

Invasive alien plants on Irish roads – an overview of the biological challenges

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Context

- Pressures to respond to invasive alien species – legislative, economic, conservation
- The field of invasive biology/management is reasonably recent and very active
- We don't know all the answers
- Some of the material that was introduced and planted was not known to be invasive
- Gather ideas, exchange experiences in the hope of improving the situation

Outline

- Origins and distribution
- NRA (2006) Guide to Landscape Treatments on Irish Roads
- Which ones are of concern?
- Biology/ecology of invasive alien plants
- Effects of invasive alien plants
- Road infrastructure as promoter of dispersion
- Control

Origins

- Title – non-native invasive alien plants
- Outside of their native ranges – human mediated (accidental or deliberate)
- Cause serious negative effects to species, habitats, economies, infrastructure, human health
- Examples
 - *Rhododendron ponticum* (“Rhododendron”)
 - Japanese knotweed
 - Himalayan balsam

“Rhododendron” - gardening



Japanese knotweed - gardening



Himalayan balsam- gardening

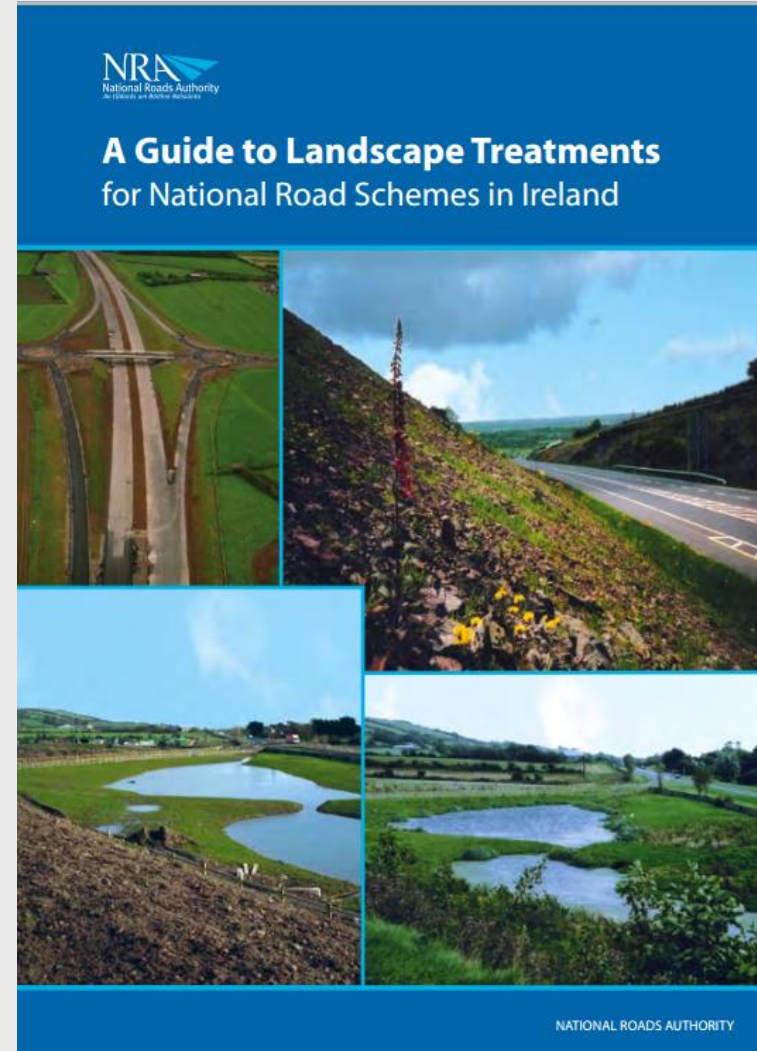


Road landscaping = gardening???



NRA (2006) Change in landscaping practices (less gardening)

- Horticultural to ecological landscape design approach
- Reducing inputs – mowing fertilisers, pesticides
- Native species of native provenance
- Use of subsoil – if possible
- Natural recolonisation
- Help to reduce alien establishment
- Legacy on existing road landscaping treatments



Natural recolonisation



Open habitat mosaic

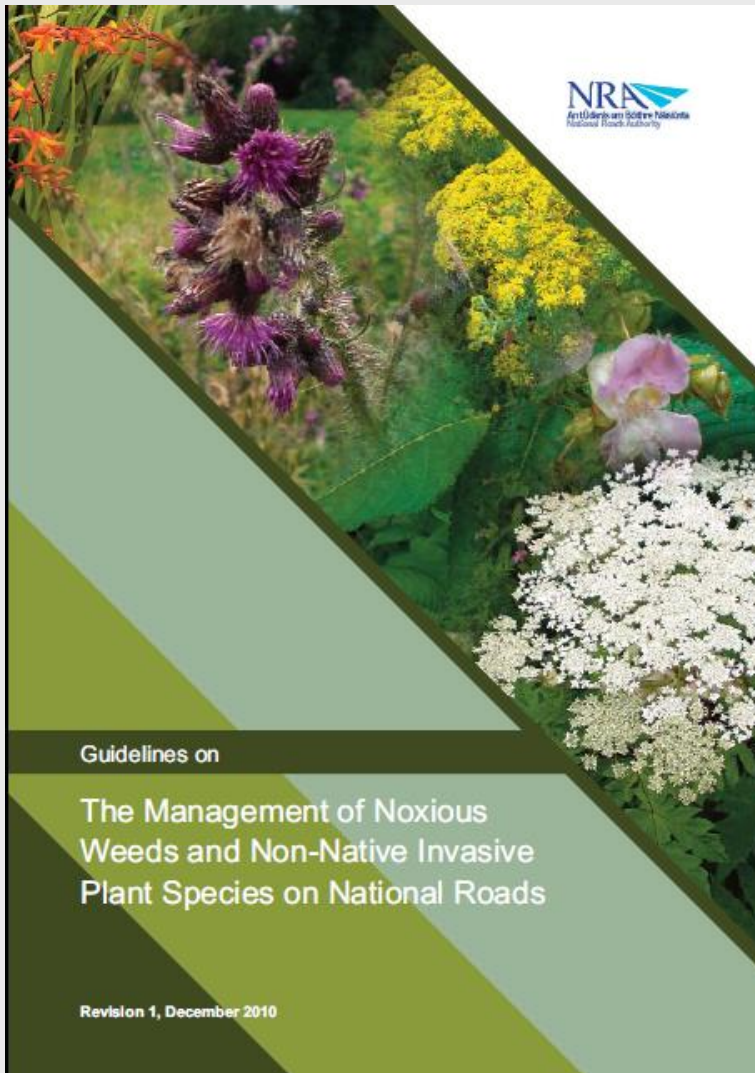


Hay strewing (locally sourced)



Further management of invasive alien plants on roads (more later)

- 2011 European Communities (Birds and Habitat Regulations) – S.I. 477



So, which ones are of most concern on roads?

- Field Guide to Invasive Species Ireland (2nd Ed): Himalayan Balsam, Japanese Knotweed, Giant Hogweed, Giant Rhubarb, Hottentot Fig (+7 FW aquatics and 1 marine)
- NRA (2010): Himalayan Balsam, Japanese Knotweed, Giant Hogweed, Giant Rhubarb, Rhododendron, Buddleja, Montbretia, Winter Heliotrope, Traveller's Joy
- S.I. 477 of 2011: Himalayan Balsam, Japanese Knotweed, Giant Hogweed, Giant Rhubarb, Hottentot Fig, Rhododendron, plus 9 others (not mentioned by the previous two works (+ 13FW aquatics and several marine species))

Generalities Biology/Ecology

- Concept of propagules
- Prolific reproduction
- Vegetative (clonal) reproduction – resource use
- Fragmentation
- Rapid growth
- Often more vigorous than in native ranges – predator release
- Age at first seed set
- Time lag
- Seed longevity
- Seed bank formed
- Stem partitioning
- Perturbation regimes
- Vacant niches
- Nitrogen fixers (some cases)
- Dispersal mechanisms

Effects

- McDonaldisation
- Burney “Biological invasion is really a bigger impact than a lot of horrible things that we hear about all the time, like global warming. Many of the impacts of global warming could be reversed in time, but once you homogenise the biodiversity of the world, there’s really no turning back from that”.
- Effects greatest on islands – Hawaii, New Zealand, Galápagos Islands, Ireland (?)
- May outcompete native vegetation (incl. shading effects)
- May attract pollinators away from native species
- May not provide an alternative food source
- May not provide habitat for other fungi, plants and animals
- May change in soil conditions and soil communities
- May cause erosion – siltation
- Damage to infrastructure – other speakers

Himalayan Balsam attracts Bumble Bee



Roads promote establishment and dispersion

- Road construction – perturbation on a landscape scale!!
- Road maintenance – local perturbation – Three-cornered leek, *Montbretia*, run-off carrying propagules (of flailed/strimmed alien plants)
- Road materials depots - sources of invasive aliens
- Attenuation ponds - establishment and dispersion of aquatic invasive aliens
- Slipstream effect – Traveller's joy, *Buddleja*
- Dumping of garden waste – establishment
- Roadside invasive plants as sources of further natural dispersion by animals, wind, water

Dispersal through maintenance



Road materials depots





Control (more later)

- No “magic bullet”
- Manage vegetation to promote resistance
- Early identification and early treatment reduce costs
- Accurate costing based on distribution, density, treatment
- Work with the biology/ecology of the species: let density effects do some of the work; knowing the age/timing of seed set can buy time; work down the catchment; treat outliers first
- Consolidate any gains by follow-up checks and control
- Use techniques that minimise herbicide use – saves money and protects non target species
- Physical removal creates soil disturbance – use with care to avoid perturbation which promotes alien plants and can cause erosion of soil
- Stem partitioning can be a problem in woody species
- Dispose of correctly – don’t turn disposal into dispersal

It's not easy

- Roads inherently involve perturbation
- Road construction and maintenance involves moving materials that can transport invasive alien plants
- Avoid the magic bullet concept
- Keep the biology and ecology of the native and alien plants in mind
- A single propagule can start an invasion
- Control is easier and cheaper at the early stages of establishment
- Consolidate your gains – don't skimp on follow up checks and treatment