

Forestry, Water and the WFD



COFORD Council Land Acquisition Working Group
Tullamore, 5th October 2012 Dr. Deirdre Tierney

Why this presentation?

- Forestry in the context of the WFD
- Emphasise, the most sensitive areas i.e. deep peats in uplands are susceptible to all pressures and are not suitable for planting
- Over emphasis on acid sensitive areas - not the only pressure
- Literature reviews done for acidification, eutrophication and sedimentation under WFD preparation
- No thresholds set despite research carried out therefore:
- Precautionary principle applies
- Little research on efficacy of measures to mitigate pressures e.g. buffer zones
- Do the measures work on a National basis, do we know?

WFD - objectives

- Integrated framework for all water categories
- Achieve **Good Status** by 2015
- Maintaining that status where it already exists (in particular **High Status**)
- Preventing further deterioration
- Reduction in emissions of specific pollutants

WFD - Protected Areas

- Protected Areas particular mention – Article 4:

(c) for protected areas

.....Where more than one of the objectives under paragraph 1 relates to a given body of water, the most stringent shall apply.

- Article 6 Register of protected areas

- Article 8 - Monitoring - for protected areas the above programmes shall be supplemented by those specifications contained in Community legislation under which the individual protected areas have been established.

ANNEX IV

EMBEDDED, reported separately

PROTECTED AREAS

1. The register of protected areas required under Article 6 shall include the following types of protected areas:
 - (i) areas designated for the abstraction of water intended for human consumption under Article 7;
 - (ii) areas designated for the protection of economically significant aquatic species;
 - (iii) bodies of water designated as recreational waters, including areas designated as bathing waters under Directive 76/160/EEC;
 - (iv) nutrient-sensitive areas, including areas designated as vulnerable zones under Directive 91/676/EEC and areas designated as sensitive areas under Directive 91/271/EEC; and
 - (v) areas designated for the protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection, including relevant Natura 2000 sites designated under Directive 92/43/EEC ⁽¹⁾ and Directive 79/409/EEC ⁽²⁾.
2. The summary of the register required as part of the river basin management plan shall include maps indicating the location of each protected area and a description of the Community, national or local legislation under which they have been designated.

WFD strands or how does it work?

■ Classification – Ecological Status

- Monitoring
- Assigns status that dictates objectives
- Assess **Programme of Measures (POMS)** in achieving objectives

■ Characterisation Report 2005, update 2013

- Identified **pressures**
- Associated risk (**risk assessment**) of failing to meet objectives

■ RBD plans 2009, update 2015

- Outlines the **measures** actionable to prevent or mitigate a risk are prescribed

Published
Obligatory reporting at every stage
Every stage scrutinised by the Commission

Forest related Pressures

Anon 2005 – Article 5 Characterisation report

Diffuse Source Pollution Pressure

- Acidification
- Eutrophication
- Suspended solids
- Priority substances
- Morphological alteration under intensive landuse
- Shading and light occlusion

Sensitivity Factors – ESBI 2008

Sensitivity factors (Pathway)	Acidification	Eutrophication	Sedimentation	Pesticide use/Herbicide	Hydromorphological change	Shading and Occlusion
Site characteristics:						
Geology/ rock type	✓	✓	✓		✓	
Soil/subsoil (nutrient retention capacity)	✓	✓	✓		✓	
slope	✓	✓	✓		✓	
elevation	✓	✓	✓			
aspect	✓					
geographic location	✓					
Forest characteristics:						
closed canopy,	✓	✓			✓	✓
forest type	✓	✓	✓		✓	✓
the percentage of forest cover in the catchment,	✓		✓		✓	
stand age and structure	✓	✓				✓
location in catchment/ distance from receiving waters	✓		✓	✓	✓	

Particularly applies to peats

Sensitivity Factors – ESBI 2008

Sensitivity factors (Pathway)	Acidification	Eutrophication	Sedimentation	Pesticide use/Herbicide	Hydromorphological change	Shading and Occlusion
<i>climatic conditions:</i>						
rainfall volume and type	✓	✓			✓	
<i>climate change</i>	✓	✓			✓	
Operation						
area of operation,		✓		✓		
forestry activities within a catchment		✓				
the area to be fertilised in relation to the area of the total catchment		✓		✓		
presence of vegetated buffer		✓				
fertiliser application rate		✓		✓		
type of application		✓	✓			
road network density			✓			
persistence and behaviour of the herbicide and its formulation used				✓		
Ground cultivation method			✓			

Forest related Pressures – EPA Submission - Acidification

- Ruth covered the mechanisms very well

Recent studies:

- No significant changes in pH or aluminium concentrations in 60 acid sensitive lakes (Burton and Aherne, 2012)
- Mechanism - sea-salt inputs and increases in dissolved organic carbon concentrations - also in Scotland (Dunford *et al.*, 2012) supporting evidence
- Impact on chemistry and biology found (Kelly-Quinn *et al.*, 2008) in forested streams particularly on peats overlying base poor geologies
- Coincide with **High status waterbodies**
- Climate change

PEATS

Forest related Pressures – EPA Submission - Eutrophication

Nutrient release from coniferous plantations on **peat soils** occurs:

- In the early fertilisation phase
- Following clear-felling – brash – upcoming problem
- Mid cycle aerial fertilisation with N or P on poorly performing plantations is also an issue
- Broadcasting of nutrient granules directly into water or onto adjoining buffer strips

Forest related Pressures – EPA Submission - Suspended Solids

- Drainage activities at establishment
- New planting and clear-felling - temporal and spatial dimension
- Impacts on salmonid spawning areas or where freshwater pearl mussel populations

Forest related Pressures – EPA Submission - Priority Substances

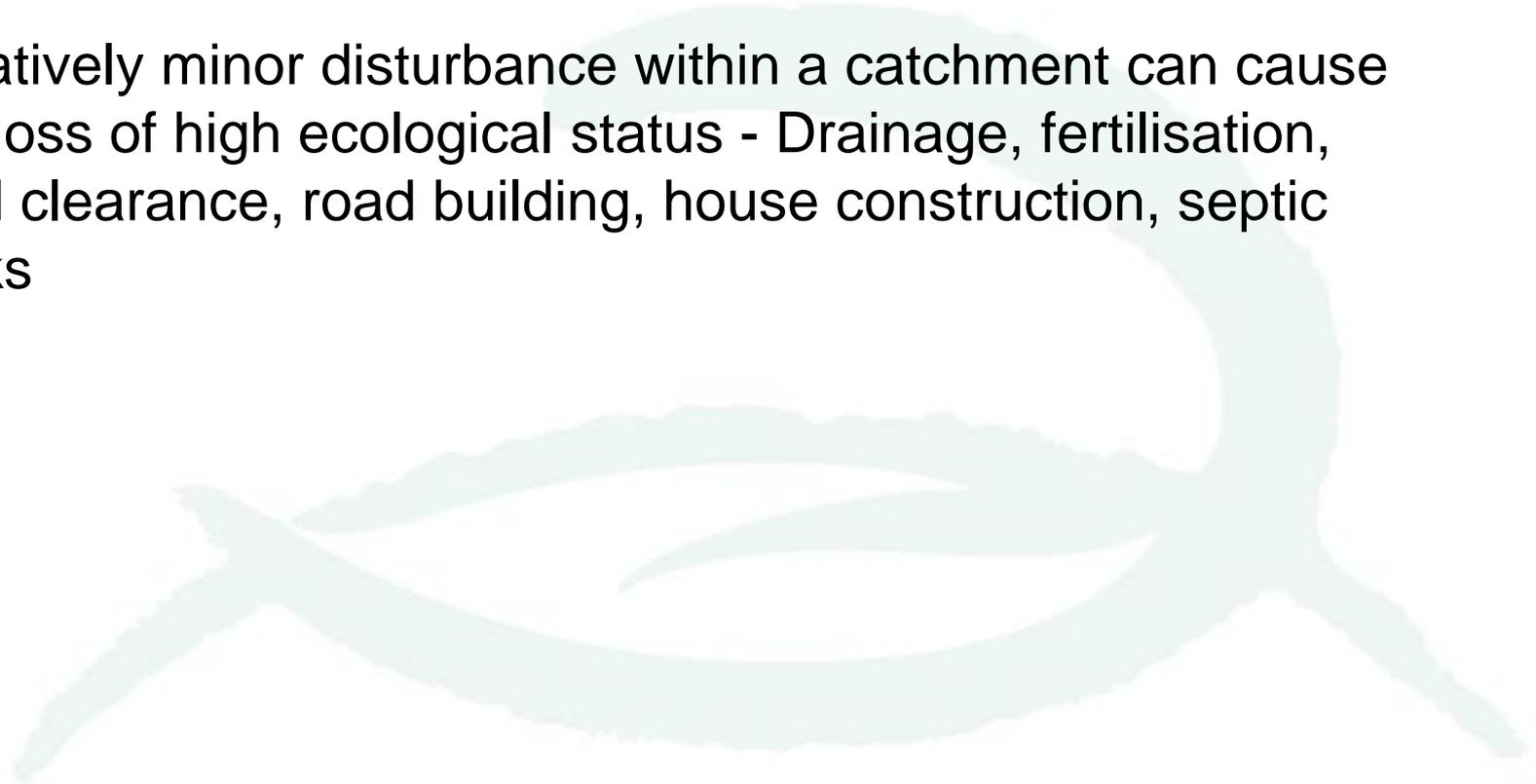
- Cypermethrin is used to control pine weevil particularly in newly planted trees
- Primarily associated with sheep farming but some evidence of loss of invertebrate taxa inside fenced forestry plantations (suspected)
- Decline in ecological status of some remote rivers

Forest related Pressures – EPA Submission - Hydrological effects

- Mature forest canopy can divert large quantities of water via evapotranspiration -may reduce the flow of water in rivers
- Impacts of climate change -reduced rainfall in summer the impact on juvenile salmonid populations
- At the clear-felling stage - flashiness leading to flood damage or erosion and increased silt transport

Loss of High Status Aquatic Ecology

- Relatively minor disturbance within a catchment can cause the loss of high ecological status - Drainage, fertilisation, land clearance, road building, house construction, septic tanks



Programme of Measures

- Two literature reviews were commissioned to assist the development of measures by further describing pressure impacts from forestry (Hutton *et al.*, 2008, Johnson *et al.*, 2008)
- Two research project were commissioned to address gaps identified in the Characterisation Report for forest impacts in acid sensitive areas (Kelly – Quinn *et al.*, 2008) and to further describe eutrophication and sedimentation arising from forest activities (Harrison *et al.*, 2008).

Forestry Measures - Acidification

Acidification measures: Acidification appears on current evidence to be a management problems with Irish forest on some soil types, notably peat soils and to lesser extent peaty podzols on metamorphic and sedimentary rock. Measures include the following:

- avoid or limit (to below critical thresholds) afforestation on 1st and 2nd order stream catchments in acid sensitive catchments
- restructure existing forests to include open space and structural diversity through age classes and species mix, including broadleaves
- mitigate acid impacts symptomatically using basic material (e.g. limestone or sand liming)

Forestry Measures - Acidification

Acidification measures:

- Implement measures to increase stream production – for example with native woodland in riparian zones.
- Revise the **Acidification Protocol** to ensure actual minimum alkalinities are detected (i.e. ensure sampling under high flow conditions) and the revision of boundary conditions for afforestation in acid sensitive areas.

Some practical some are not.

Forestry Measures - Eutrophication and Sedimentation

Eutrophication measures/ Sedimentation measures: Eutrophication and sedimentation pressure are identified primarily with forestry activities, principally clearfell, roading, and, in certain circumstances, aerial fertilisation occurring on peat soils. In some instances the impacts may be confined to the headwaters of streams and can be critical where sensitive catchments are involved with sensitive habitats and species further downstream. Measures to control nutrient and sediment load from forestry operations include;

- avoid or limit forest cover on peat sites;
- change the tree species mix (e.g. broadleaves) on replanting
- limiting felling coup size

Forestry Measures – Eutrophication and Sedimentation

- new forest structures on older plantation sites (including new riparian zones, drainage layouts, species mix, open areas)
- establishing riparian zone management prior to clearfelling
- enhance sediment control
- manage catchment drainage to increase residence times and soil wetting, including no drainage in some locations
- Consider prohibition of aerial fertilisation on sensitive/ protected sites
- No replanting on certain hydrogeological settings (peat soils) on sensitive sites.

Evaluation of Efficacy?

Forestry Measures – Hydromorphological

FH – Hydromorphological measures: Hydromorphological impacts can occur both from reduced water flow in catchments, due to increased evapotranspiration, in dry weather periods and from enhanced peak flood events increased flow from forested areas with large drainage networks established before the introduction of environmental guidelines. **Further research is necessary in this area to quantify the potential impacts.** Measures which have been recommended include:

- auditing of existing drainage networks in forest catchments
- enhanced drainage network management – minimise drainage in peat soils

Planning and modelling to cope with reduced and enhanced flows during forest life cycle

Forestry Measures – Pesticide use

FP- Pesticide use measures: Pesticide use is generally associated with forest establishment (herbicide) and with re-establishment post clearfelling (herbicides and insecticides). Measures which have been recommended include:

- reduction in pesticide usage
- pre-dipping of trees in nurseries prior to planting out
- development of biological control methods
- maintaining registers of pesticide use (it is acknowledged that this is a national issue relating to pesticide use in general across all sectors)

Measures relating to Forestry

It is envisaged that for a given area the most appropriate measures will be adopted from the suite of measures proposed as these will tend to be site specific.

River Basin District Management Plans (RBDMPs)

- 7 RBDMPs
- Reported to the Commission 2010
- Currently being Evaluated
- Reporting on POMS progress due 2013

South Western RBD Plan - An example

SWRBD Plan

‘Forestry

In the South Western RBD there are 49,930 hectares of private forestry and 68,186 hectares of public forestry. A risk assessment of acidification, eutrophication and sedimentation pressures based on percentage forest cover and underlying geology and soils has identified 13 rivers that are at risk of failing to achieve the required standards due to potential impacts from coniferous forestry. Where mature plantations of coniferous trees have been established on acid-sensitive soils, it can lead to increased acidity and heavy metal concentrations in the run-off waters from such soils. Forestry activities can introduce extra nutrients; in naturally nutrient-poor areas, that can lead to problems such as excessive algal growth. Road-making and stream-crossing can cause erosion and sediment loss on susceptible soils, afforestation and clearfelling of forests may change flow patterns: and pesticides can damage aquatic organisms if applied incorrectly.’

SWRBD Plan – Water Management Units

‘The programme of measures

The key provisions of the programme of measures are summarised in the following sections. The details of measures for the South Western RBD are contained in the Water Management action plans for the district.’

‘5.2.7 Control of environmental impacts from forestry

.....

These pressures include:

- artificial acidification of waters arising from the presence of coniferous afforestation on acid-sensitive soils.*
- nutrient enrichment and sedimentation impacts arising from forestry operations (mainly fertilisation and high levels of felling activity) in catchments with forest cover of over 50% on peat soils.’*

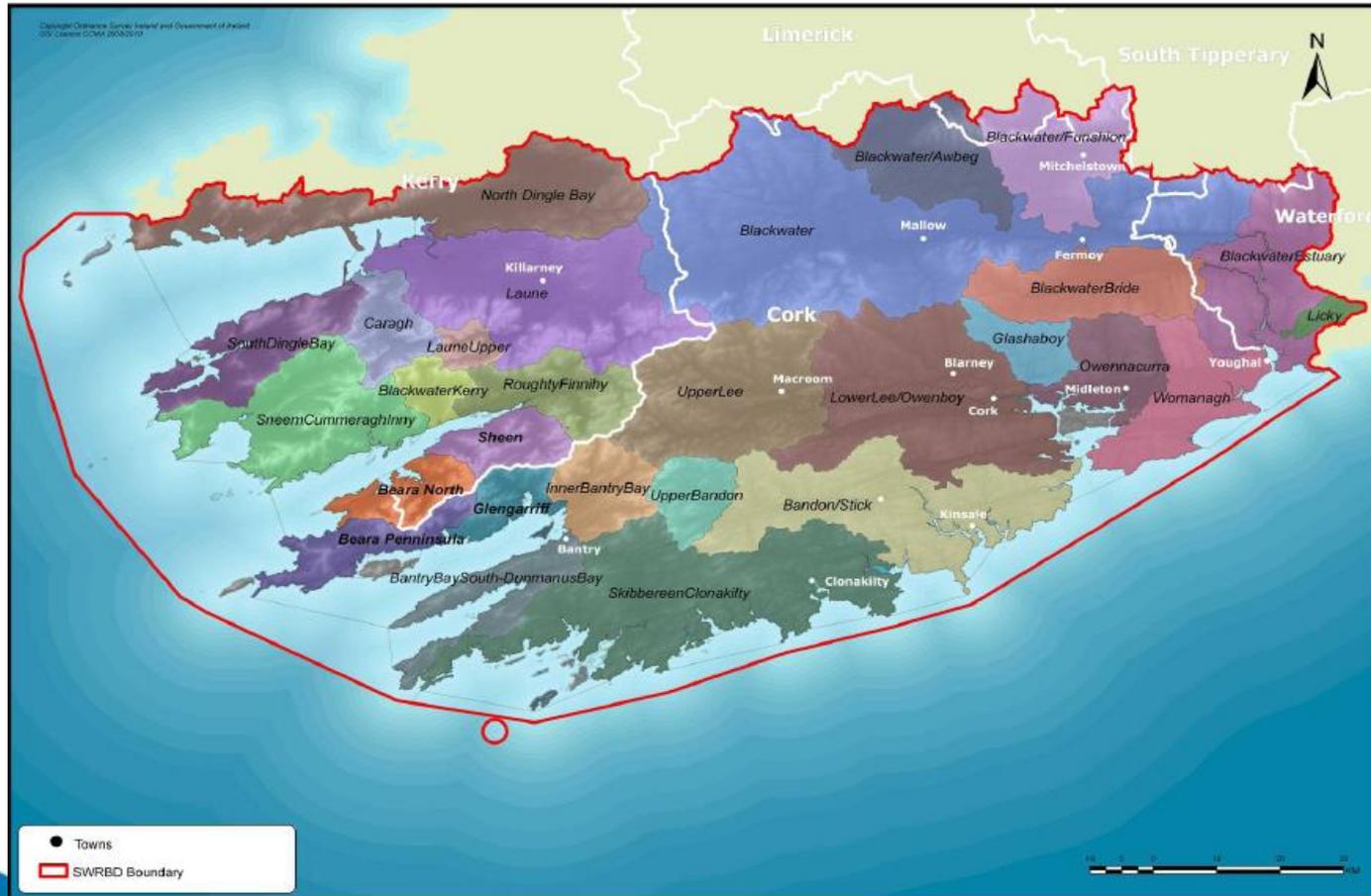
SWRBD Plan - WMUs

The WMU action plans are the basis for detailed implementation programmes, which will guide and monitor the progress of implementation between 2009 and 2015. The principal measures identified in WMU action plans to address the key issues in the South Western RBD include:

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- *compliance with codes of practice and Forest Service Protocol in the forestry sector;*
- *implementing Freshwater Pearl Mussel sub-basin plans (available at www.wfdireland.ie) for the following nine areas: Allow, Ownagappul, Bandon/Caha, Munster Blackwater, Currane, Caragh, Licky, Kerry Blackwater and Gearhameen;*

.....

SWRBD Plan - WMUs



28 WMUs

SWRBD Plan - WMUs

Appendix 5: South Western RBD Action Programme

What	Who leads	When & where
<p>Relevant actions: Promote forestry with financial incentives. License forestry activity and where necessary, attach additional conditions in sensitive areas.</p> <p>Encourage sustainable, commercial afforestation. Ensure compliance with guidance and codes of practice.</p> <p>A new Forestry Bill, replacing the 1946 Forestry Act, has been drafted to strengthen sustainable forestry management. Provisions relating to water protection are;</p> <ul style="list-style-type: none"> • All forestry operations must be carried out in accordance with any guidelines and regulations issued by the Minister for Agriculture, Fisheries and Food. • Allowing for change of land use from forestry to other agricultural uses. <p>In acid sensitive catchments apply a protocol agreed between the Department of Environment, Heritage and Local Government, the Forest Service, the EPA and COFORD for dealing with grant-aid applications in acid sensitive areas. All relevant applications received by the Forest Service are checked for alkalinity levels in run-off water. Borderline cases are referred to the Environmental Protection Agency for recommendations.</p> <p>2008 guidelines for the protection of Natura 2000 sites designated for the protection Freshwater Pearl Mussel populations from forestry activities are intended to ensure that forest operations such as afforestation, forest road construction, harvesting and forest planning are compatible with the protection of this particularly sensitive species. The guidelines describe a range of measures intended to reduce any potential negative impacts on the species arising from forest operations.</p> <p>Strategic Plan for the Development of Forestry: Purpose: to provide for the development and regulation of forestry.</p>	<p>Forest Service</p> <p>Forest Service</p> <p>Minister for the Department of Agriculture, Fisheries and Food</p> <p>Forest Service, EPA</p> <p>Forest Service</p>	<p>2009–2015 National</p>
<p>Relevant actions: Adhere to forest management plans and the principles of sustainable forest management.</p> <p>Ensure implementation of the National Forestry Standard and adherence to the code of best forest practice.</p> <p>Additional actions: Forestry: Good practice measures are available in the Programmes of Measures – technical studies – Forest and Water and National Summary Programme of Measures background documents.</p>	<p>All stakeholders</p> <p>Forest Service</p>	<p>2009–2015</p>
<p>Environmental Objectives (Freshwater Pearl Mussel) Regulations (SI 296 of 2009)</p>		<p>2009–2015</p>

Forest Service
Active role



Recommendations for Forest Service as the consent authority

- Understand - as a consent & licencing body - the requirements of WFD and promote to its stakeholders
- Engage with RBDs and relevant authorities
- Take full account of current and potential future impacts on water of activities it licences and consents
- Explore opportunities for the positive influence of woodlands and water

Other RBDS and WMUs

SE –Erkina Water Management Unit Action Plan

‘FORESTRY - Measures to address acidification and sedimentation apply to all but two waterbodies within the WMU’.

Other RBDS and WMUs

SH– West Coast Clare Water Management Unit Action Plan

ANNAGEERAGH - Currently moderate status (Q3-4). The quality is mainly moderate for macroinvertebrates along the entire course. There is a large amount of the upper catchment under forestry on peat soils. The Sruhaunakit Stream joins the Annageeragh d/s of Doo Lough, quality is moderate for macroinvertebrates also. Doo Lough is a large abstraction source for a public water supply.

ANNAGH (CLARE - Currently poor status (Q3) at site 200 (bridge at Drehidenagh) and good status (Q4) at site 900 (Bealaclogga Bridge). The upper reaches of the Annagh are mainly forestry and agricultural pressures. Quality improves in the middle reaches to satisfactory but drops downstream due to localised pressures and/or because it is affected by seawater.

Summary

- Forests and Forest practice put waterbodies at risk of failing the objectives of the WFD (Sitka spruce plantations)
- Peats in uplands are particularly susceptible to all pressures and are not suitable for planting
- Waterbodies are not allowed to deteriorate – fines
- Protected areas embedded in WFD
- Precautionary principle applies
- Measures in RBDMPs but efficacy? – research
- Forestry Service have work to do
- Alternative forestry needs exploration



Thank You!