

that only seeds, parts of plants and young plants of acceptable quality are offered for sale within the Internal Market. To achieve this, regions of origin were demarcated in each Member State for the marketing of reproductive material of approved species, with all such material to be accompanied by an official certificate to confirm its identity. These Directives have recently been revised and the new Directive 1999/105/EC will come into force from 1 January, 2003. Categories of reproductive material are source identified, selected, qualified and tested. Basic material is categorised as seed source, stand, seed orchard, parents of family, clone or clonal mixtures. Seed sources used in Irish forestry include:

- direct imports from the species natural range;
- collections from registered seed stands in Ireland;
- collections from registered seed stands in Europe or from established seed orchards.

Seed collected from homogenous stands provides some level of genetic improvement in adaptability, vigour and form. Little is known about the best home sources for broadleaf trees and shrubs, particularly native species. Research is ongoing to select superior individuals, to establish a germ bank and in vegetative propagation. Particular emphasis is being directed by Irish research organisations towards the improvement of ash, birch, oak and sycamore. Species such as beech and yew also warrant further attention.

Measures

4.5.1 At national level, measures are:

- evidence that EU Directives are being implemented;
- the maintenance and updating of the national register of seed stands;
- area of forest managed for conservation and utilisation of forest genetic resources (seed stands and seed production areas);
- evidence for differentiation between the indigenous and introduced provenances;
- annual area of natural regeneration in relation to total area reforested in plantations and semi-natural woodlands;
- area of plantation and semi-natural forest with site-appropriate tree

species of

- native provenance;
- level of research into native species tree improvement.

4.5.2 At a local level, measures are:

- Certificate of Provenance records;
- records of native species planted;
- area of natural regeneration of native and introduced species in relation

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- planting;
- records of superior trees;
- records of superior stands;
- management plans for seed stands.

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Indicator 4.6: Diversity and landscape

Forests are highly visible in the countryside and are such an obvious change of landuse that they frequently attract much public attention and sometimes give rise to a degree of public reaction. This reaction may be rooted in a dislike of any change in familiar landscapes or a fear of isolation of homes and farms. Forest Service FORESTRY AND THE LANDSCAPE GUIDELINES aim to:

- optimise the aesthetic effect through the integration of forests with the landscape;
- minimise visual conflict and the obliteration of familiar characteristics;
- ensure a positive relationship between the forest and the landscape as a whole;
- mitigate adverse impacts of forest operations on the landscape.

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The FORESTRY AND THE LANDSCAPE GUIDELINES take into account the impact of forest practice in relation to species choice, treatment of margins and ridges, size and



CRITERION 5

MAINTENANCE AND APPROPRIATE ENHANCEMENT OF PROTECTIVE FUNCTIONS IN FOREST MANAGEMENT (NOTABLY SOIL AND WATER)

The importance of forests in protecting soil and water has been recognised for a long time. In Ireland, concern has often focused on the negative impacts of forests and forest operations on soil and water. This particularly applies to compaction, erosion and acidification of soils and to eutrophication, acidification and sedimentation of surface waters. In order to ensure that terrestrial and aquatic systems are maintained, it is important that the appropriate soil and water quality indicators are carefully monitored.

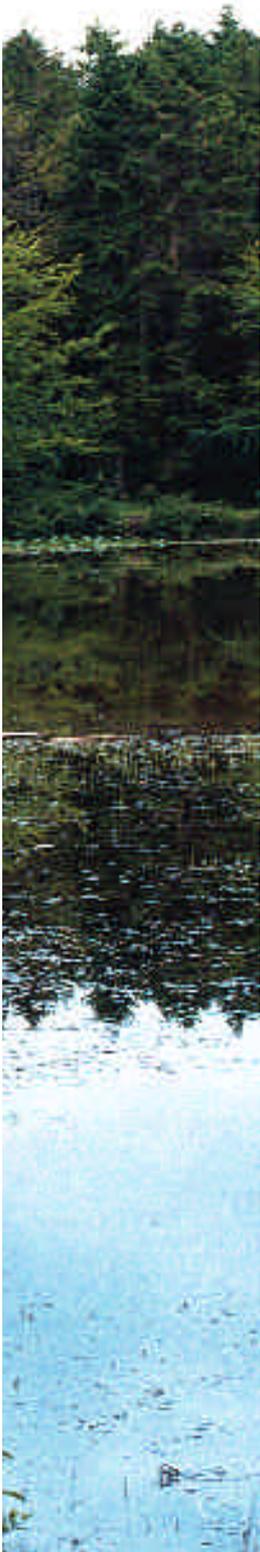
The indicators for this criterion are:

Indicator 5.1: Policy, legislation and support measures

Indicator 5.2: Protection of waters

Indicator 5.3: Protection of soils

Water and soil are key components of the natural environment upon which we rely. Their protection is an essential element of sustainable forest management.





Indicator 5.1: Policy, legislation and support measures

To address the compatibility of forestry and aquatic resources, the Forest Service issued its *Forestry and Fisheries Guidelines* in 1992 and set up a consultative process with the Central and Regional Fisheries Boards. New FORESTRY AND WATER QUALITY GUIDELINES and FOREST HARVESTING AND THE ENVIRONMENT GUIDELINES have been prepared. Water issues are extensively addressed in the CODE OF BEST FOREST PRACTICE. The Local Government (Water Pollution) Acts 1977-1990 deal with the prevention of water pollution through fines for offences and obligations to notify accidental discharges. Local Authorities are permitted to make by-laws to secure the protection of water quality.

Measures

- 5.1.1 The existence of policies, review mechanisms and a legal framework which can maintain and enhance the quality of soil and water in forests.
- 5.1.2 Evidence for the existence of adequate research and information systems which can provide reliable data leading to the maintenance and enhancement of soil and water in forests.
- 5.1.3 Evidence of financial incentives to support the maintenance and enhancement of soil and water in forests.
- 5.1.4 Existence of financial support for research to develop protocols and data to monitor the effectiveness of forest measures designed to protect soil and waters.

Indicator 5.2: Protection of waters

While the overall responsibility to protect water quality rests with a number of government agencies, all water users within a catchment, including industries and forest owners, play a crucial role in ensuring that their activities do not impact adversely on water quality. In many catchments, river systems receive surface and drainage water from forest areas. This creates a situation where forest operations, such as ground preparation and drainage, vegetation management, the construction of roads and bridges, fertiliser application and forest harvesting, may adversely impact on water quality. Eutrophication, acidification and sedimentation can affect the biology, chemistry and hydrology of aquatic ecosystems. Guidelines to address these threats have been prepared by the Forest Service (see CODE OF BEST FOREST PRACTICE and FORESTRY AND WATER QUALITY GUIDELINES).

Measures

- 5.2.1 At a national level, this indicator may be evaluated by:
- the identification and mapping of sensitive catchment areas;
 - the acquisition and assembly of data to quantify critical loads relevant to specific forestry regions;
 - the existence of good communications between the forestry sector and agencies responsible for water quality and fisheries;
 - the existence of effective reporting procedures in the case of water pollution;
 - the existence of financial support for research on forest interactions with surface and drainage waters;
 - evidence for the adoption of forest operations which avoid erosion, sedimentation, eutrophication and acidification in sensitive areas.
- 5.2.2 At local level, there should be evidence:

- that appropriate environmental guidelines and sections of the CODE OF BEST FOREST PRACTICE relevant to the protection of waters are specified in management plans;
- that appropriate environmental guidelines and relevant sections of the CODE OF BEST FOREST PRACTICE are being implemented on the ground;
- that there is adequate sampling and analysis of water to monitor the effectiveness of measures designed to protect waters;
- of the existence of good communication locally with water and fisheries agencies.

Indicator 5.3: Protection of soils

The maintenance of soil structure and productivity is a key element in achieving sustainable forest management. Intensive management regimes combined with high levels of mechanisation in forest operations can damage forest soils. Wet soils and peats may be compacted and rutted by machinery. Erosion can have off-site effects. The danger of soil damage is particularly high at establishment time and during forest harvesting operations. Unless properly designed, ground preparation and drainage schemes can lead to soil erosion. The selection of suitable machines, the use of dense brush mats, the planning of rack layout and the use of low ground pressure tyres, tracks and chains all help to protect forest soils. The timing of forest operations such as road construction and extraction may also be important.

Measures

- 5.3.1 National measures by which this indicator may be evaluated are the existence and use of relevant environmental guidelines and sections of the CODE OF BEST FOREST PRACTICE which define:
- appropriate site cultivation and drainage schemes;
 - appropriate methods and equipment in forest harvesting;
 - appropriate practices for use in the construction of roads and bridges;
 - suitable procedures for use in the handling and disposal of fertilisers, herbicides, insecticides, fuel and machine oils;
 - the existence of financial support for research on forest soil towards the improved understanding of soil protection in terms of soil loss, soil content, pH and alkalinity.

- 5.3.2 At local level, there should be evidence that:
- appropriate practices to protect soils are specified in management plans;
 - appropriate practices to protect soils are being implemented;
 - forest managers and workers are properly trained in the use, storage and disposal of fertilisers, herbicides, insecticides, fuel and machine oils;
 - there is adequate support for soil and litter sampling, analyses and studies to facilitate the monitoring of soil condition.



CRITERION 6

MAINTENANCE OF OTHER SOCIO-ECONOMIC AND CULTURAL FUNCTIONS AND CONDITIONS

The concept of sustainable forest management transcends ecological and production criteria. It also relates to society values, the quality of life and the best interests of current and future generations. Thus, this criterion concerns the ability of forestry and forestry institutions to meet social goals and to deal with special or unique needs.

The indicators for this criterion are:

Indicator 6.1: Policy, legislation and support measures

Indicator 6.2: The socio-economic and employment contribution of the forestry sector

Indicator 6.3: Public awareness and participation

Indicator 6.4: Forestry education, research and training

Indicator 6.5: Recreation and amenity values

Indicator 6.6: Cultural merit

Indicator 6.7: Safety in the forest

Sustainable forest management incorporates the functions and benefits of forestry to society as a whole. These range from the contribution to the wider economy and employment to the use of woodlands for folklore and artistic

