



**Invasive Species & Roads Workshop -
Key Findings**

May 23rd 2013

Trinity College Dublin

Introduction

The SIMBIOSYS project <http://www.tcd.ie/research/simbiosys/> held a one day conference/workshop to communicate key messages from researchers, government, the NRA and industry regarding Invasive Alien Species (IAS) and roads in Ireland.

The speakers were Pádraig Whelan (University College Cork), Christian Nea (National Roads Authority), Gerry Lecky (National Parks & Wildlife Service), Paul Murphy (EirEco Environmental Consultants), Micheline Sheehy Skeffington (NUI Galway), Sean Hathaway (Swansea Council, Wales), John O'Donovan (O'Donovan Agri Environmental Services) and Rosalyn Thompson (University College Cork).

Key points from the meeting are presented below. Individual presentations are also available on the website for further information:

<http://www.tcd.ie/research/simbiosys/outputs/conferences/invasive-species-roads.php>

Invasive aliens

There are legislative, economic and conservation pressures to respond to Invasive Alien Species (IAS). Many IAS were not recognised as such when initially introduced, often as horticultural or garden plants, as well as road landscaping. IAS often have traits such as clonal growth/vegetative spread, prolific reproduction and effective dispersal.

A number of species have been identified at different times by different groups, but some are common (in bold): **Himalayan Balsam**, **Japanese Knotweed**, **Giant Hogweed**, **Giant Rhubarb**, **Hottentot Fig**, **Rhododendron ponticum**, Buddleja, Montbretia, Winter Heliotrope, Traveller's Joy, plus a handful of others.

Invasibility differs by region, e.g. *Gunnera tinctoria* (Giant Rhubarb) is abundant in milder coastal regions of SW Ireland, Mayo, Cornwall, while Winter Heliotrope seems to have potential for invasibility in Cork.

Road treatments

Road landscaping treatments traditionally involved a horticultural approach. NRA 2006 guidelines promoted ecological approach – native species, subsoil, natural recolonisation, hay-strewing (provides seed and mulch), soil management to reduce alien establishment etc.

Roads can promote the establishment and dispersal of IAS. During the construction phase landscape perturbation and the movement of machinery and materials to and from depots can create disturbance allowing colonisation by IAS propagules, as well as transporting propagules along the road corridor. Road maintenance can also promote dispersal.

IAS can inflict damage to road infrastructure, soil erosion and collapse of river banks, colonization of adjacent habitats and facilitation of future spread, have an adverse effect on landscape quality and reduce the biodiversity value of roadside habitats.

Legislation

IAS in Ireland are calculated to cost at least €260 million. The EU Commission has concerns with how IAS are addressed – currently this is happening in a very fragmented and incomplete way, through a number of EU legislative instruments, which has led to a lack of consistency in approach across the EU and a lack of leverage for member states to take action against IAS. A new EU Regulation/Directive is due to be published soon.

Regulation 27 of the Birds and Natural Habitats Regulations 2011 (Regulations 49 and 50 are also relevant) defines the duties of public authorities relating to nature conservation. Public authorities (including ministers of government and An Bord Pleanála) must take steps to avoid damaging European sites. Local Authorities are responsible for maintenance of national roads; IAS can be introduced and spread to designated areas.

Regulation 49: anyone who plants, disperses, spreads or otherwise grows specified plants is guilty of an offence. The interpretation of this regulation is unclear, but can be taken to mean that local authorities, in the maintenance of national roads, shouldn't cause the spread or dispersal of plants. The plants (listed in Schedule 3) can be seen on many national roads, e.g. giant hogweed, giant rhubarb, Japanese knotweed.

Regulation 50: (not yet in force) this is an expansive provision, making it an offence to import, buy, sell, breed, reproduce or propagate, offer or expose for sale plant species or vector material listed in the 3rd Schedule. It will be an offence to advertise, publish a price list, transport or distribute these plant species (including online). Risk assessment on the species included in the 3rd Schedule, as well as engagement with stakeholders (e.g. horticultural industry, pet shop owners) will be carried out prior to commencement.

Irish response to IAS

The Invasive Species Ireland project ran from 2006 – 2012; a new all-Ireland project will commence later on this year.

NRA

The NRA is an independent statutory body established as a result of the 1993 Roads Act. Its mission is to deliver a network of national roads in a safe, cost-effective and sustainable manner. It specifies standards and guidelines in relation to construction and maintenance of roads.

NRA and Local Authority compliance

NRA has produced Environmental Assessment Guidelines (originally produced in 2008, updated in 2010), which outlines current best practice for management of invasive non-native plants (and noxious weeds). The guidelines provide:

- An introduction to non-native invasive plants and noxious weeds;
- An overview of legislation (to 2010, so doesn't include 2011 Birds and Natural Habitats regulations);
- An assessment of risks at EIA phase (assess presence and abundance, control measures, consider infestations outside the road footprint);
- Guidelines for control during site clearance and construction;
- Guidelines for control during maintenance; and
- Advice on identification, ecology and control of invasive non-native species and noxious weeds.

Management of IAS during road construction

The NRA Guidelines on The Management Of Noxious Weeds And Non Native Invasive Plant Species On National Roads lists 9 invasive plants and 5 noxious weeds. (<http://www.nra.ie/Publications/DownloadableDocumentation/Environment/file,16172,en.pdf>)

Phases in construction of a road scheme:

1. Planning phase: constraints study – identifies the big issues in the landscape (SACs, physical structures etc.), route selection – several options, EIA – on the ground for a detailed look.
2. Pre-construction – while awaiting permission to go ahead with construction there is a requirement to update information during pre-construction surveys.
3. Construction – can take 2-3 years or longer.
4. Operation and maintenance.

Control measures during planning

During the EIA, detailed mapping along the route and beyond is carried out, and the location and extent of invasive species is plotted on a habitat map. Records are submitted to the National Biodiversity Data Centre (NBDC), and locations of IAS are flagged to the lead consultants of the project. EIAs include ecological, archaeological and geological surveys, and some surveying may risk dispersal of IAS, e.g. equipment or machinery moving throughout the landscape, this needs to be planned for.

The Environmental Impact Statement (EIS) describes the existing environment and describes what impact the road scheme will have and any mitigation measures proposed. For invasive plants, it will state the species, extent and impacts, and specify mitigation and control measures (including area of treatment, type of treatment, risk of re-infestation, requirement for the management plan – the EIS will transfer into contract documents for the road scheme by the engineering/construction company which will need all specifications to be documented. There may be multiple species requiring different management, codes of practice etc. If these issues are not dealt with during the EIS stage, they will not get into the contract or the Environmental Operating Plan.

Control measures during construction

A detailed assessment is required prior to commencement of construction (there may have been changes since the EIS was carried out), including a detailed survey determining the extent of plants, sensitivity of local environment (including seasonality – there may be seasonal restriction, may be SACs or sensitive habitats which affect which control measures may be used), establishing how to minimise the risk of transfer of propagules, etc. The Management Plan will be established at this stage, those responsible for IAS will be identified. This can be contractually difficult, but if specified in the EIS that the contractor has responsibility then the developer is obliged to identify the responsible organisation to carry out control measures. The Management Plan will detail species, sensitivity, control plan, disposal measures (IAS are often buried < 1.5m on site, but this is not sufficient for Japanese knotweed, for example, and not all landfills will take IAS) and soil management. The implementation schedule needs to be documented and incorporated into the Environmental Operating Plan.

Control measures need to be site-specific, and there will be need for ongoing treatment and control. Where there is a risk of colonisation from a site just outside the road corridor, a temporary Compulsory Purchase Order for the stand of invasive species can be sought to allow eradication. The use of herbicides should be minimised, especially when adjacent to water courses; consultation may be required with Inland Fisheries Ireland and/or the National Parks and Wildlife Service.

Control of Japanese Knotweed

Chemical control is currently the best option available for Japanese Knotweed. Glyphosate, a systemic herbicide, produces the best results, but timing is critical for application. From onset of flowering to dieback is the ideal time for foliar application. Stem injection is also effective but can be labour intensive and hence expensive.

Giant Rhubarb

Giant Rhubarb (*Gunnera tinctoria*) was introduced to Ireland in the 1800s as an ornamental garden plant. Genetic, climatic or environmental changes have resulted in it becoming established in the wild; it was first recorded as naturalised near Leenane and on the Corraun peninsula in Mayo by Praeger. By 2002 it was recorded in 12 vice counties.

Giant Rhubarb is prolific, producing large flower spikes (up to 7 per plant), with each spike capable of producing more than 100,000 seeds. Reproduction is mainly through seeds, although it can also spread vegetatively. It is generally found in disturbed habitats, and can be invasive in some areas, e.g. Achill. It has recently expanded its range in Ireland, which may be due to genetic adaptation to the climate.

Giant Rhubarb should be monitored, and eradicated/controlled where possible. Care should be taken with identification, as it can be confused with *Gunnera manicata*, which does not appear to be invasive.

Developing landscaping and management regimes that resist invasion by IAS

In a project carried out by Rosalyn Thompson as part of her PhD research, four IAS were selected to study invasion resistance of landscaping treatments both before and after the NRA Guidelines were produced. The species studied were Japanese Knotweed, *Rosa rugosa*, Buddleja and Winter Heliotrope. Four treatments were included in the study: bare topsoil; bare subsoil; SGSM (Standard grass seed mix, pre-guidelines, turf removed from an established community) and Natural Recolonisation (post-guidelines, turf removed from an established community). Propagules used were seeds, stems and rhizomes for Japanese Knotweed and *Rosa rugosa*, seeds and stems for Buddleja, and rhizomes for Winter Heliotrope.

For Japanese Knotweed, the only growth from seeds was on bare soil (but viable seeds do not seem to be regarded as problematic, cf NRA manual), stems did not produce much growth, but rhizomes generated shoots in all treatments. Post-guideline treatments actually produced more growth from rhizomes. *Rosa rugosa* showed seed growth only on bare soil, while stems and rhizomes generated shoots on all treatments. Most growth for Buddleja was recorded on bare topsoil and natural recolonisation treatments. Winter Heliotrope was found to produce leaves in all treatments.

Disturbance was found to be a major factor in allowing establishment of IAS; seeds and stems only grew on disturbed sites. No difference was found between the pre- and post-guideline treatments, indicating that the post-guideline communities, with higher numbers of native species, do not confer a greater invasion resistance. Ability to invade vegetated habitats (as opposed to disturbed) depends on plant species.

IAS – city and council of Swansea perspective

Sean Hathaway of Swansea Council, Wales, gave an overview of the control measures employed in Swansea. Japanese Knotweed control began in 1991, with an urban survey in 1992 showing 48

hectares containing Japanese Knotweed. This area increased to ca 63 hectares in 1998. Infected sites become less attractive to developers, as planning conditions for eradication/control of knotweed are added to planning approvals where it is found. Each month, approximately 6 planning applications are received with knotweed issues, and other IAS can also be problematic.

Treatment and control are limited by funding. Sites of conservation value, highways, areas where there have been complaints or safety/aesthetic concerns are more likely to get funding for control. Funding can come internally from the Highways Department, Housing Department etc., or externally from regional and national bodies.

Control is primarily through application of herbicides, with chemical stem injection proving particularly effective for Japanese Knotweed. A biological control initiative lead by CABI (Centre for Agricultural Bioscience International) in conjunction with stakeholders is underway in the UK. A sap-sucking psyllid (*Aphalara itadori*) has been released in 2011, 2012 and 2013, with the aim of control, not eradication.

There is a need to raise awareness of the threat of IAS, and to develop and maintain biosecurity protocols to prevent the spread of propagules. Climate change may increase the risk of spread, as some IAS may be able to grow throughout the year.