

**Central Fisheries Board** 

An Príomh-Bhord Iascaigh

# **Aquatic Invasive Non-Native Species in Ireland** – An Environmental Disaster Waiting to Happen

Dr Joe Caffrey







# What Are Invasive Non-Native Species?

Invasive non-native species (synonym alien species) are defined as species whose introduction and/or spread threaten biological diversity or have other unforeseen impacts. Invasive species represent one of the greatest threats to biodiversity worldwide, second only to that caused by direct habitat destruction. They also pose the greatest threat to fragile ecosystems, such as islands. Their introduction is acknowledged to be one of the major causes of species extinction in freshwater ecosystems.



Infestation of Nuttall's pondweed in Carrigadrohid Reservoir, County Cork

# What Threat Do They Pose?

Invasive non-native species pose a growing threat to Ireland's unique biodiversity but also pose a significant threat to economic interests such as agriculture, forestry, fisheries and tourism. The impact of invasive non-native species on biodiversity may be mediated by competitively excluding or outcompeting the less robust native species, by preying on native species or by altering the natural aquatic or riparian habitat in which they reside. They can also adversely impact the recreational and amenity use of infested watercourses, and hence tourism, by restricting angling, boating, swimming and other water-based leisure pursuits. They can further impact upon commerce and industry by presenting flood hazards, clogging engines, turbines and water intake pipes. A significant financial cost to the economy will be incurred as a consequence of the above.

# Introduction and Expansion in Ireland

Rapidly accelerating human trade and international travel have allowed both deliberate and inadvertent movement of species between different parts of the globe, often resulting in unexpected and sometimes disastrous

consequences. While increasing globalisation is increasing the rate of nonnative species introductions to Ireland, it is considered that climate change will have a substantial impact on species assemblages in the coming years by enabling some non-native species to reproduce and/or overwinter successfully, at the expense of our indigenous communities.

# **Invasive Species and European Directives & Conventions**

Invasive non-native (alien) species are included as part of the assessment of pressures and impacts that will determine ecological status for the Water Framework Directive (WFD). It is widely recognised that invasive non-native species have the potential to compromise the achievement of good ecological status (GES, as per WFD) for waterbodies, and the conservation objectives ('to maintain or restore, at favourable conservation status') for natural habitats and species (as per the Habitats Directive). The obligation on the Irish Government to protect Natura 2000 sites and features, under the Habitats Directive, offers a further important driver in the fight against invasive non-native species.

As a signatory to the Convention on Biological Diversity (CBD) the Irish Government is required to, as far as is possible and appropriate, 'prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species'. Signatories must report on what has been done to implement the Convention and how effective this is in meeting the objectives of the Convention.



Japanese knotweed encroaching banks of a river flowing through Lenanne, County Galway

# 'High Impact' Invasive Aquatic Species in Ireland

Most of the problematic aquatic invasive species present in Ireland today were introduced in the last 20 years, and a number have been first recorded here as recently as 2005. The aquatic non-native species that are most

invasive and that currently represent the greatest threat to biodiversity and commerce in Ireland ('high impact species') include the fishes – Chub and Dace, the macroinvertebrates – Zebra mussel and Chinese mitten crab, the riparian plants – Giant hogweed, Japanese knotweed and Himalayan balsam, and the aquatic plants – Curly leaved waterweed, Parrot's feather, Fringed water lily, Water fern, Nuttall's waterweed and New Zealand pigmyweed. This list of 'high impact' invasive species is small by comparison with the numbers recorded in Great Britain and Europe. Relatively little research in Ireland has been conducted on these species (except Zebra mussel) and details regarding their current distribution, ecology under Irish conditions, rate of spread or direct impact on native species and communities are scant.

## Case Study - Lagarosiphon major in Lough Corrib

While there are relatively few high impact invasive aquatics in Ireland at this time, those that are present are having a significant adverse impact on the environment and on the economy in affected areas. A case in point is *Lagarosiphon major* in Lough Corrib. This large western lake is of major conservation importance and includes 12 habitats listed on Annex 1 of the EU Habitats Directive. The lake supports one of the most extensive beds of stonewort (*Chara* species) in Ireland. These *Chara* species beds are an important source of food for waterfowl and provide a multitude of refugia for fish-food invertebrates.

Lagarosiphon major is a native of southern Africa and is a submerged, rooted perennial plant that can grow to a depth of 6.5m in clear water. The stems are fragile and break easily under the influence of wind or wave action. This aids in the natural spread of the plant, as reproduction and dispersal are mediated solely *via* plant fragments.

*Lagarosiphon major* was first identified in Rinerroon Bay, Lough Corrib, in April 2005. At that time *circa* 12 ha of the bay was overgrown with the weed. A biomass 138 tonnes per hectare of *Lagarosiphon* was recorded in the bay at that time. By October 2007 a further 7.4 ha of the bay had been infested with this highly invasive weed.

In 2005, *Lagarosiphon* was recorded from nine shallow bays in the upper lake. In 2006 the number of bays or lake areas from which the weed was recorded increased to 24 and by September 2007, some 64 bays were infested.

In those areas of the lake in which *Lagarosiphon* is well established, the plant is having a significant negative impact on indigenous macrophyte communities. Beneath the dense canopy cover produced by *Lagarosiphon*, virtually no incident light can penetrate. Thus, in bays previously characterised by extensive *Chara* species meadows, only *Lagarosiphon* is now present.

It is anticipated that the impact on natural indigenous fish communities in the lake will also be significant as the habitat conditions created by dense *Lagarosiphon* stands are not those preferred by wild brown trout. By contrast,

this habitat structure will probably favour the proliferation of coarse fish, perch and pike in Lough Corrib.

In 2007 pilot trials to determine the most appropriate control methods to remove *Lagarosiphon* were conducted in Rinerroon Bay. The results are currently being evaluated.

## Legislation

Current legislation in Ireland to prohibit the introduction and sale of 'high impact' invasive non-native species is sadly lacking. However, in November 2007, the Minister for Environment, Heritage and Local Government committed to introduce regulations under the Wildlife Act that would prohibit the possession and introduction of *Lagarosiphon major* (one of the 'high impact' invasives currently present in Ireland). The Minister stated that this regulation will be introduced in the first quarter of 2008. It will be important for the CFB, and other interested parties, to have input into the construction of this regulation.



Fringed water lily, Ballyhonock Lake, Youghal, County Cork

It will also be important to develop a package of legislative proposals designed specifically to provide a more coherent and comprehensive framework for tackling invasive non-native species.

# The Urgent Need for National Control – 'A Stitch in Time....'

Of the expanding list of invasive species that threaten the ecology of Irish freshwater ecosystems, a significant proportion of these could potentially be

eradicated with swift, thorough and co-ordinated effort, *on a national basis*. Those most likely to respond positively (i.e. be successfully eradicated) are those that are currently localised in distribution or have most recently invaded the country. The exceptions to this, probably, are the three riparian plant species, dace, Zebra mussel and Nuttall's Pondweed, all of which are already widespread within the country.

In Ireland we may consider ourselves lucky to be *in the early stages* of a progressive invasion process by unwanted, non-native species. Many aquatic plant and animal invasive species that are currently reaping ecological and economic havoc in England and on the Continent have not yet reached our shores (or have not yet been recorded here). It is only a matter of time, in the absence of timely and informed intervention, and the implementation of rigorous biosecurity measures, before significant numbers of these unwelcome visitors are recorded on this island. Furthermore, with each season that passes, these organisms are expanding their range and gaining an even more secure foothold. Concomitant with this spread is a significant escalation in control costs and the added risk that the organisms may get beyond our control capacity (as is probably the case with the Zebra mussel).

A five-year rolling programme of research and control is required. Any shorter time period would be insufficient to conduct the necessary field and laboratory research, to trial and implement appropriate control measures and to monitor the efficacy of these measures.

### Who Will Assume Responsibility?

To adopt a piecemeal approach, where disparate groups or organisations target individual species in specific locations for control and/or removal, is not the way to address this national problem. It is imperative that a single coordinating body assumes responsibility for documenting the presence, distribution and spread of aquatic invasive species, for conducting scientific research and for co-ordinating appropriate prevention (biosecurity), control, eradication and/or containment procedures throughout the island of Ireland. This body would provide the point of contact for information on these species as well as providing a rapid reaction service to respond to reported sightings of potential new species.

To date, no single body has come forward to champion the cause of invasive aquatic species research and control in Ireland. As a consequence, these species are continuing to expand their range and to wreak environmental havoc within the country. Not alone that, without swift and scientifically informed intervention, new species will continue to enter and establish in watercourses throughout the country. It is proposed that the Central Fisheries Board (CFB) would undertake and coordinate this programme, in partnership with interested bodies and stakeholders north and south of the border.

The CFB has a track record in successfully tackling invasive aquatic (e.g. milfoil) and riparian (e.g. Giant hogweed) species and is to the fore in developing and implementing a major research and control programme for *Lagarosiphon major* in Lough Corrib. The Board has gained considerable

national profile in this new and (regrettably) expanding area. This reflects the specialist expertise and the practical experience that the Board's scientific and support staff has in identifying new invasive species, in creating awareness through publicity campaigns and in developing environmentally sensitive prevention, control and eradication programmes. Through the Regional Fisheries Boards, there is ready access to practically all of the waterbodies in the country and a support infrastructure that will provide invaluable back-up throughout the life of any research and control programme.

# Funding

No funding has been made available through the Department of Marine, Energy and Natural Resources, or its predecessor, to tackle the growing problems posed by invasive species. In 2007 a total of €135,000 was allocated to the CFB to conduct preliminary research and to trial control measures on two invasive species – *Lagarosiphon major* in Lough Corrib and Chub in the River Inny. This funding was provided by the NPWS, OPW and the Western RBD. In 2008 come €300k was eventually obtained following a great deal of 'begging'.



Chinese mitten crab from Waterford Estuary, County Waterford

Funding to match the requirements of a national, strategic and comprehensive education, research and control programme for invasive aquatic non-native species in Ireland is urgently required. Appropriate and sufficient investment is needed if we are to reduce, or avert, far greater future pressures and costs resulting from the introduction and spread of invasive species.

Dr Joe Caffrey Senior Research Officer

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