

Sectoral Impacts on Biodiversity and Ecosystem Services

Work Package 2:

Impacts of Road Landscape Treatments on Biodiversity within Road Corridors and Adjacent Ecosystems

P. Whelan, ERI, BEES, University College Cork





NUI Galway OÉ Gaillimh



Roads in the landscape



- Breaks in continuity of landscape features?
- Opportunity for creation of habitats and continuity?

Road landscapes as ecosystems

•Are the species/communities on roads different from surrounding communities?

•Do the

species/communities on roads interact with surrounding communities.

Provision of continuity of habitats and movement of fauna.
Potential to enhance biodiversity in a

landscape?



•Ecosystem services (predation, biocontrol, carbon fixation, pollination, rainfall attenuation, flood prevention, etc.).

Roads - Biodiversity at three levels

- Landscape diversity creation, restoration, compensation and/ or replacement in largely agricultural landscapes (not reported here).
- Species level. Plant and animal diversity along roads.
- Gene level. Whitethorn







Roads - Objectives

•Biodiversity on roads

•Interactions between biodiversity on road and surrounding systems?

•Management of biotic and abiotic landscape treatments promote invasion resistance to aliens



•Impacts of road management on intraspecific genetic variation

•Guide to landscape treatments for national road schemes in Ireland (NRA, 2006)



A Guide to Landscape Treatments for National Road Schemes in Ireland (NRA, 2006)

- Pre-Guidelines
- Standard agricultural grass seed mixes
- Use of plants available in the horticultural market
- Highly fertile topsoil with added fertilisers
- High maintenance chemically & physically
- A horticultural outcome

• Post-Guidelines

- Ecological landscape design
- Verge fits with wider landscape
- Native species of local provenance
- Natural recolonisation
- Subsoil where possible
- Low maintenance
- Increased sustainability

Both pre and post treatments in place in 2009

New Approach to Verge Treatments

Planted (Rock/Scree)





Natural Recolonisation (Rock/Scree)

Planted (Soil Slope) Standard Grass Seed (Soil Slope)

SGSM (Wider Verge)









Open Habitat Mosaic (Soil Slope/Wider Verge)

Hay Strewing (Soil Slope/Wider verge)

Distribution of study sites



300km transect Tralee to Rosslare

Sampling of roaded landscapes

Road	
Immediate Verge A	\rea
Wider Verge Area	• •
Hedgerow/Fence-	ine
Field Margin	••
Adjacent Field	• • •



Wider Verge Sand Bed



Field Margin Quadrat adjacent Pitfall

- Position of Quadrat and Pitfall Trap
- Position of Sand Bed

Biotic sampling and abiotic measurements taken at road sites

Biotic

- Pitfall traps
- Plant quadrats
- Hedgerow surveys
- Sand beds
- Mammal traps
- Bird surveys
- Soil seed bank

Abiotic

- Grid references
- Hedgerow aspect
- Margin widths
- Slope
- Weather
- Soil nutrients
- Photographic record
- Pan traps (L. Mountsey)

Soil Slopes: Pre vs Post Guidelines and Adjacent Field



Below ground plant communitySoil seed bank (more later from R. Thompson)



Carabid Community Structure & Road Landscaping



Invasion Resistance (ongoing).





Japanese Rose Rosa rugosa Pics. Wikimedia Commons

Thanks to Tracy Smith Kerry Co. Co.

Long term, large scale, experiment M7 – Castletown to Nenagh

Biodiversity resulting from different treatments (natural recolonisation, hay strewing, standard grass seed mix, commercial wildflower seed mix). Major part completed in Nov 2010 Atkins, Bowen-Somag (B. Barron), J.Kelly (Laois

Co. Co.)



Biodiversity at the genetic level

C. Spillane team NUIG

- Effect of road landscaping on gene flow in *Crataegus monogyna* (Whitethorn).
- All populations (from Ireland and mainland Europe) indicate that all samples belong to a single gene pool.
- High levels of inbreeding which could be a result of founder effect.



Implications for discussion on local provenance - Jones and Evans (1994), Jones et al. (2001) – differences in phenology, thorniness and resistance to mildew. Not resolved.

Implications – The future?

- Early days!
- Preliminary findings
- Road communities are different from those of improved agric grassland.
- Of the groups processed, pre vs post treatments vary from group to group but post shown to be as good as, if not better than, pre for biodiversity and is more sustainable because of lower inputs, so post is to be preferred.



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Thank you EPA

• Any Questions ?



St Patrick's Cabbage, Rock Face, Macroom, Co. Cork.

