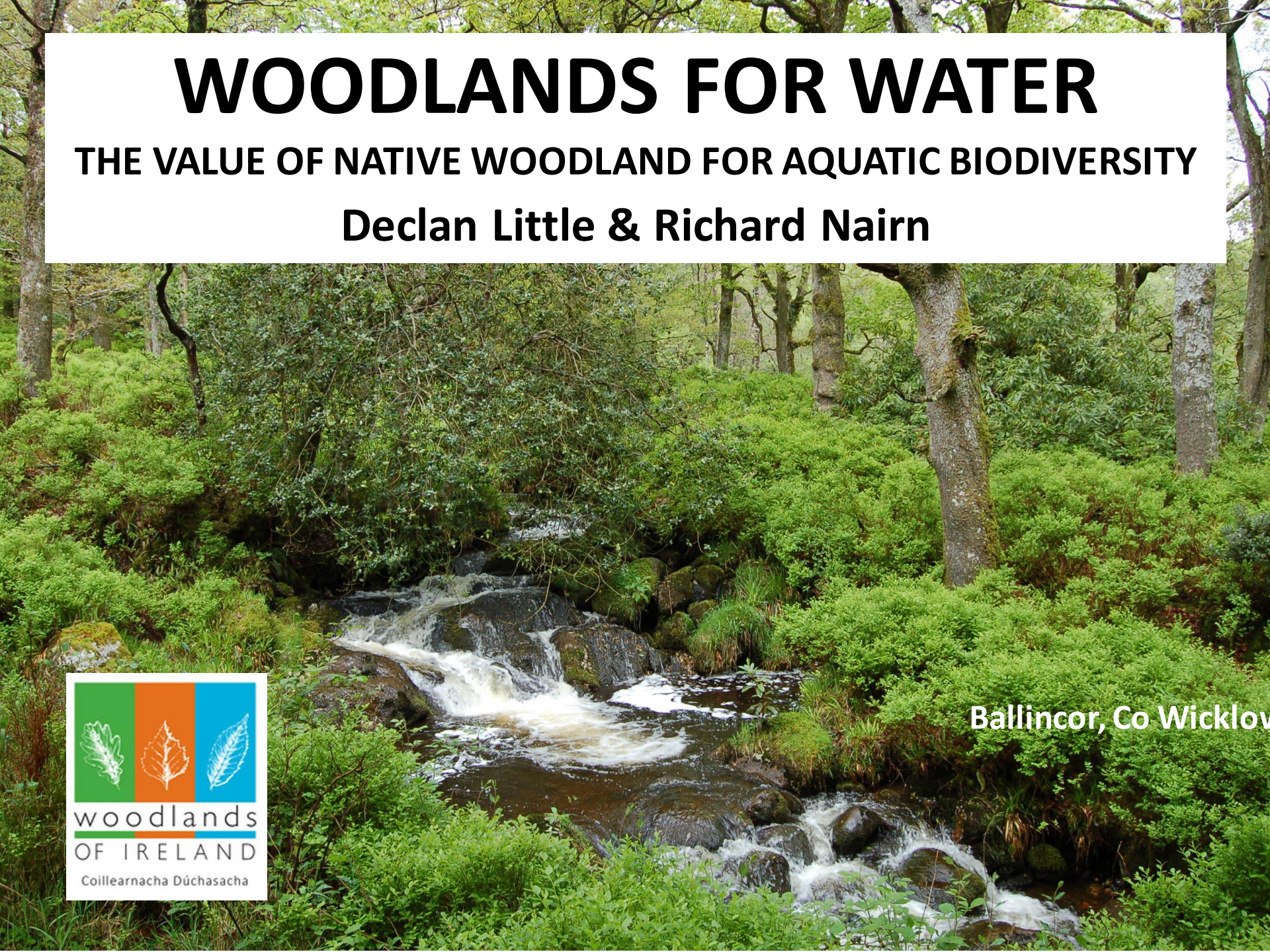
WOODLANDS FOR WATER

THE VALUE OF NATIVE WOODLAND FOR AQUATIC BIODIVERSITY

Declan Little & Richard Nairn



Ballincor, Co Wicklow

woodlands OF IRELAND
Coillearnacha Dúchasacha

Surviving native woodlands 1600

McCracken (1971) *Ireland's Woods since Tudor Times*

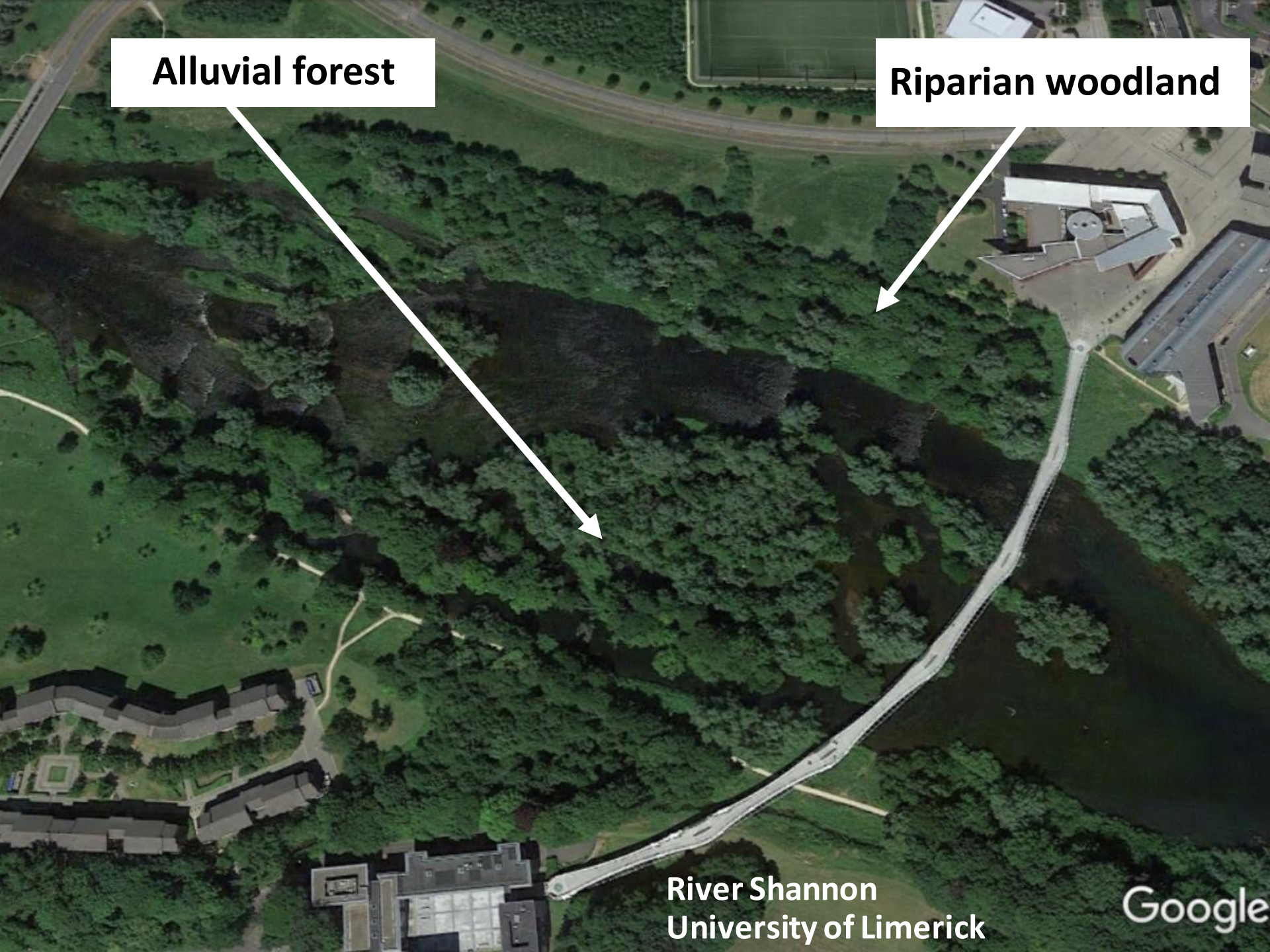
Woodland on Avonmore River, Co. Wicklow c.1800

woodlands OF IRELAND
Coillearnacha Dúchasacha

Erriff River, Co Galway

Riparian woodlands are:

- **Native woodlands growing on land immediately alongside streams and rivers including the riverbank itself**
- **Native woodlands on river floodplains that interact with the river in times of flood**
- **Native woodlands on periodically flooded ground around lakes**


Alluvial forest
Riparian woodland
River Shannon
University of Limerick
Google

Native riparian woodland
Ecological functions and benefits » Ecosystem Services

- Woodland biodiversity
- Instream biodiversity
- Connectivity
- Temperature regulation
- Flood control
- Carbon sequestration
- Nutrient trapping
- Silt trapping
- Erosion prevention
- Partial shading
- Angling benefits

woodlands OF IRELAND
Coillearnacha Dúchasacha

Bankside erosion

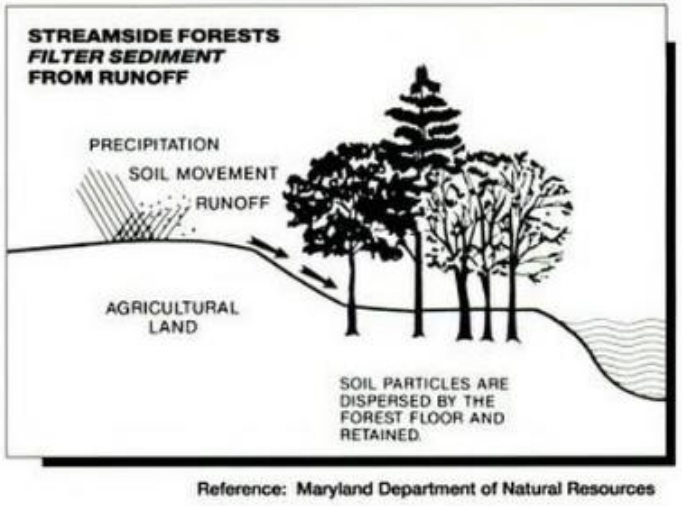
- Leads to siltation which blankets spawning gravels downstream
- Riparian woodland binds the sediment preventing erosion

Avonmore River, Co Wicklow

woodlands OF IRELAND
Coillearnacha Dúchasacha

- Streamside forests very effective in removing excess nutrients and sediment from surface runoff and shallow groundwater
- Ameliorate the effects of many pesticides and provide dissolved and particulate organic food maintaining high biological productivity and diversity in stream

Riparian Forest Buffers: Function and Design for Protection and Enhancement
By David J. Welsch, U.S. Department of Agriculture, Forest Service



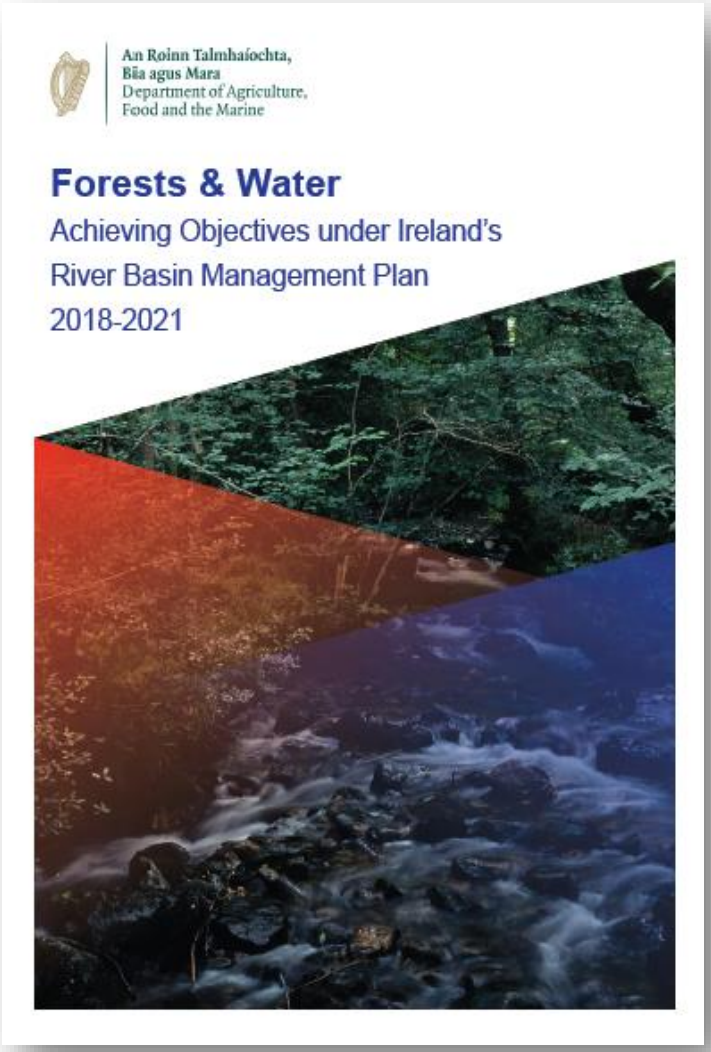
- Investigations in Illinois, U.S.A on the effectiveness of forested and grass vegetated buffer strip for reducing shallow subsurface inputs of nutrients from agriculture to a stream
- Up to 90% reduction in nitrate-N concentrations in shallow groundwater in both forest and grass

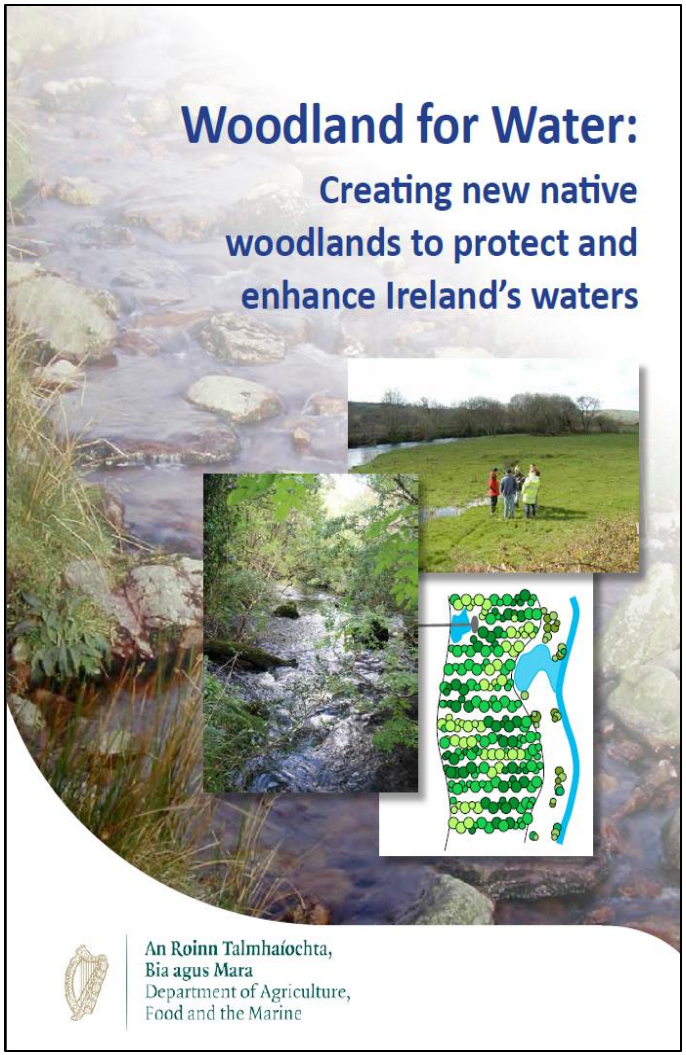
Osborne & Kovacic 1993 Freshwater Biology 29: 243

woodlands OF IRELAND
Coillearnacha Dúchasacha


Riparian woodland buffer zones
Agricultural nutrient trapping
Anne Valley, Co. Waterford

Current policy and incentives
The Native Woodland Scheme and protecting water quality

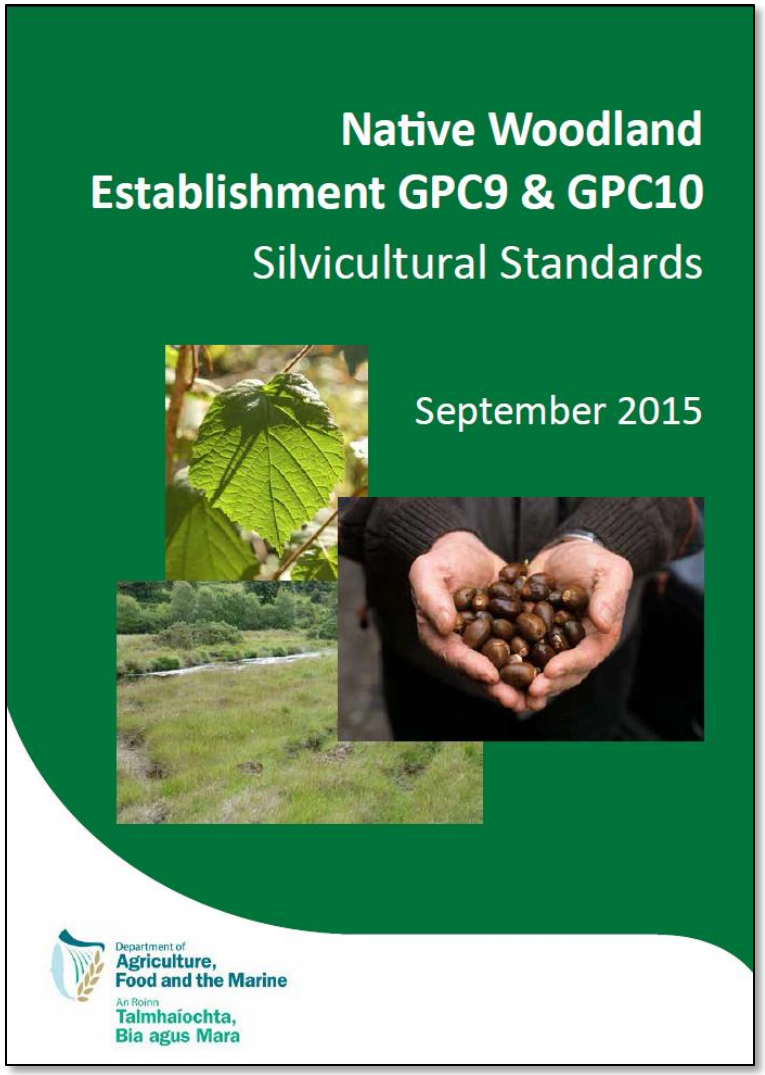




woodlands
OF IRELAND
Coillearnacha Dúchasacha

Creating new native woodlands to protect and enhance aquatic zones

- Mimics the trees and shrubs that would naturally regenerate in aquatic zones
- Up to €6,300/ha capital costs covered
- Annual premium of over €600/ha for 15 years
- Includes operations such as planting, fencing and re-designing drains to ensure overland flow in the protective Aquatic Buffer Zone (ABZ)



woodlands
OF IRELAND
Coillearnacha Dúchasacha

NWS Establishment - Scenarios

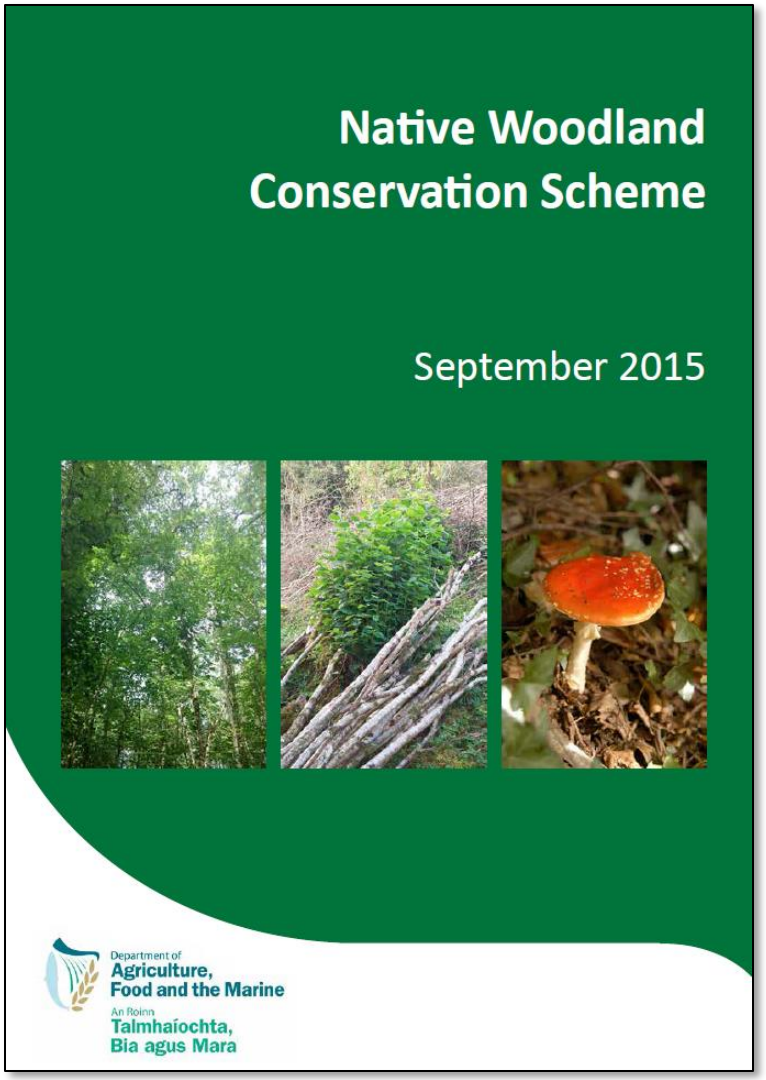
- An accredited NWS Forester applies to the Forest Service using the following based on soil types and woodland classification:
- **Scenario 1 – Podzols/Oak-Birch-Holly**
- **Scenario 2 – Brown podzolic/Oak-Birch Holly with Hazel**
- **Scenario 3 – Brown earth/Oak-Ash-Hazel**
- **Scenario 4 – Gleys/Alder-Oak-Ash**
- **Scenario 5 – Highly modified peat & peaty podzol/Pioneer birch**

Note: We advise that an ecologist is hired especially for marginal and designated sites – not mandatory!

A Scenario 1 site at Garrykock, Co. Wicklow

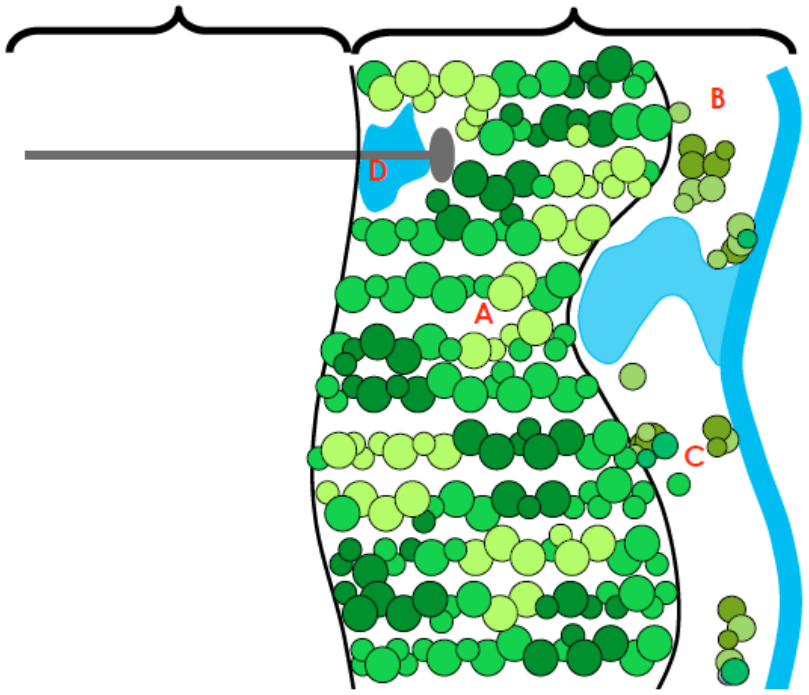
Managing existing riparian woodlands to improve water protection

- Up to €5,000/ha for NWS management plan & capital costs, and €350/ha annual premium for 7 years
- Requires an NWS ecologist
- Removing invasive non-native trees and shrubs
- Replanting native stock
- Fencing & re-designing drains in the ABZ
- Converting conifer plantations in the ABZ to native riparian protective woodlands



woodlands
OF IRELAND
Coillearnacha Dúchasacha

Figure 1 Overview of the Woodland for Water measure.



Key:

A New native woodland created under NWS Establishment, 20 metres or greater in width & uncrossed by new drains. Can be strategically widened at key locations onsite, where adjoining landuse, site hydrology & slope increase the vulnerability of receiving waters.

B Permanent undisturbed water setback, 10-25 metres in width (or greater, if required), uncrossed by new drains & largely unplanted. Can be strategically widened at key locations onsite, where site hydrology & slope increase the vulnerability of receiving waters.

C Setback planting comprising single or small groups of trees of suitable native riparian species, strategically planted & maintained for bank stabilisation, dappled shading & as a food source for aquatic life.

D Possible interventions within existing drains (e.g. silt traps, slow-flow dams) to break existing pathways from source to the receiving watercourse, & to create pocket wetlands & settlement areas.

A NWS Establishment site, Bandon River, Dunmanway, Co. Cork, subsequently planted with native riparian woodland


Mature alluvial woodland in Co Wicklow
Gallery forest?
Alder, Ash, Holly, Hazel, Oak, Willow
Dense canopy with wet gley soils

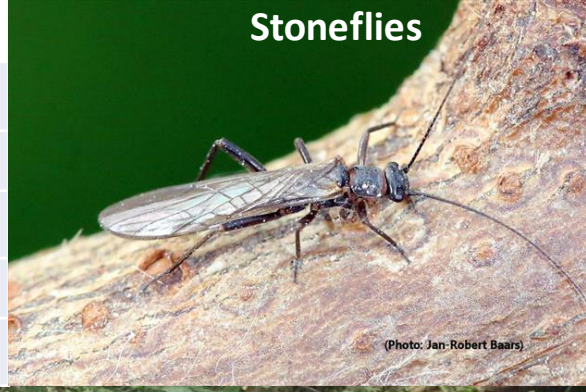
- Oldest Alder trees up to 1.6m in diameter
- May be several centuries old
- Evidence of historic coppicing of Alder


Spring vegetation
Wood anemone
Hemlock water dropwort

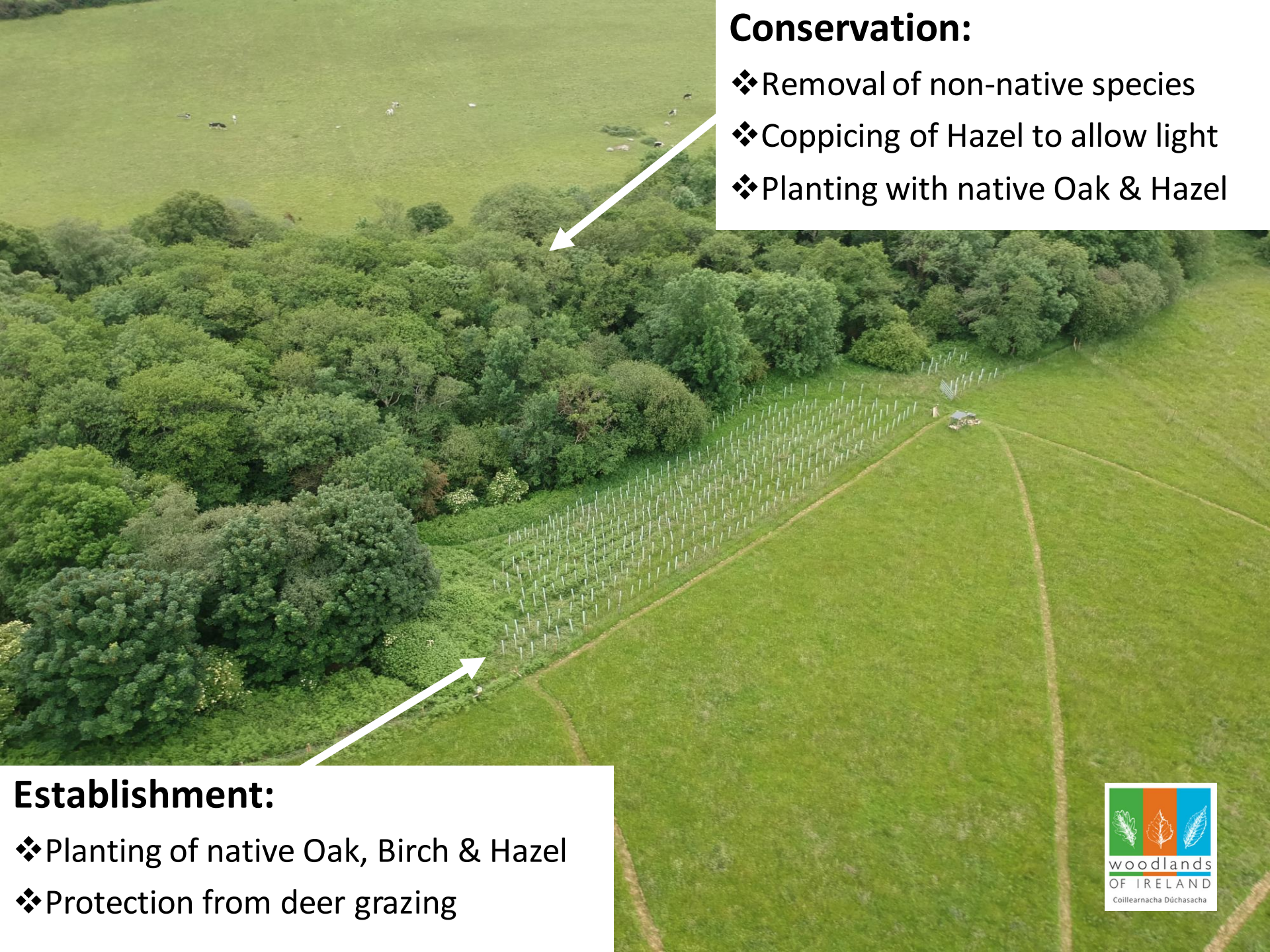

Winter flood

Mary Kelly-Quinn sampled invertebrates

EPA Q-value A class species	
MAYFLIES	*Rhithrogena semicolorata*
Ephemeroptera	*Ecdyonurus venosus*
STONEFLIES	*Amphinemura sulcicollis*
Plecoptera	*Siphlonoperla torrentium*



Reference site for baseline surveys and monitoring by range of specialists



Conservation:

- ❖Removal of non-native species
- ❖Coppicing of Hazel to allow light
- ❖Planting with native Oak & Hazel

Establishment:

- ❖Planting of native Oak, Birch & Hazel
- ❖Protection from deer grazing

woodlands OF IRELAND
Coillearnacha Dúchasacha

Conservation includes
Removal of non-native Sycamore

Planting with Oak and Hazel in clearings

Establishment included:
Deer fencing and planting of 2-year old natives

Tree guards enhanced growth in drought year

Take home messages

- Riparian woodland provides many benefits for aquatic biodiversity and water quality – ecosystem services!
- New riparian woodland can be established under the Native Woodland Scheme
- Existing riparian woodland can be managed under the Native Woodland Scheme, including conifer conversion to native riparian woodland
- Input of a professional ecologist is needed to plan woodland conservation

woodlands OF IRELAND
Coillearnacha Dúchasacha