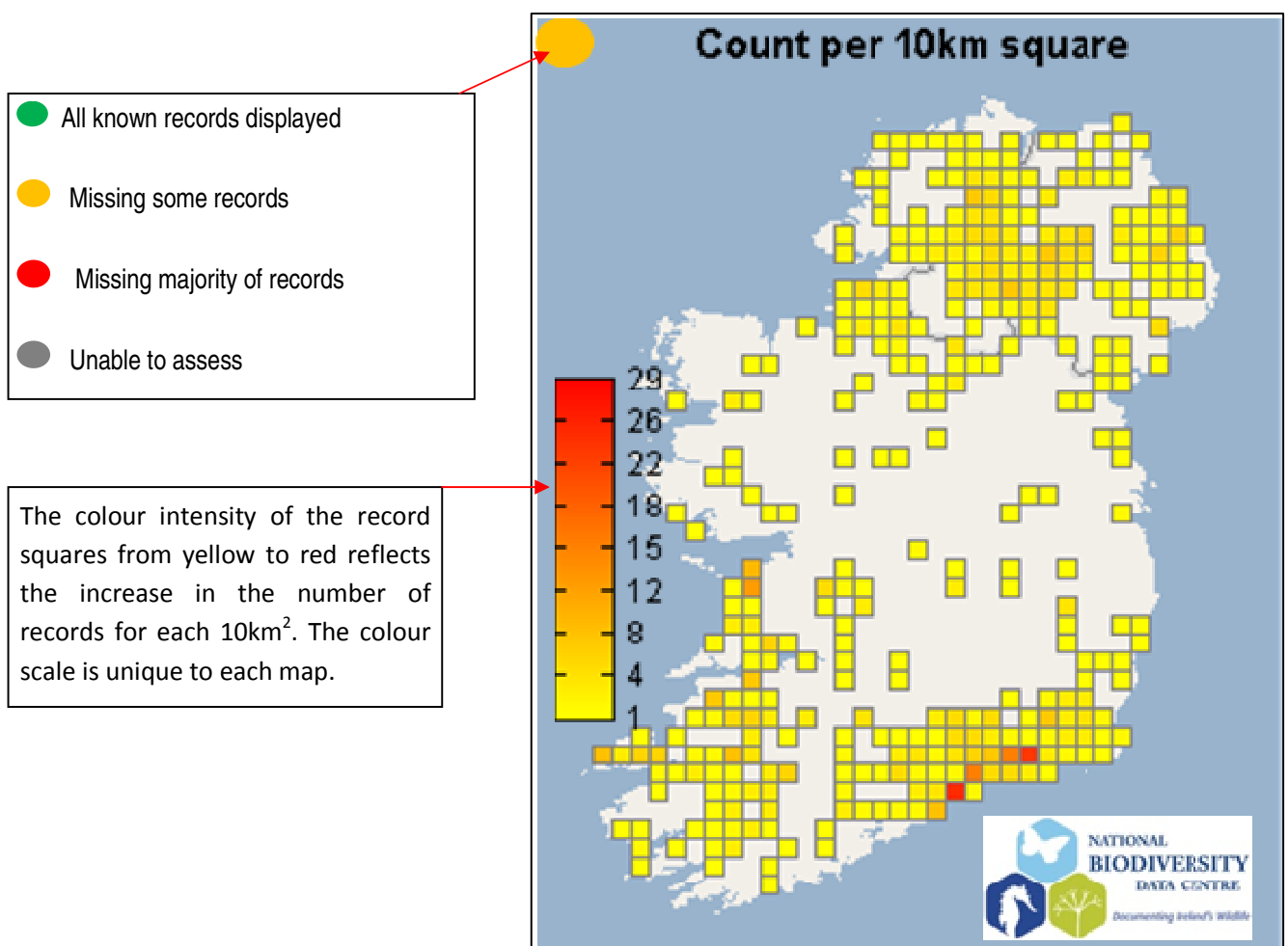
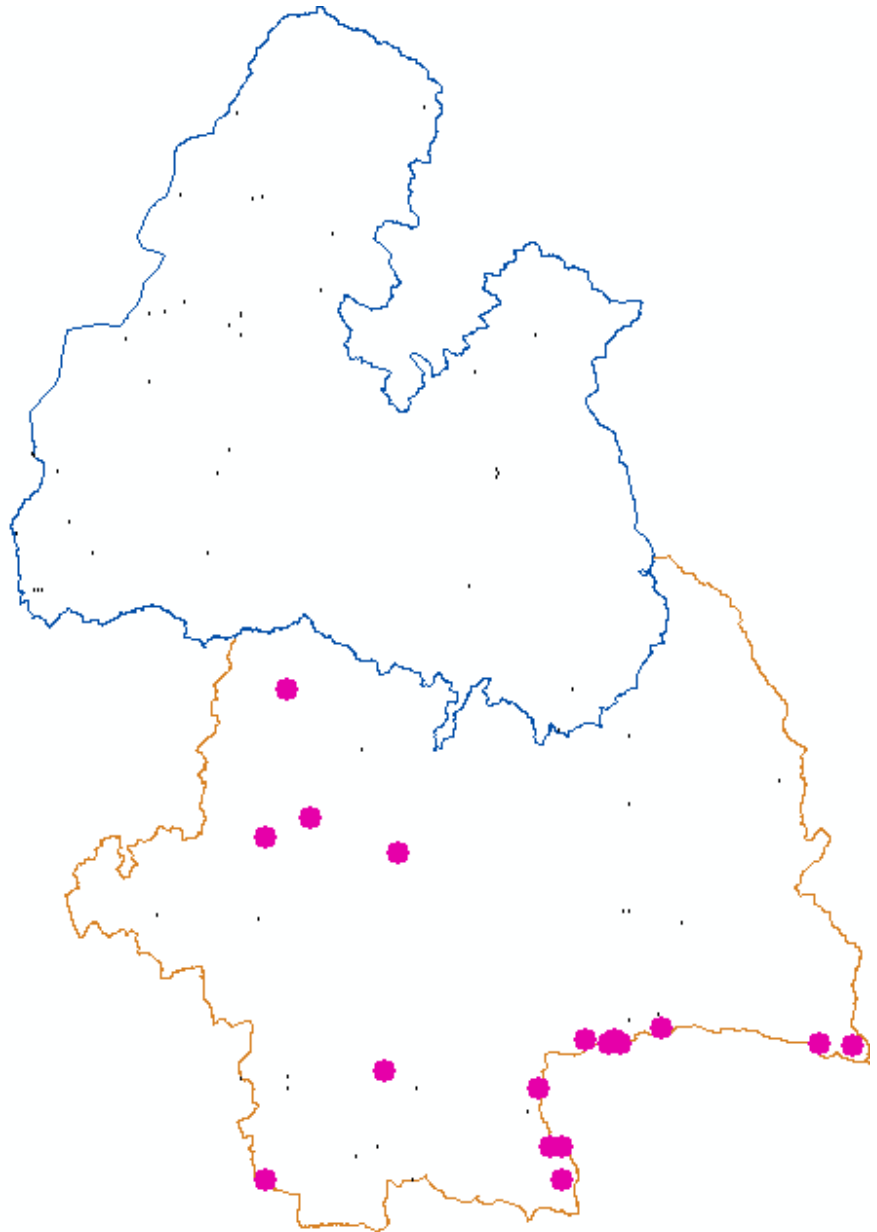
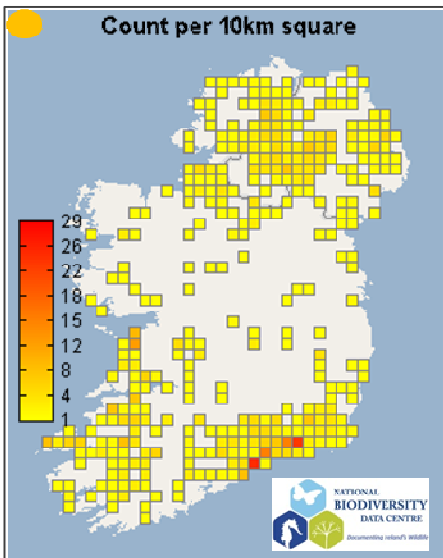


FIGURE 3. COVERAGE ASSESSMENT


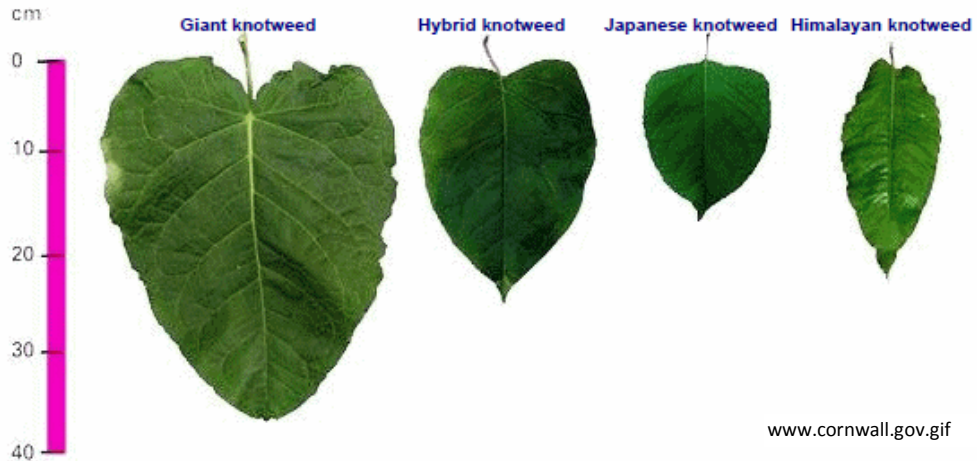
## 4. SPECIES DISTRIBUTION AND PROFILES

### I. *FALLOPIA JAPONICA* – JAPANESE KNOTWEED



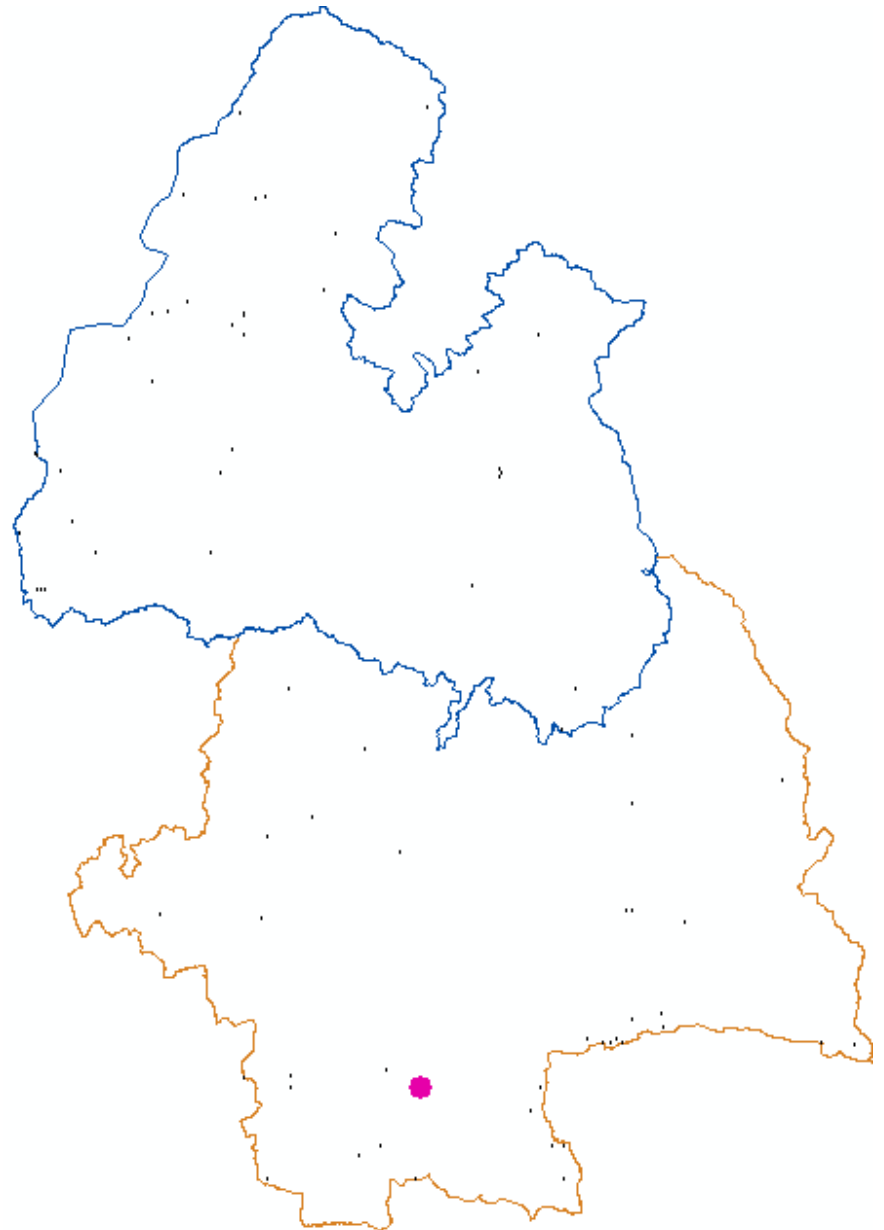
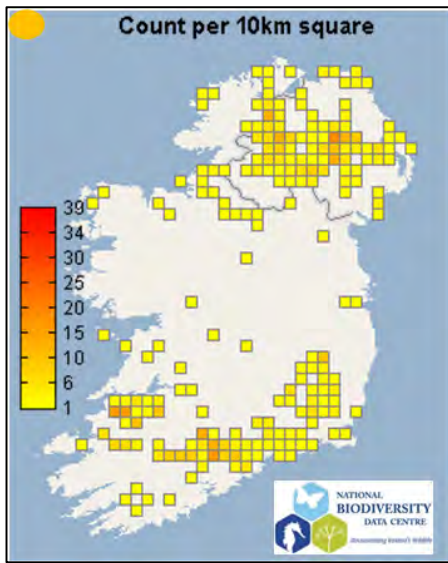


SPECIES PROFILE

Species Name	Common Name	Irish Name	First Recorded in Ireland	
<i>Fallopia japonica</i>	Japanese Knotweed	Glúineach bhiorach	1902	
Native Distribution	Asia: Japan, Sakhalin Island, the Kurile Islands, Korea, SW China, Taiwan, and Vietnam	Irish Distribution Frequency	<b>Very Common</b> – many sites and many individuals	
No. of records in Co. Tipperary		<b>22</b>	No. of 1km <sup>2</sup> record squares or higher resolution	
			<b>18</b>	
Priority Tagging	<ul style="list-style-type: none"> <li>• One of the 8 Invasive Species Survey plants</li> <li>• In designated sites</li> <li>• High impact invasive species</li> </ul>			
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.	Fossitt (2000) general habitat code	FW,GA,GS,PB,WL, ED,BC,BL,CD	
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 defense 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				
				
	www.cornwall.gov.gif			



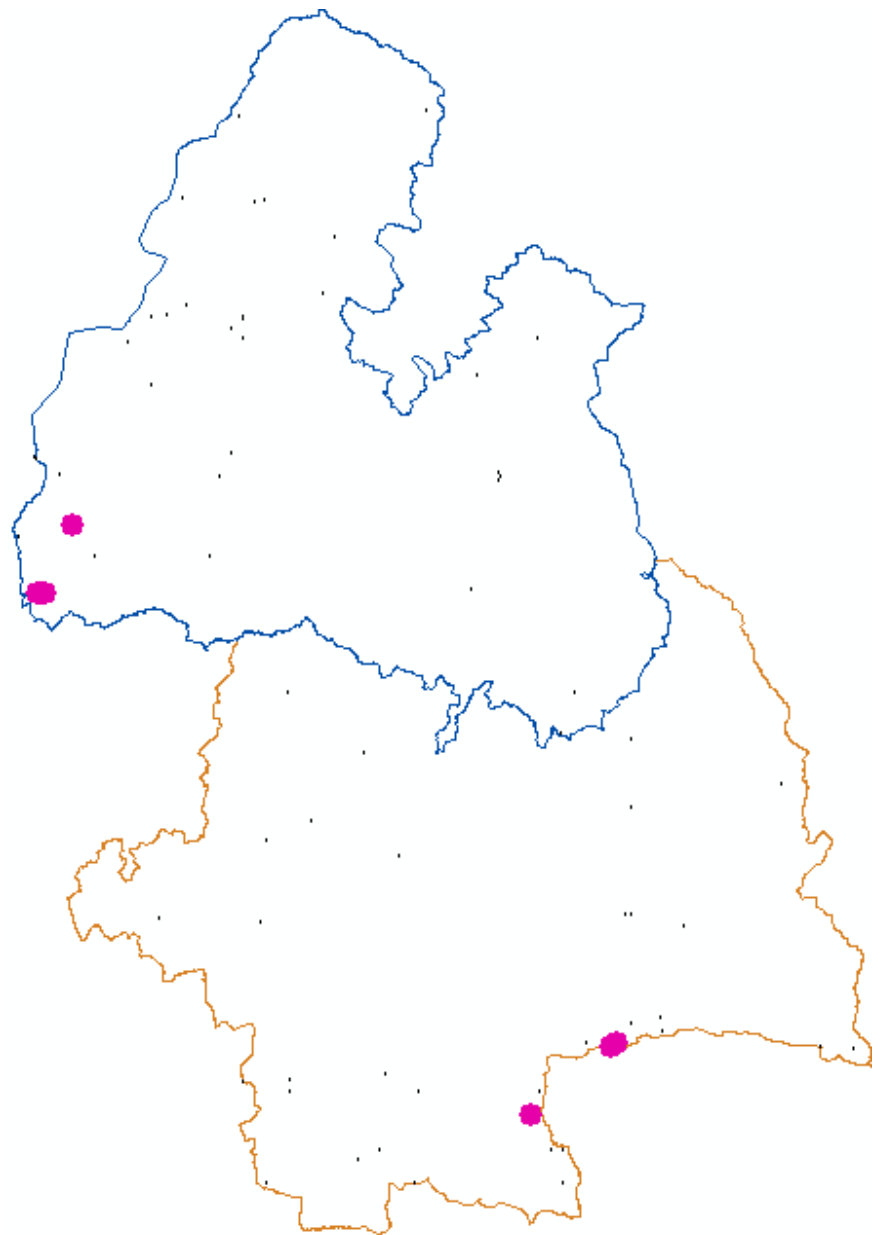
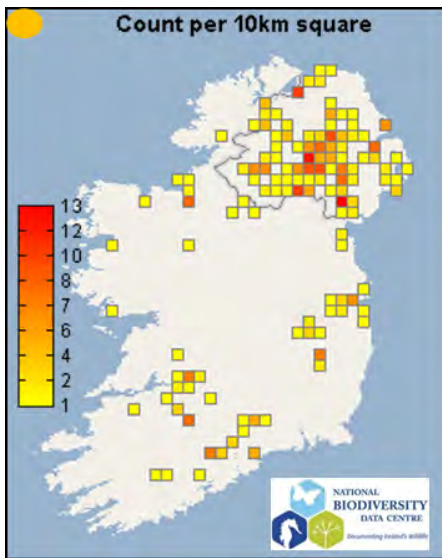
## II. IMPATIENS GLANDULIFERA – HIMALAYAN BALSAM




SPECIES PROFILE

Species Name	Common Name	Irish Name	First Recorded in Ireland	
<i>Impatiens glandulifera</i>	Himalayan Balsam	Lus no pléisce	1906	
<b>Native Distribution</b>	Asia: Western Himalayas		<b>Irish Distribution Frequency</b>	<b>Very Common</b> – many sites and many individuals
<b>No. of records in Co. Tipperary</b>	<b>2</b>	<b>No. of 1km<sup>2</sup> record squares or higher resolution</b>	<b>2</b>	
<b>Comment</b>	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. <i>Fallopia japonica</i> and <i>Heracleum mantegazzianum</i> could also be easily surveyed for at the same time along riparian areas.			
<b>Priority Tagging</b>	<ul style="list-style-type: none"> <li>• One of the 8 Invasive Species Survey plants</li> <li>• Recent invader</li> <li>• Few locations</li> <li>• High impact invasive species</li> </ul>			
<b>Habitat</b>	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.	<b>Fossitt (2000) general habitat code</b>	FW, GS, GM, PB, PF, WN, WS, WL, ED, BL	
<b>Impact</b>	Competition and abiotic change impacts. Shading out of native species and increased soil erosion along river banks.			
<b>Identification Features</b>	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.			
<b>Photos</b>				

III. HERACLEUM MANTEGAZZIANUM – GIANT HOGWEED



SPECIES PROFILE

Species Name	Common Name	Irish Name	First Recorded in Ireland	
<i>Heracleum mantegazzianum</i>	Giant Knotweed	Feabhrán capaill	1902	
<b>Native Distribution</b>	Asia: Russian Caucasus		<b>Irish Distribution Frequency</b>	<b>Common</b> – many sites in the country
<b>No. of records in Co. Tipperary</b>	<b>8</b>	<b>No. of 1km<sup>2</sup> record squares or higher resolution</b>	<b>7</b>	
<b>Priority Tagging</b>	<ul style="list-style-type: none"> <li>• One of the 8 Invasive Species Survey plants</li> <li>• Few locations</li> <li>• In designated sites</li> <li>• High impact invasive species</li> </ul>			
<b>Habitat</b>	Riparian zones, Disturbed areas, Urban areas. Found on moist ground along river, stream, and lake margins. Also in grassland and roadsides.	<b>Fossitt (2000) general habitat code</b>	FW, GS, WL	
<b>Impact</b>	Competition, abiotic changes and human health impacts. Shading out of native species and increases soil erosion along river banks. It produces a <b>hazardous</b> sap that can cause severe burns and scarring by sensitising the skin to light (UV radiation).			
<b>Identification Features</b>	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 pink and it flowers from June to August. Can be up to 50,000 (1.5cm long) seeds per plant!			
<b>Photos</b>				



Joe Caffrey

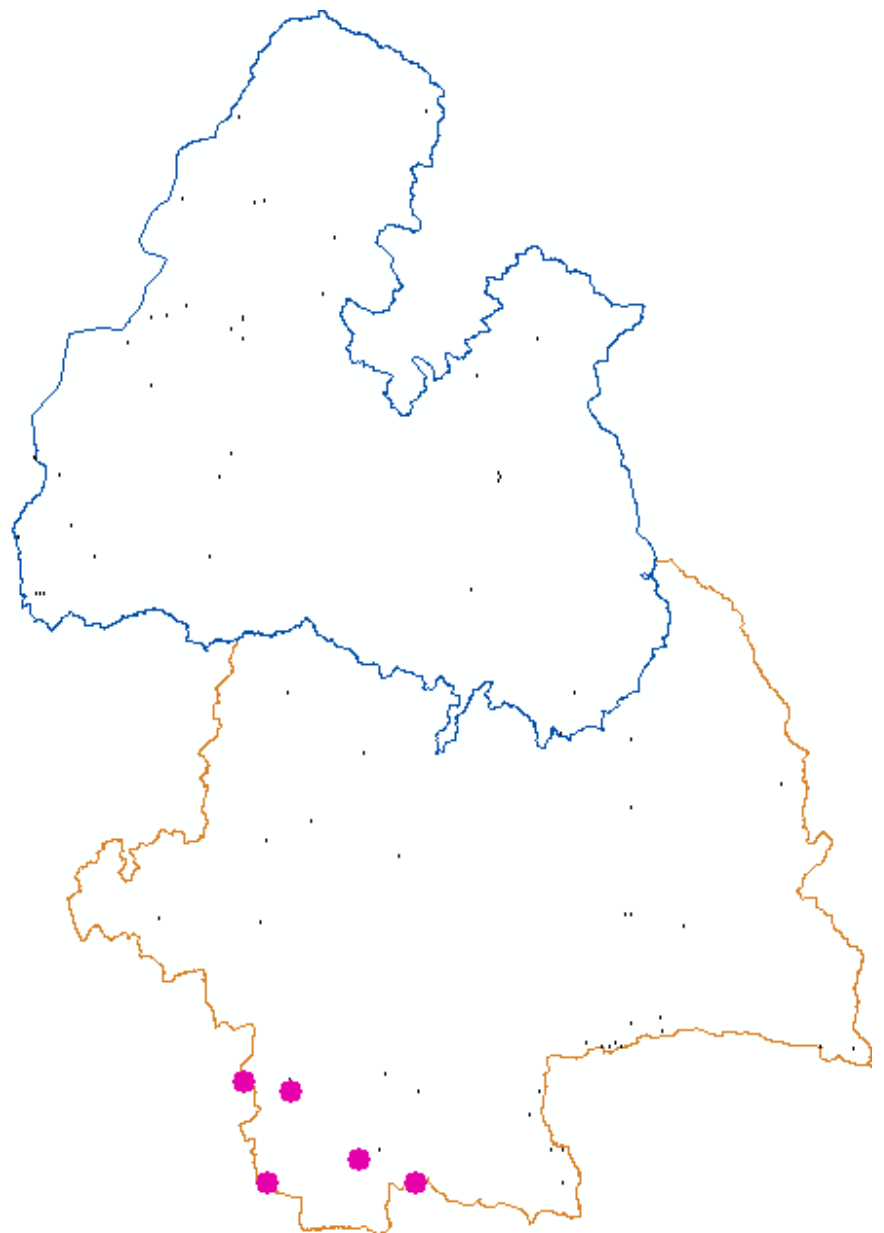
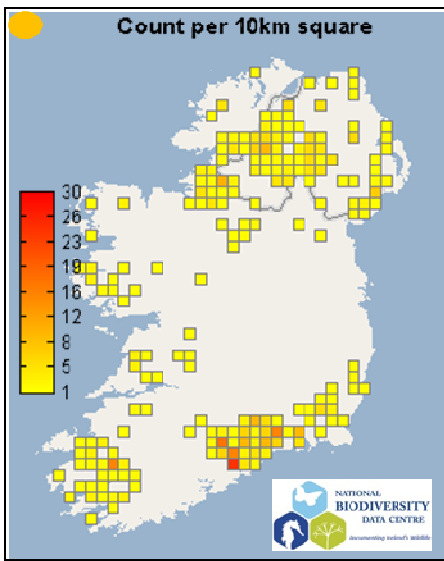


Seamus Forde



Seamus Forde

#### IV. RHODODENDRON PONTICUM - RHODODENDRON



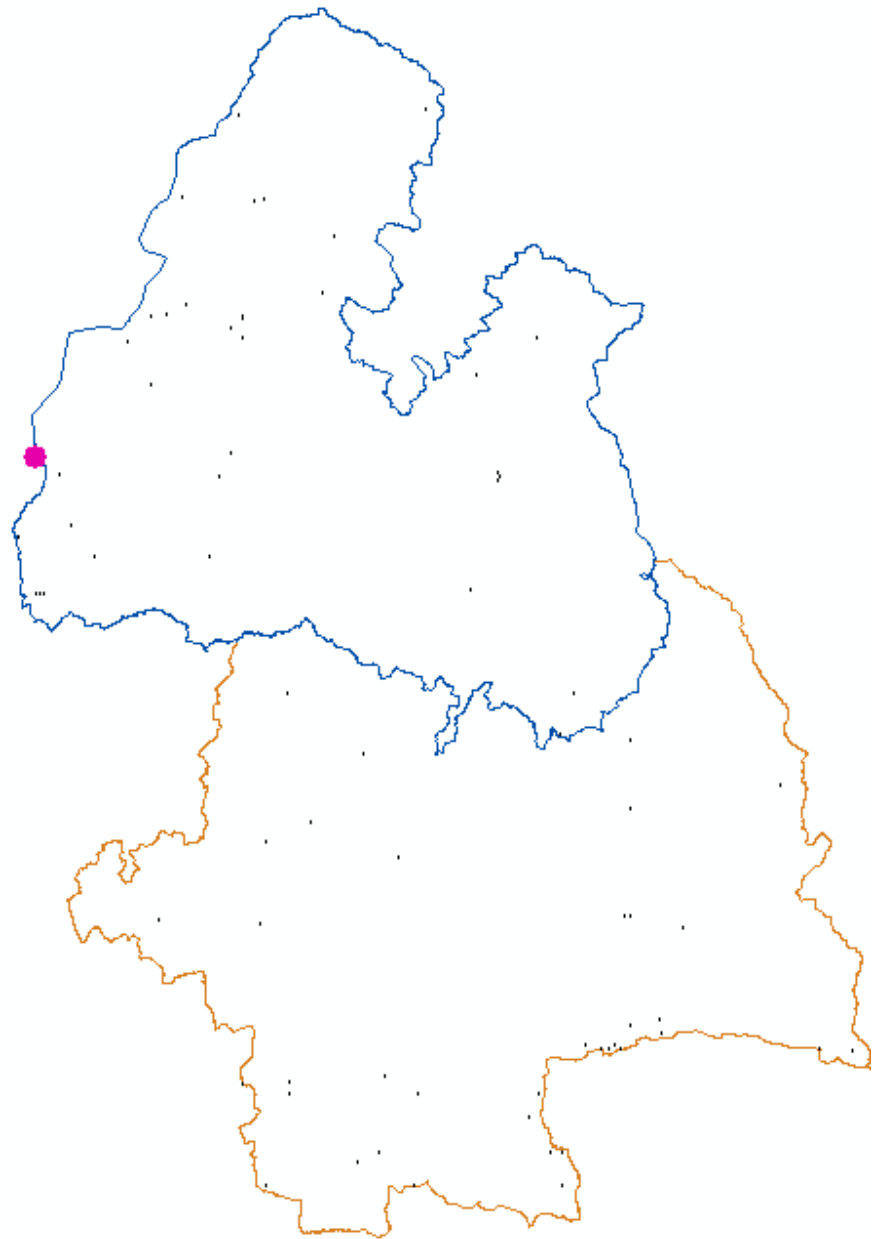
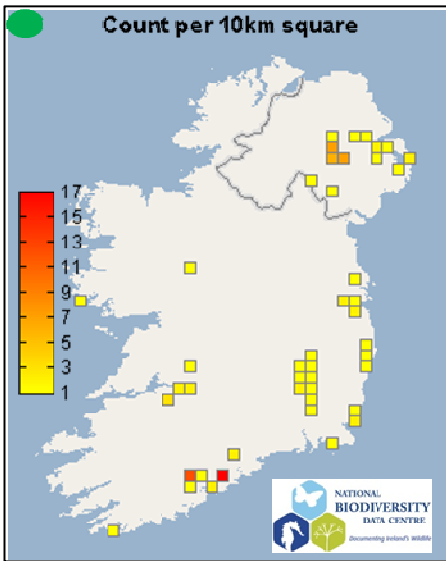


SPECIES PROFILE


Species Name	Common Name	Irish Name	First Recorded in Ireland	
<i>Rhododendron ponticum</i>	Rhododendron	Róslabhras	1800	
<b>Native Distribution</b>	South-west Europe and south-west Asia.		<b>Irish Distribution Frequency</b>	<b>Very Common</b> – many sites and many individuals
<b>No. of records in Co. Tipperary</b>	<b>11</b>	<b>No. of 1km<sup>2</sup> record squares or higher resolution</b>		<b>8</b>
<b>Priority Tagging</b>	<ul style="list-style-type: none"> <li>• Few locations</li> <li>• In close proximity to a natural corridor leading to designated sites</li> <li>• High impact invasive species</li> </ul>			
<b>Habitat</b>	It thrives in acidic soils in woodlands and also found on heathland, bogs, rocky hillsides, gardens and parks.		<b>Fossitt (2000) general habitat code</b>	GS, HH, PB, ED, BC, WN, WD, WS
<b>Impact</b>	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.			
<b>Identification Features</b>	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.			
<b>Photos</b> Seamus Forde				



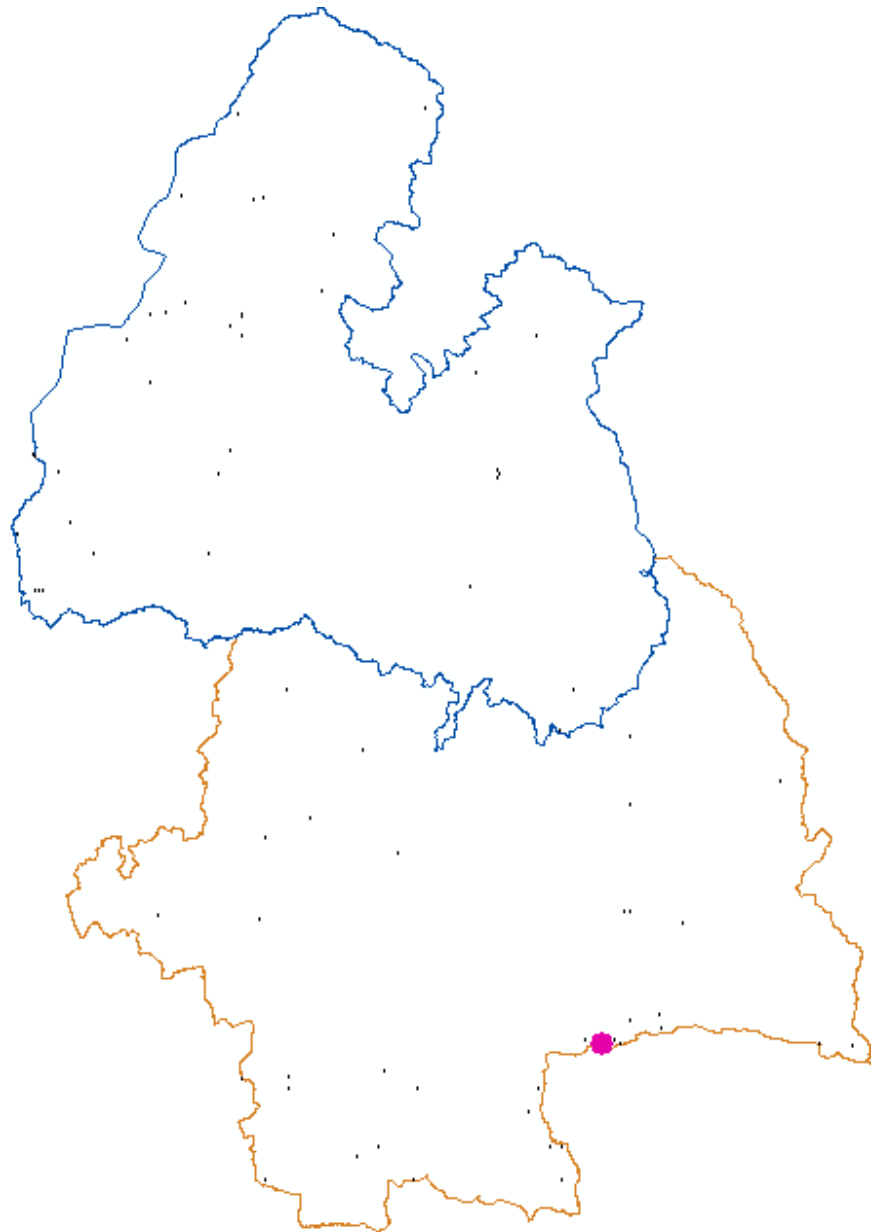
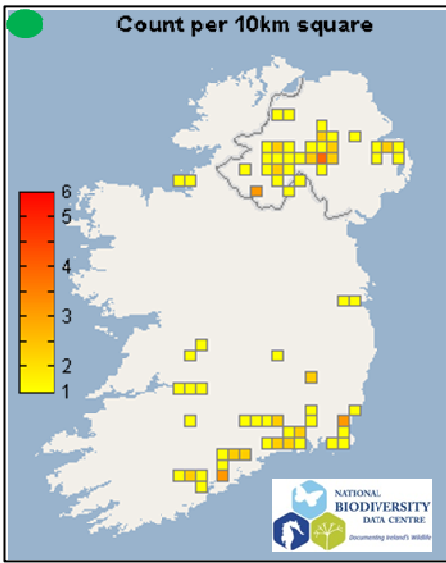
V. AZOLLA FILICULOIDES – WATER FERN



SPECIES PROFILE

Species Name	Common Name	Irish Name	First recorded in Ireland	
<i>Azolla filiculoides</i>	Water Fern	Raithneach uisce	1907 in wild (1893 in garden pond)	
Native Distribution	North and South America. Warm temperate and subtropical America through Western North America (including Alaska).		Irish Distribution Frequency	Common - many sites in the country
No. of records in Co. Tipperary		1	No. of 1km <sup>2</sup> record squares or higher resolution	
1		1		
Priority Tagging	<ul style="list-style-type: none"> <li>• One of the 8 Invasive Species Survey plants</li> <li>• Recent invader</li> <li>• Few locations</li> <li>• In designated sites</li> <li>• Connected waterbodies</li> </ul>			
Habitat	Lakes, Watercourses. The preferred habitat is still and slow flowing water bodies such as ponds, ditches, water reservoirs, wetlands, channels, canals and slow moving rivers.	Fossitt (2000) general habitat code	FL, FW, FS	
Impact	Abiotic changes, competition, human health and socio-economic. Water Fern can form large dense monospecific floating mats which outcompete native submerged plants and algae by shading and blocking oxygen diffusion. This can also result in reduced animal life in the water. These dense floating mats can also reduce the recreational value of the waterbodies. In Great Britain there have been reports of impact to human health as children may mistakenly think the surface of a water body is solid and fall through.			
Identification Features	Plants can be present year round but often die back in winter. These floating plants are small up to 2.5cm long and have a fern like shape. Their surface is granular in appearance and non-wettable. The plant can vary in colour from bright to dark green to red. This depends on the intensity of sunlight and time of year. It has multiple dark roots.			
Photos				

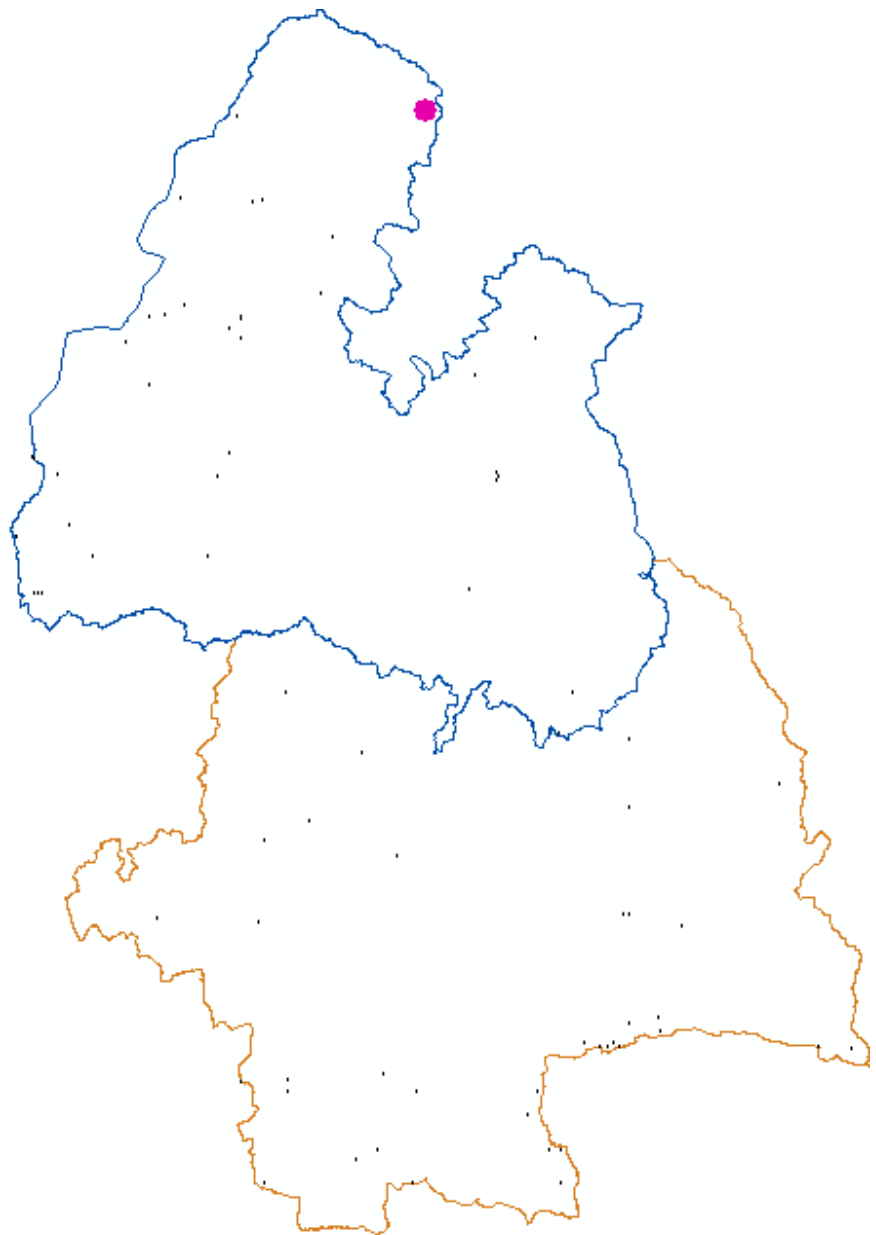
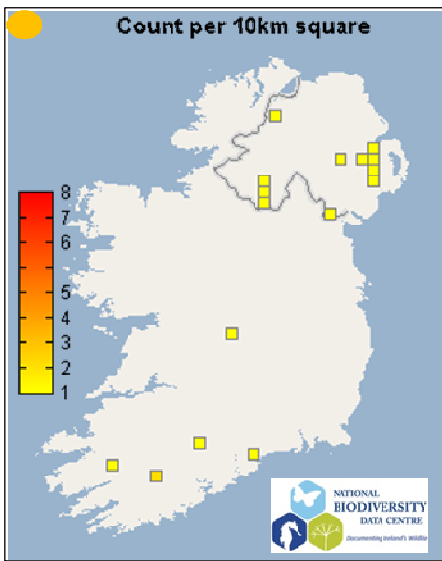
VI. *LEMNA MINUTA* – LEAST DUCKWEED



SPECIES PROFILE


Species Name	Common Name	Irish Name	First Recorded in Ireland	
<i>Lemna minuta</i>	Least Duckweed	none	1993	
<b>Native Distribution</b>	North and South America		<b>Irish Distribution Frequency</b>	<b>Common</b> – many sites in the country
<b>No. of records in Co. Tipperary</b>	<b>1</b>	<b>No. of 1km<sup>2</sup> record squares or higher resolution</b>	<b>1</b>	
<b>Distribution Comment</b>	As this species is very small it can easily be transferred to another waterbody by birds, angling equipment etc. The level of invasion is unknown but if it is very abundant than many forms of control may be required and total eradication is unlikely.			
<b>Priority Tagging</b>	<ul style="list-style-type: none"> <li>• Recent invader</li> <li>• Few locations</li> <li>• High impact invasive species</li> </ul>			
<b>Habitat</b>	Ponds, rivers, canals. Still and slow moving waters. Also found in drainage ditches.	<b>Fossitt (2000) general habitat code</b>	FL, FW	
<b>Impact</b>	Competition, abiotic change. It can form large dense floating mats in a short space of time. This reduces light penetration/availability to submerged macrophyte plants.			
<b>Identification Features</b>	Small pad like frond 0.8 to 4mm long and 0.5 to 2.5mm wide. Elliptical shape with one vein. It has only one root per frond. Fronds overlap each other and it is often found growing in dense mats. Very similar to the larger <i>Lemna minor</i> . Should only use well grown spring or summer fronds for identifying <i>Lemna</i> to species level.			
<b>Photos</b>				

VII. NYPHOIDES PELTATA – FRINGED WATER-LILY





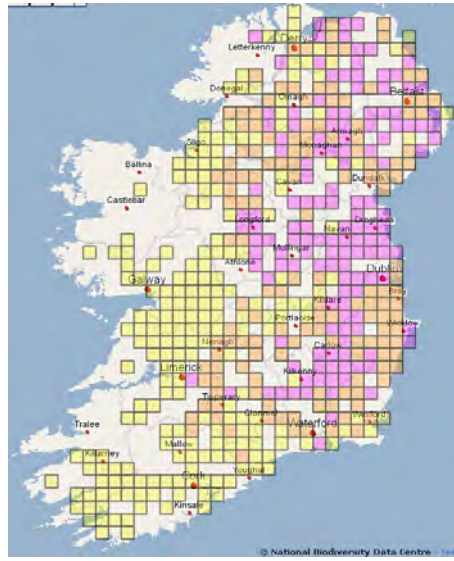
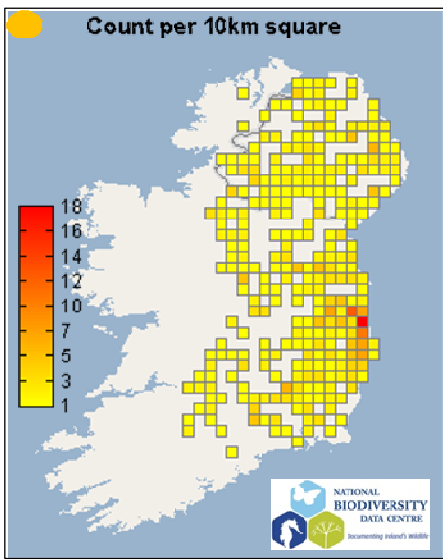
SPECIES PROFILE

Species Name	Common Name	Irish Name	First recorded in Ireland	
<i>Nymphoides peltata</i>	Fringed Water-lily		Pre 1866	
<b>Native Distribution</b>	Europe, Asia. British Isles, Central Europe, Southern Europe, Eastern Europe, Mediterranean Islands, Temperate Asia	<b>Irish Distribution Frequency</b>	Local - many individuals in some areas of the country	
<b>No. of records in Co. Tipperary</b>		<b>No. of 1km<sup>2</sup> record squares or higher resolution</b>		
<b>Priority Tagging</b>	<ul style="list-style-type: none"> <li>• Recent invader</li> <li>• Few locations</li> <li>• In close proximity to a natural corridor leading to designated sites</li> <li>• Connected waterbody</li> </ul>			
<b>Habitat</b>	Lakes, Watercourses. Ponds, slow rivers, canals and lakes.	<b>Fossitt (2000) general habitat code</b>	FL, FW	
<b>Impact</b>	Competition, abiotic changes, socio-economic. Can grow in dense patches and outcompete and exclude native species for resources such as light. It can create stagnant areas with low oxygen levels underneath the floating mats. These mats can make it difficult to fish or use for recreational boating activities.			
<b>Identification Features</b>	Stems floating to 1.5m. Leaves simple, alternate on the vegetative stems and opposite on flowering stems, up to 12x10cm. Pedicels ≤8cm. Flowers yellow with fringed margins 3-4cm across and only flowers for one day although plants flower for over a long period.			
<b>Photos</b>				

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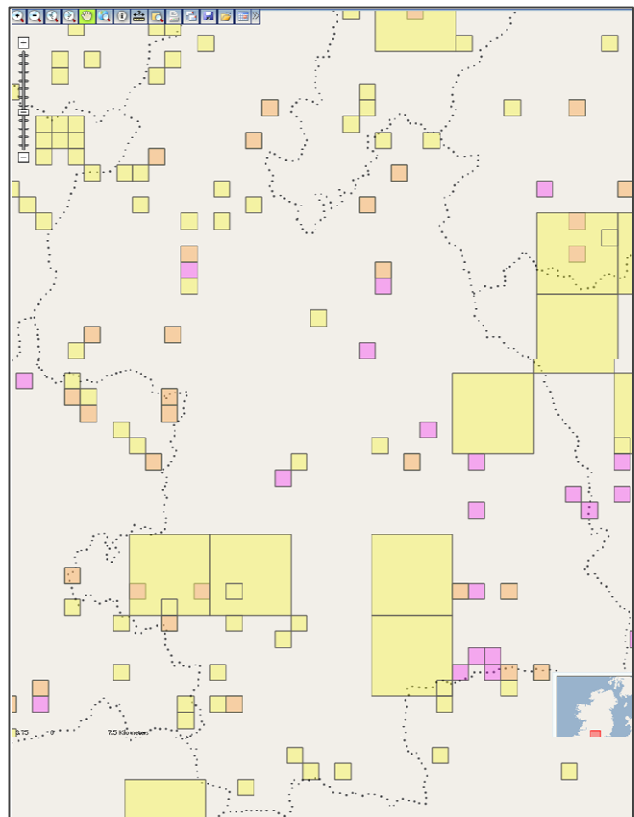
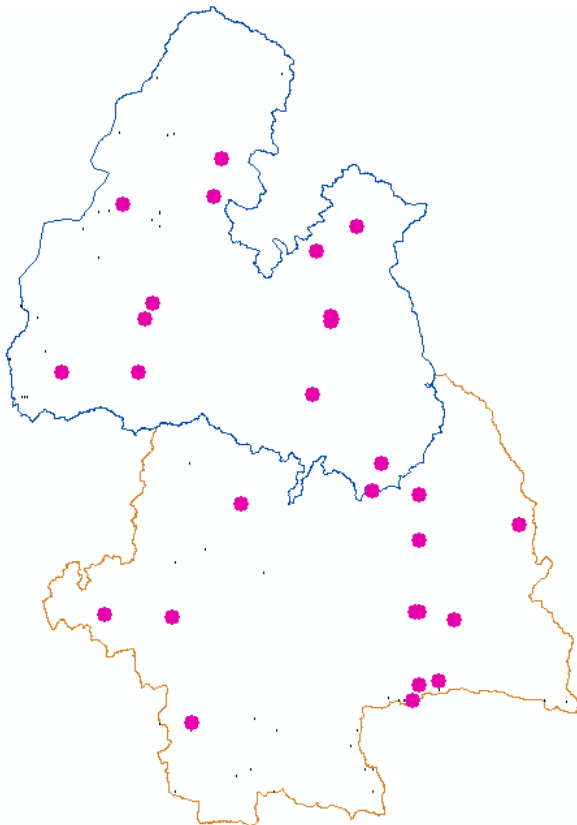


VIII. SCIURUS CAROLINENSIS – GREY SQUIRREL









**Map Legend**

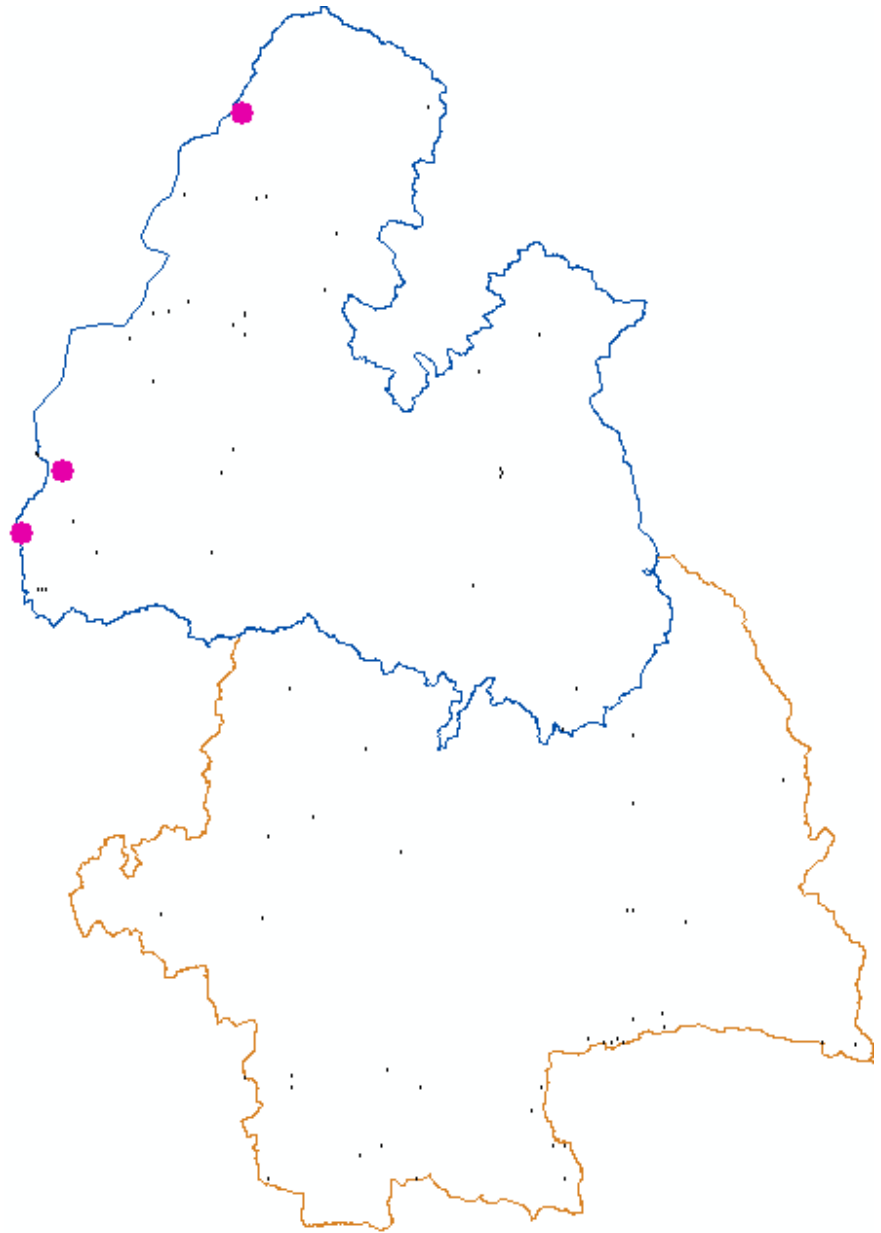
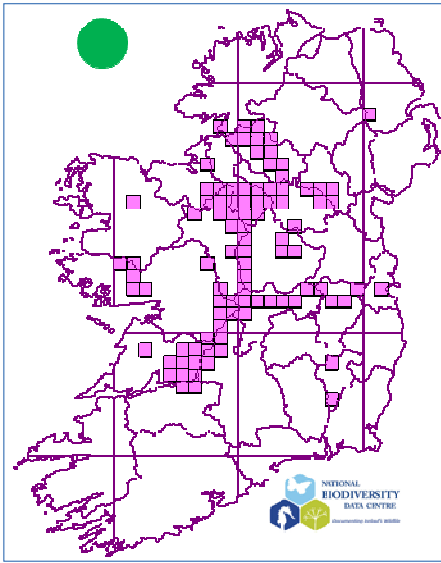
- Sciurus carolinensis**
- Red Squirrel**
- Both species**




SPECIES PROFILE

Species Name	Common Name	Irish Name	First recorded in Ireland							
<i>Sciurus carolinensis</i>	Grey/American Squirrel	Iora Glas	Introduced in 1911							
Native Distribution	Eastern part of North America, from Mexican gulf to southern part of Quebec and Ontario.		Irish Distribution Frequency	Common – many sites in the country						
No. of records in Co. Tipperary	29	No. of 1km <sup>2</sup> record squares or higher resolution	29							
Distribution Comment	Priority areas for Grey Squirrel control and the native Red Squirrel ( <i>Sciurus vulgaris</i> ) 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	<ul style="list-style-type: none"> <li>• In designated sites</li> <li>• In designated sites</li> <li>• High impact invasive species</li> </ul>									
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.	Fossitt (2000) general habitat code	WN, WD							
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	<table border="0" style="width: 100%;"> <tr> <td style="text-align: center; width: 50%;"><b>RED SQUIRREL (SCIURUS VULGARIS)</b></td> <td style="text-align: center; width: 50%;"><b>GREY SQUIRREL (SCIURUS CAROLENSIS)</b></td> </tr> <tr> <td style="text-align: center;">  <p>Tail: 14-19.5cm</p> <p>Head and Body length: 18-24cm</p> <p>Weight: 240-435g</p> </td> <td style="text-align: center;">  <p>Head and Body length: 24-28.5cm</p> <p>Tail: 19.5-24cm</p> <p>Weight: 400-720g</p> </td> </tr> <tr> <td colspan="2" style="text-align: center;"> <a href="http://newsimg.bbc.co.uk/media/images/44927000/gif/44927752_red_grey_compare466.gif">http://newsimg.bbc.co.uk/media/images/44927000/gif/44927752_red_grey_compare466.gif</a> </td> </tr> </table>				<b>RED SQUIRREL (SCIURUS VULGARIS)</b>	<b>GREY SQUIRREL (SCIURUS CAROLENSIS)</b>	 <p>Tail: 14-19.5cm</p> <p>Head and Body length: 18-24cm</p> <p>Weight: 240-435g</p>	 <p>Head and Body length: 24-28.5cm</p> <p>Tail: 19.5-24cm</p> <p>Weight: 400-720g</p>	<a href="http://newsimg.bbc.co.uk/media/images/44927000/gif/44927752_red_grey_compare466.gif">http://newsimg.bbc.co.uk/media/images/44927000/gif/44927752_red_grey_compare466.gif</a>	
<b>RED SQUIRREL (SCIURUS VULGARIS)</b>	<b>GREY SQUIRREL (SCIURUS CAROLENSIS)</b>									
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<a href="http://newsimg.bbc.co.uk/media/images/44927000/gif/44927752_red_grey_compare466.gif">http://newsimg.bbc.co.uk/media/images/44927000/gif/44927752_red_grey_compare466.gif</a>										

IX. DREISSENA POLYMORPHA – ZEBRA MUSSEL




SPECIES PROFILE

Species Name	Common Name	Irish Name	First recorded in Ireland	
<i>Dreissena polymorpha</i>	Zebra Mussel		1997	
Native Distribution	Asia. From the drainage basins of the Black, Caspian and Aral Seas.	Irish Distribution Frequency	Common – many sites in the country	
No. of records in Co. Tipperary	4	No. of 1km <sup>2</sup> record squares or higher resolution	4	
Comment	Precautionary measures should be taken to help prevent spread of this highly invasive species.			
Priority Tagging	<ul style="list-style-type: none"> <li>• Recent invader</li> <li>• Few locations</li> <li>• In designated sites</li> <li>• In High impact invasive species</li> </ul>			
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.	Fossitt (2000) general habitat code	FL, FW, CW, CC	
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	 <p>Amy Benson, U.S. Geological Survey, Bugwood.org UGA1265051</p> <p>Randy Westbrook, U.S. Geological Survey, United States UGA1299199</p> <p>Distinctive 'D' shape</p>			



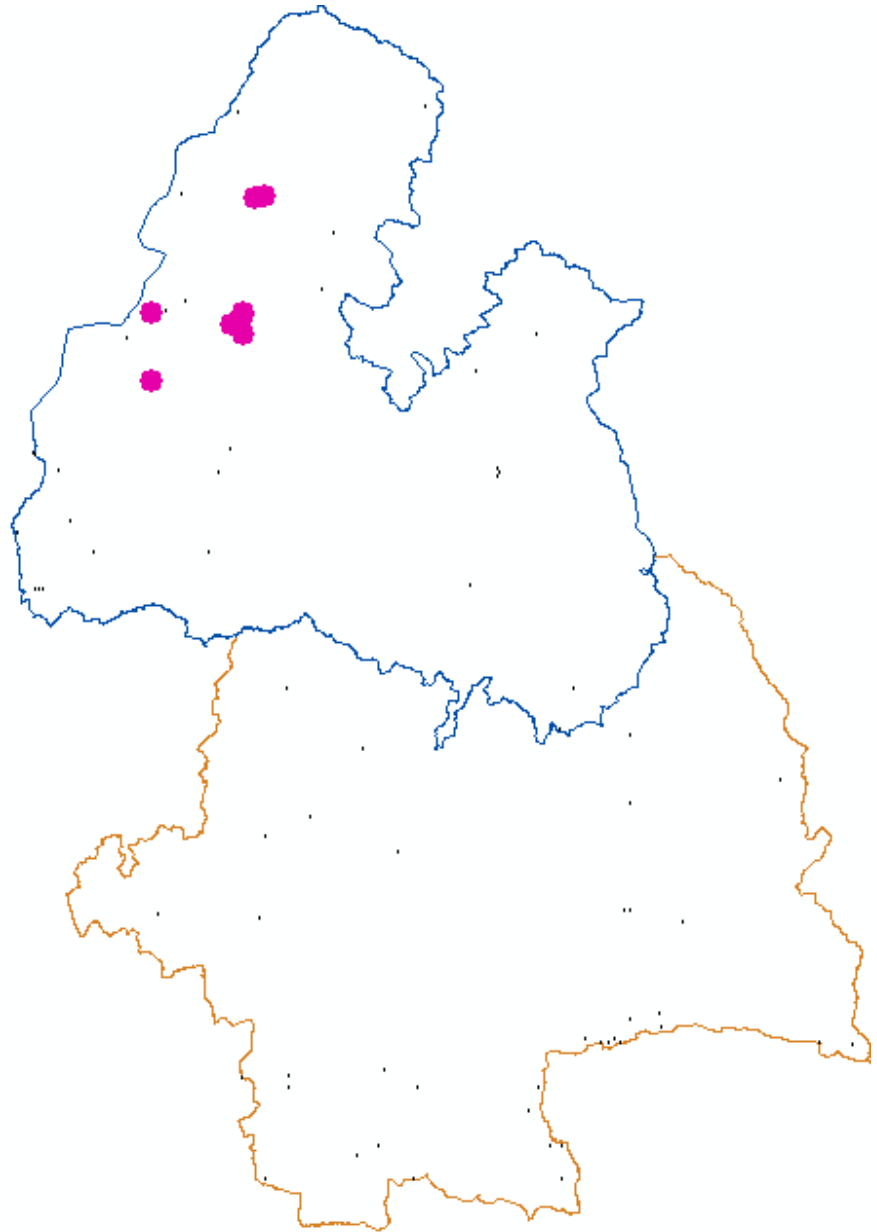
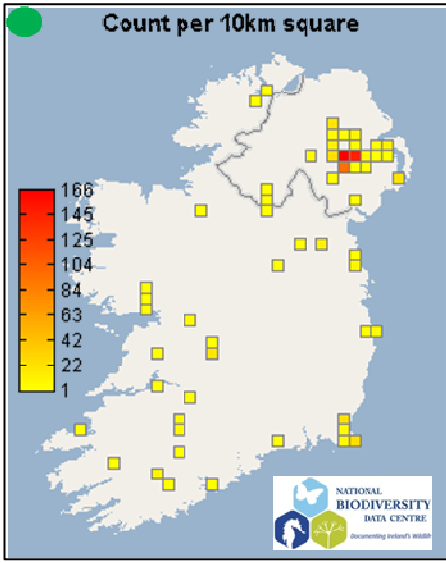


SPECIES PROFILE

Species Name	Common Name	Irish Name	First recorded in Ireland	
<i>Hemimysis anomala</i>	Bloody-red Shrimp	none	2008	
Native Distribution	Europe, Asia. This species is known from the Ponto Caspian region.	Irish Distribution Frequency	Rare – few sites where it is found in the country	
No. of records in Co. Tipperary		13	No. of 1km <sup>2</sup> record squares or higher resolution	
			13	
Distribution Comment	Some of these records are for the same location but taken on different dates. 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	<ul style="list-style-type: none"> <li>• Recent invader</li> <li>• Few locations (but see distribution comment)</li> <li>• In designated sites</li> <li>• High impact invasive species</li> </ul>			
Habitat	Lakes, Watercourses, Estuaries, Brackish waters. Water temperature preference between 9-20oC 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 <i>Mysis relicta</i> . 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				



XI. OXYURA JAMAICENSIS – RUDDY DUCK



SPECIES PROFILE

Species Name	Common Name	Irish Name	First recorded in Ireland	
<i>Oxyura jamaicensis</i>	Ruddy Duck	Lacha Rua	1973	
<b>Native Distribution</b>	North and Central America and western South America		<b>Irish Distribution Frequency</b>	<b>Local</b> – many individuals in some areas of the country
<b>No. of records in Co. Tipperary</b>	25	<b>No. of 1km<sup>2</sup> record squares or higher resolution</b>		22
<b>Priority Tagging</b>	<ul style="list-style-type: none"> <li>• Few locations</li> <li>• In designated sites (although not a direct impact to the sites)</li> <li>• High impact invasive species (See impact section)</li> </ul>			
<b>Habitat</b>	Lowland wetlands with lush emergent vegetation and areas of open water.	<b>Fossitt (2000) general habitat code</b>	FL, FS, GS, GM	
<b>Impact</b>	<p><b>Genetic dilution.</b> Ruddy duck is a serious threat to the IUCN globally endangered and European vulnerable White-headed duck <i>Oxyura leucocephala</i>. Ruddy duck is dominant over this species and it breeds with it to produce first and second generation fertile hybrids. While the White-headed duck is not found in Ireland, Ruddy duck individuals in Ireland may be a source population for spread to the White-headed duck's native range.</p>			
<b>Identification Features</b>	<p>A small compact duck with a long stiff tail that is sometimes erect and characteristic of the stiff tail tribe <i>Oxyurini</i>. The <b>males</b> have a bright blue bill, black crown and nape, reddish-brown body and white cheeks. The <b>females</b> have a dull lighter brown body with a dark cap, grey bill with creamy cheeks that have a distinguishing dark horizontal stripe.</p>			
<b>Photos</b>				

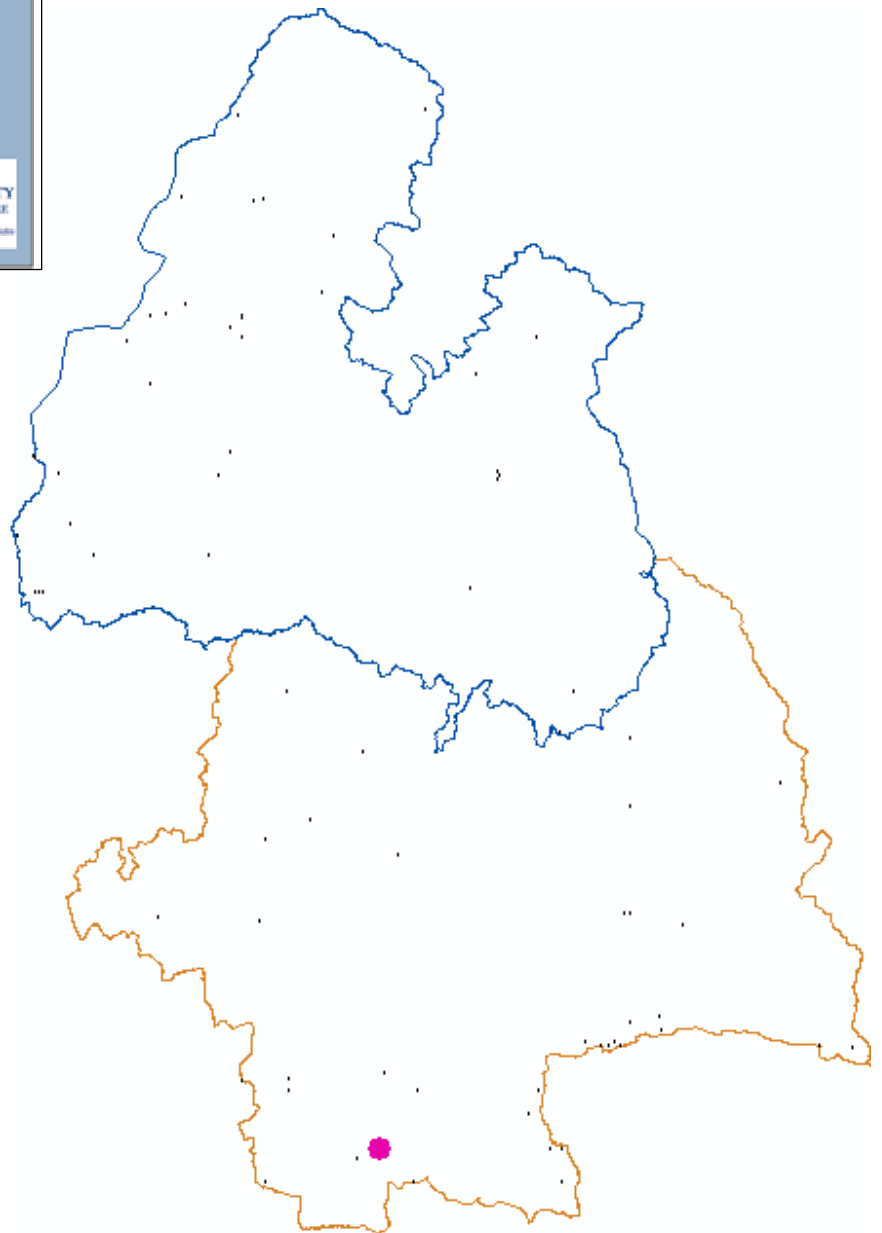
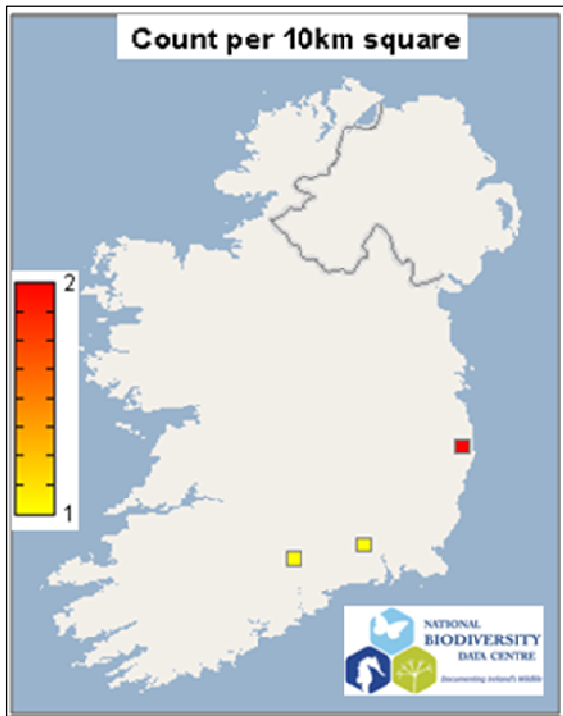


Male Ruddy Duck. © Scott Streit, 2000






Female Ruddy Duck. © Scott Streit, 2000

XII. SUS SCROFA – WILD BOAR

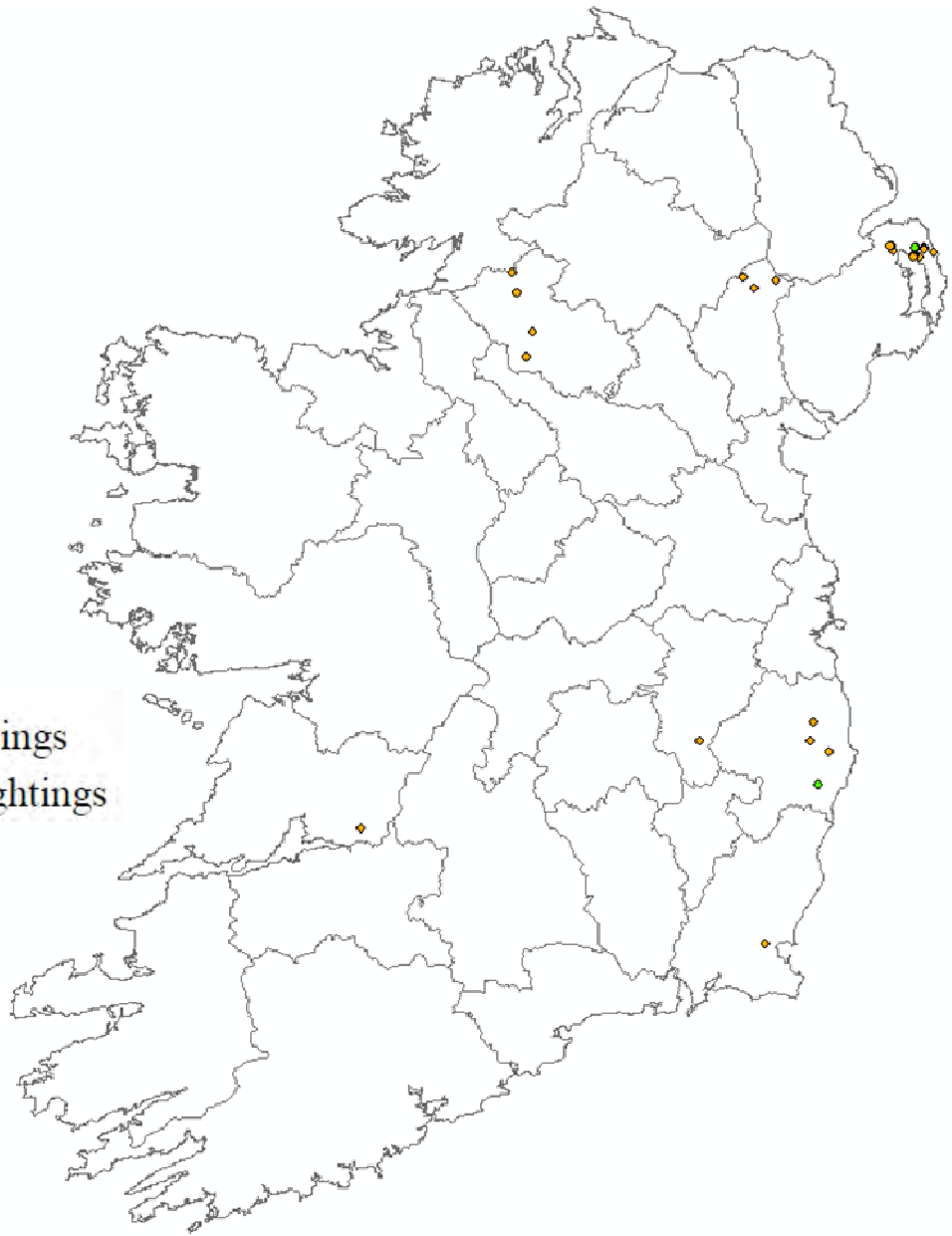


SPECIES PROFILE

Species Name	Common Name	Irish Name	First recorded in Ireland
<i>Sus scrofa</i>	Wild Boar	-	2009
Native Distribution	Europe, Asia. <i>Sus scrofa</i> 's native range is throughout Europe and continental Asia. It became extinct in Ireland in pre-historic times.	Irish Distribution Frequency	Rare - few sites where it is found in the country
No. of records in Co. Tipperary		No. of 1km <sup>2</sup> record squares or higher resolution	
Distribution Comment	One Wild Boar was seen and removed from this one area in Co. Tipperary. There are increasing numbers of anecdotal reports of Wild Boar in Ireland with many being subsequently being verified. It is likely that more than one animal would have been escaped/released into he area.		
Priority Tagging	<ul style="list-style-type: none"> <li>Recent invader</li> <li>Few locations (see comment above)</li> <li>In designated sites</li> <li>High impact invasive species</li> </ul>		
Habitat	Uses a range of habitat including woodland, grasslands, agricultural land, riparian areas and scrubland.	Fossitt (2000) general habitat code	GA, GS, WN, WD, WS, BC
Impact	Rooting disturbs the seed bank, reduces surface vegetation, alters the soil by increasing soil temperature, increasing or decreasing the nitrogen content, increasing oxidation and increasing the leaching of minerals. It damages cultivated crops and the productivity of forest plantations. Acting as a reservoir, source and transmission of diseases such as foot-and-mouth, blue tongue etc also a concern.		
Identification Features	Compact body, large head, the legs relatively short. Hair consists of stiff bristles and usually finer fur. The colour varies from dark grey to black or dark brown . Adult boars average 120–180 cm in length and a shoulder height of 90 cm. Average weight is 50–90kg kilograms although animal culled in Co. Tipperary weighed 180kg. The lower tusks of an adult male measure about 20 cm (rarely 30cm) seldom more than 10 cm protrude out of the mouth. The upper tusks are bent upwards in males, in females they are smaller, and the upper tusks are only slightly bent upwards in older individuals. Wild boar piglets are coloured differently from adults, being a soft brown with longitudinal darker stripes. The stripes fade by the time the piglet is about half-grown when the animal takes on the adult's grizzled grey or brown colour. Sightings of escaped Tamworth species have been received in Ireland. Please use caution in ID.		
Photos	  		
	<p>Note the reddish colour to the coat of a <b>Tamworth cross species</b></p>		

MUNTIACUS REEVESI – MUNTJAC DEER



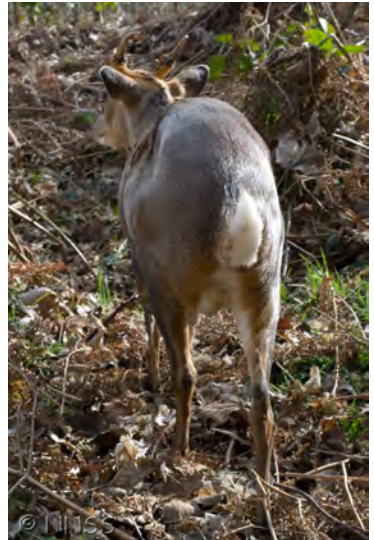
**Warning!**  
**Potential Invader**



- Confirmed sightings
- Unconfirmed sightings



SPECIES PROFILE

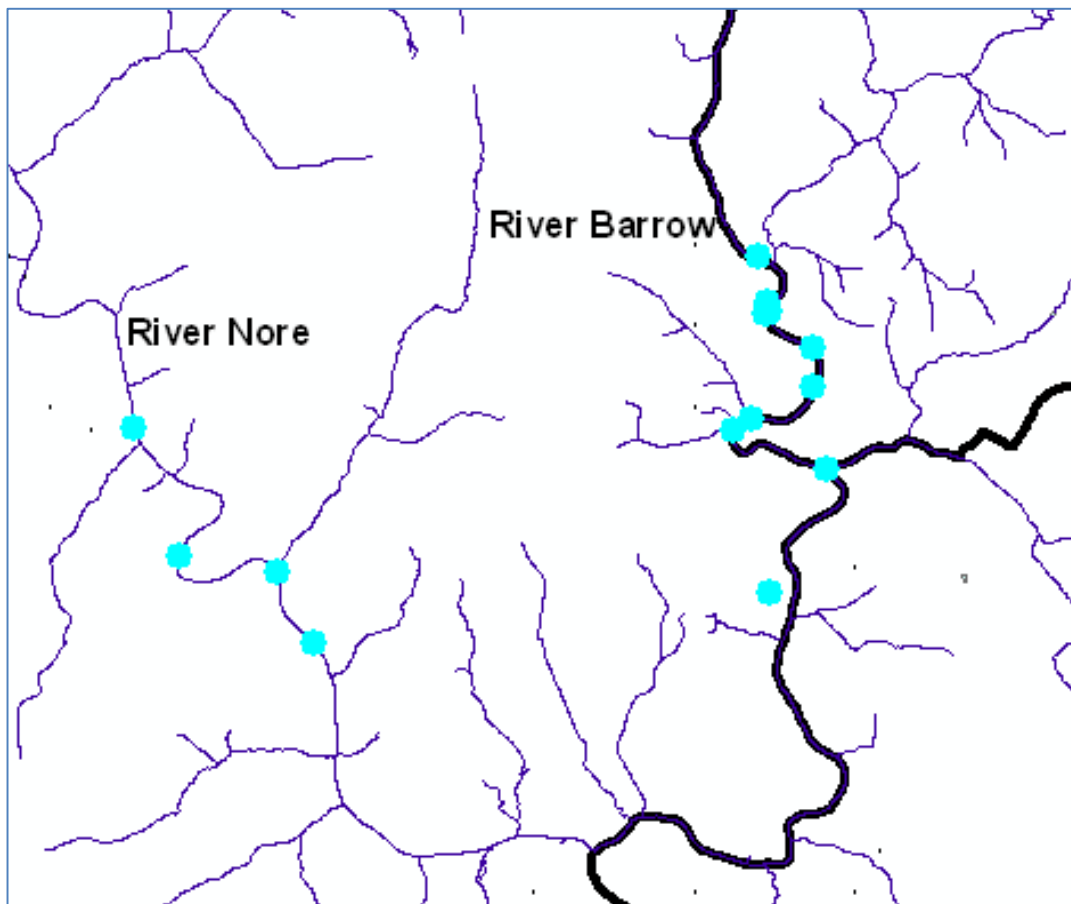
Species Name	Common Name	Irish Name	First recorded in Ireland	
<i>Muntiacus reevesi</i>	Muntjac Deer		2008 (2009 for NI but may be as early	
Native Distribution	Asia. China and Taiwan.		Irish Distribution Frequency	Rare
No. of records in Co. Tipperary	-	No. of 1km <sup>2</sup> record squares or higher resolution	-	
Priority Tagging	<ul style="list-style-type: none"> <li>High impact invasive species - <b>potential invader</b></li> </ul>			
Habitat	Temperate forests, coniferous and broadleaf. In introduced range it also inhabits scrub and grassland and marginal urban areas.		Fossitt (2000) general habitat code	GA, GS, WN, WD, WS
Impact	<p>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.</p>			
Identification Features	<p>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 in May and long canines/tusks. Short tail (about 10cm) with white underside.</p>			
Photos	<div style="display: flex; justify-content: space-around;">    </div> <p style="text-align: center; margin-top: 10px;">All photos of Muntjac deer shown here are courtesy of GB NNSS and are taxidermy specimens</p>			



**Warning!**  
**Potential Invader**

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



SPECES PROFILE

Species Name	Common Name	Irish Name	First recorded in Ireland	
<i>Corbicula fluminea</i>	Asian Clam	none	2010	
<b>Native Distribution</b>	Asia, Oceania (Australia), Africa.		<b>Irish Distribution Frequency</b>	Rare – few sites where it is found in the country
<b>No. of records in Co. Tipperary</b>	-	<b>No. of 1km<sup>2</sup> record squares or higher resolution</b>		-
<b>Priority Tagging</b>	<ul style="list-style-type: none"> <li>High impact invasive species – <b>potential invader</b></li> </ul>			
<b>Habitat</b>	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.		<b>Fossitt (2000) general habitat code</b>	FL, FW
<b>Impact</b>	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.			
<b>Identification Features</b>	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.			
<b>Photos</b>				



Colette O' Flynn



Evelyn Moorkens

## 5. DIGITIZED RECORDS FOR CO. TIPPERARY

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>. These digitized records can be incorporated into the Council's GIS system and viewed against a variety of layers to give

## 6. POTENTIAL INVADERS

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 et cetera 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

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

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](mailto: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](http://www.biodiversityireland.ie) or contact the Data Centre directly.

## APPENDIX I – USEFUL RESOURCES

### REFERENCE BOOKS

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- Preston, C. D. & Croft, J.M. (2001). *Aquatic Plants in Britain and Ireland*. Harley Books, England.
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- European Environment Agency (2010). *Towards an early warning and information system for invasive alien species (IAS) threatening biodiversity in Europe*. EEA Technical Report | No. 5/2010
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- IUCN (2000). IUCN Guidelines for the Prevention of Biodiversity Loss caused by Alien Invasive Species.
- Millennium Ecosystem Assessment, 2005. *Ecosystems and Human Well-being: Biodiversity Synthesis*. World Resources Institute, Washington, D.C.

### WEBSITES

#### IRELAND

- National Invasive Species Database <http://invasives.biodiversityireland.ie>
- Invasive Species Ireland [www.invasivespeciesireland.com](http://www.invasivespeciesireland.com)
- BioChange – alien plants in Ireland [www.biochange.ie/alienplants/](http://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](http://www.nonnativespecies.org)

#### EUROPEAN IAS NETWORKS

- NOBANIS – European Network on Invasive Alien Species [www.nobanis.org](http://www.nobanis.org)
- DAISIE – Delivering Alien Invasive Species Inventories for Europe [www.europe-aliens.org](http://www.europe-aliens.org)

#### INTERNATIONAL IAS NETWORKS

- GISID – Global Invasive Species Database [www.issg.org/database/welcome](http://www.issg.org/database/welcome)
- GISIN – Global Invasive Species Information Network [www.gisinet.org](http://www.gisinet.org)
- ISSG – Invasive Species Specialist Group [www.issg.org](http://www.issg.org)

#### LEGISLATION

- Wildlife (Amendment) Act, 2000 - [www.irishstatutebook.ie/2000/en/act/pub/0038/index.html](http://www.irishstatutebook.ie/2000/en/act/pub/0038/index.html)
- The Wildlife (Amendment) (Northern Ireland) Order 1995 - [http://www.opsi.gov.uk/RevisedStatutes/Acts/nisi/1995/cnisi\\_19950761\\_en\\_1](http://www.opsi.gov.uk/RevisedStatutes/Acts/nisi/1995/cnisi_19950761_en_1)
- Convention on Biological Diversity – [www.cbd.int](http://www.cbd.int)
- IUCN/UNEP tematea – [www.tematea.org/?q=node/224](http://www.tematea.org/?q=node/224)



## APPENDIX II - BIBLIOGRAPHY

### ANIMALS

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#### ***Corbicula fluminea* – Asian Clam**

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## APPENDIX III – SPECIES LIST

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



## APPENDIX IV – KEY OBLIGATIONS AND LEGISLATION

European legislation relevant to non-native species		
Wildlife Trade Regulation: Council Regulation (EC) No 338/97 on the protection of species of wild fauna and flora by regulating trade therein Commission Regulation (EC) No 939/97 laying down detailed rules concerning the implementation of Council Regulation (EC) No 338/97 Commission Regulation (EC) NO191/2001 suspending the introduction into the Community of specimens of certain species of wild fauna and flora	1997	Trade-related agreements/Biodiversity conservation
Habitats Directive: Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora	1992	Biodiversity conservation
Birds Directive: Council Directive 79/409/EEC on the conservation of wild birds	1979	Biodiversity conservation
Environmental Impact Assessment Directive Council Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment Council Directive 97/11/EC amending Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment	1985 1997	Environmental protection
Forest Reproductive Material Directive Council Directive 1999/105/EC on the marketing of forest reproductive material	1999	Phytosanitary measures & biodiversity conservation
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	2000	Phytosanitary measures & biodiversity conservation
Plant Protection Products Directive Council Directive 91/414/EEC of 15 July 1991 concerning the placing of plant protection products on the market	1991	Phytosanitary measures & biodiversity conservation
Fish Health Directive Council Directive 91/67/EEC concerning the animal health conditions governing the placing on the market of aquaculture animals and products	1991	Sanitary measures
Animal Health Directives Council Directive 90/425/EEC concerning veterinary and zootechnical checks applicable in intra-Community trade in certain live animals and products with a view to the completion of the internal market.	1990	Sanitary measures
Domestic legislation relevant to non-native species		
Wildlife Act	1976	Biodiversity conservation
Wildlife (Amendment) Act	2000	Biodiversity conservation
Environmental Protection Agency Act	1992	Biodiversity conservation
Heritage Act	1995	Biodiversity conservation
Marketing of ornamental plant propagating material (Amended 1999)	1995	Phytosanitary measures
Marketing of Forest Reproductive Material Regulations S.I. 2002/618	2002	Forestry
The Foot and Mouth Disease (Hay, Straw and Peat Moss Litter) Order	2001	Sanitary Measures
Forestry Act	1988	Forestry
The Fisheries Act	1980	Fisheries
Dumping at Sea Act	1996	Marine
International instruments concerning non-native species relevant to Ireland		
Convention on Biological Diversity (CBD)	1993	Biodiversity Conservation
Bern Convention on conservation of European wildlife and Natural Habitats.	1982	Biodiversity Conservation
Bonn Convention on the Conservation of Migratory Species of Wild Animals	1983	Biodiversity Conservation
IUCN Guidelines for the prevention of Biodiversity loss caused by alien invasive species	2000	Biodiversity Conservation
Convention on Wetlands of International importance especially as Waterfowl Habitat (Ramsar Convention)	1975	Biodiversity Conservation
Agenda 21	1992	Biodiversity Conservation
Ministerial Conference for the Protection of Forest in Europe	1993	Biodiversity Conservation
International Maritime Organisation (IMO) Guidelines for the control and management of ships' ballast water to minimise the transfer of harmful aquatic organisms and pathogens	1997	Aquatic environment
International Council for Exploration of the Sea (ICES) Code of Practice on the Introductions and Transfers of Marine Organisms, 1994	1994	Aquatic environment
United Nations Convention on the Law of the Sea (UNCLOS)	1994	Aquatic environment
Food and Agriculture Organisation (FAO) Code of Conduct for Responsible Fisheries	1995	Phytosanitary measures
International Plant Protection Convention (IPPC)	1951	Phytosanitary measures
Food and Agriculture Organisation (FAO) Code for the Import and Release of Exotic Biological Control Agents.	1996	Phytosanitary measures
Convention on International Trade in Endangered species of wild fauna and flora (CITES)	1975	Trade-related agreements
WTO Agreement on Sanitary and Phytosanitary measures (SPS Agreement)	1995	Trade-related agreements
International Civil Aviation Organisation (ICAO) Resolution on Preventing the Introduction of Invasive Alien Species	1998	Transport

Table taken directly from the Eastern River Basin District Programme of Measures, 2009 – 2015.