



Environmental Guidelines for Timber Harvesting



Environmental Guidelines for Timber Harvesting

Contents

Section		Page No.
1.	Introduction	3
2.	Legal Requirements and Existing Guidelines	3
3.	Landscape	3
4.	Water	4
5.	Soil	5
6.	Pollution	6
7.	Archaeological sites	7
8.	Wildlife	8
9.	Plants and Trees	9
10.	People	9
Appendix 1	Legislation	10
Appendix 2	Other references	11
Appendix 3	Addresses	11
Appendix 4	Checklist	12

1. INTRODUCTION

Timber harvesting, particularly clearfelling, has the potential to have a bigger impact on the environment than any other forestry operation. Sound operational practice and cost-efficiency must be combined with care for the environment. These guidelines are intended to assist forest managers, harvesting managers and contractors to organise and carry out felling and extraction operations in a planned, environmentally sensitive manner. Adherence to the guidelines will contribute to sustainable forest management.

There are many environmental aspects which should be considered when planning and carrying out harvesting operations and it is important that everyone involved clearly understands and agrees on the principles upon which actions are based. These guidelines are designed to help in this process and it is recommended that they form the basis of a contractual agreement before work commences.

Harvesting plans and operations should be flexible and capable of adaptation to changing conditions and circumstances as work progresses.

2. LEGAL REQUIREMENTS AND EXISTING GUIDELINES

There should be compliance with all relevant legal requirements. Work should only be carried out in areas with a statutory conservation designation, such as Areas of Special Scientific Interest (ASSI), National Nature Reserves (NNR), and Special Areas of Conservation (SAC), with the agreement of the Environment and Heritage Service of the Department of the Environment. Requirements should also be adhered to in respect of landscape and cultural heritage, such as provided for by Areas of Outstanding Natural Beauty (AONB) and Historic Monuments legislation.

Examples of legislation which has a direct impact on the environmental aspects of forest harvesting are listed in Appendix 1.

Health and Safety legislation and guidelines should be complied with.

Within the UK Forestry Standard, which sets out the criteria and standards for the sustainable management of forests and woodlands in the UK, are Standard Notes that identify acceptable management options for thinning and felling. Appendix 5 of the Standard provides a comprehensive list of publications which provide detailed guidance on issues, methodologies and practices from which the Standard has developed. Those Department of Agriculture Northern Ireland (DANI) and Forestry Commission (FC) publications that are of particular relevance to harvesting are listed in Appendix 2 of this publication.

3. LANDSCAPE

Timber harvesting can have a significant impact on the landscape and may provide an opportunity to improve the existing appearance of a forest.

The UK Forestry Standard comments in Standard Note 4 on the size and shape of felling coupes depending on the type of woodland.

Forest Design Planning, published by the FC and DANI, provides a guide to good practice.



The size and shape of felling coupes and the timing of the operations determine the nature of the impacts they have. Proper design and planning will minimise any undesirable impact and make the most of opportunities to improve the existing landscape.

In addition to external views of the forest, the internal landscape as experienced by visitors and local residents should also be considered.

Landscape design plans should be in place before harvesting commences.

4. WATER

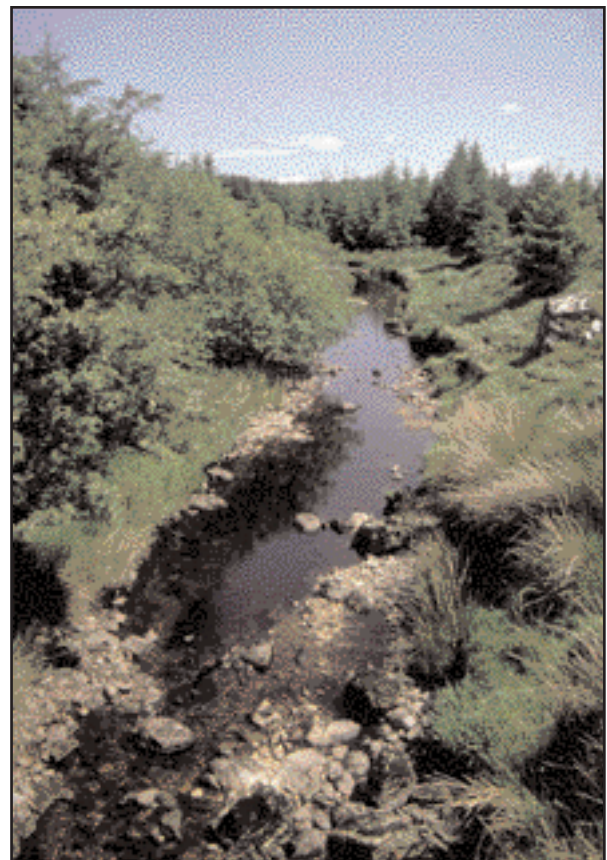
Felling operations, especially clearfelling, remove the intercepting canopy allowing more precipitation to reach the ground. Depending upon precipitation rate, duration and frequency, the volume of water reaching the ground may increase significantly after clearfelling. While this increase is unlikely in Northern Ireland (NI) to result in problems such as flash flooding (since felling coupes are relatively small), drainage water will act as a carrier for eroded soils and pollutants that may result from poorly controlled harvesting operations and inadequate on-site controls.

In order to reduce the risks of contamination beyond the harvesting site it is essential to work around watercourses so as not to disturb their edges. **Under no circumstances should machinery be taken into watercourses.** Where watercourses must be traversed they should be crossed at a minimum of locations, selected on the basis of least potential damage using acceptable standards of bridging or culverting.

Managers and operators should decide on bridge requirement, location and design before harvesting commences (Bridge location may affect the felling layout, so it is advisable to make decisions before felling and not wait until extraction starts).

The final responsibility for the location of crossing points lies with the manager.

The type of bridging required will depend on the channel width and depth, soil type, potential flow rates and expected duration of use. The simplest bridges, which are adequate for most forest drains, are simple log and brash structures where a small number of logs are placed in the watercourse and covered with brash to protect the edges. **Temporary bridges must be removed as soon as the immediate need for them has passed.** If the logs are bound with strops or rope they can be more easily removed.



Channels and water courses with continuous water flow will require at least the installation of culverts or piping to allow through-flow, although in some cases more complex bridges are required which raise the crossing above the watercourse

It is particularly important to protect the access and egress points at any stream crossing. Trees may have been planted well away from the watercourse edge, in which case timber and brash will have to be imported to create a roadway in order to avoid sedimentation of the watercourse due to rutting of the extraction route.

Provided that riparian zones are not disturbed and extraction is restricted to well-maintained brash mats, there is little risk of soil disturbance which causes sedimentation. Where it appears likely that the brash mats may be inadequate, either because of a scarcity of suitable material or because of sudden deterioration due to severe weather conditions, it will be necessary to build in safety features, such as silt traps, to cope with possible sedimentation.

It is important to prevent the movement of any silt off-site because of its harmful effects on aquatic life

and fish stocks. Suspended particles in slow moving waters will restrict plant growth, removing feeding for fish and aquatic invertebrates and will hinder fish and shellfish respiration. Coarser particles will be deposited on stream and river bottoms destroying salmonid redds and reducing feeding potential. In addition, sediment levels at abstraction points can affect the quality of drinking water.

Silt movement can be reduced by strategically locating and maintaining silt traps in drains on, or downstream, from the site. These normally take the form of one or two deepened sections of drain, shallow-dug and no more than two or three metres in length. On steeper ground, drains may be bunded using up-turned root plates to restrict water speed, promoting sedimentation in the trap. Straw bales can also be used as a short-term measure. On some sites silt traps using natural vegetation may have already been designed into the drainage system and these can be equally effective.

As ground water volume increases immediately after clearfelling, flow-rates in the original forest drains can increase dramatically and over-flows are frequently seen where lop and top is not kept clear of the watercourse. This makes extraction more difficult and, in combination with extraction damage on the more susceptible mineral slopes, can cause serious soil erosion and site destabilisation. It is the responsibility of the contractor and operator to carry out inspections and ensure that debris is removed from active drains as the harvesting operation proceeds.

During periods of exceptional heavy or prolonged rainfall, harvesting operations may have to be suspended until soil conditions improve.

Responsibility for maintaining the drainage function of watercourses lies with Rivers Agency who will provide advice if requested.

5. SOIL

Most forest site types are prone to ground damage as a result of timber extraction operations. Rutting of soils may result in silting and sedimentation of streams and rivers. Ponding on flats, if left untreated, will



cause the next crop to be unstable and reduce the area suitable for replanting. Shallow mineral soils, especially on slopes, can be severely eroded. Compaction of mineral soil types may also occur, particularly close to timber offloading points. The environmental impacts of rutting and compaction on peat soils are unlikely to be as severe but may increase timber extraction costs.

Apart from situations where harvesting is carried out by means of manual felling and cable crane extraction, the key to minimising ground damage for all site types is to provide effective brash mats and roading for harvesting machinery. They must be adequately maintained to protect the soil during extraction. The use of harvesting machines, for the most part, reduces the incidence of ground damage as they can provide consolidated brash strips during felling which, if managed correctly, will act as a roadway for the removal of timber by forwarder. The choice of machinery should be appropriate for the product and the site.

What actually constitutes an effective brash mat is dependent on a number of site and operational factors that must be considered at the planning stage.

Conifer branch wood is most effective while still fresh and with time loses its ability to recover from compression. Ground damage is usually more severe where extraction of produce is delayed or extends over a long period of time. Safe access for timber extraction is difficult to provide over previously felled areas. These situations should be avoided where ever possible by careful planning. It may be necessary to import brash or introduce new metalled forwarder

tracks on the more vulnerable sites. New forwarder tracks should be aligned to avoid vulnerable areas and should also be sympathetic to the landscape.

To be effective, **an adequate brash depth must be maintained throughout the operation.** The depth required will depend on a number of factors such as;

- 1) the load bearing capacity of the ground - a combination of soil type and wetness. (deep mats required for most gley soils and peats, shallower mats on better-drained gleys and brown earths),
- 2) extraction machine properties, (such as ground pressures, drive type, aggressiveness of wheels or tracks),
- 3) ground roughness (where increased brash depth is required to even out small undulations),
- 4) stump height,
- 5) the number of machine passes for the brash mat.

Ideally, extraction routes should be as short as possible with unrestricted access to roadside. Unfortunately, on many sites the produce has to be taken out over primary extraction routes in order to avoid obstructions, hazards or sensitive areas such as streams and gullies. These **routes should be marked out at the planning stage** and should where ever possible take advantage of crop edges where brash will be denser and provide a deeper mat. On wetter sites it may be necessary to incorporate dead or smallwood material to build up the mat.

It is likely that the felling sequence on the more sensitive sites will be dictated by the need to move brash forward to repair extraction routes - extracting from farthest away. The operator should be made aware of the primary routes so that he can lay out felling drifts sympathetically.

The location of stacking bays should be identified at the planning stage and should avoid areas of conservation interest.

Whole tree harvesting can create additional problems, as more material is being transported, leading to more journeys and there can also be no brash available to create mats. The likelihood of soil compaction and erosion with associated water problems on susceptible soil types is therefore high. Whole tree harvesting can also lead to increased fertiliser requirements as a result of the removal of nutrients in foliage and woody material. The possible impacts of whole tree harvesting should therefore be carefully considered before deciding the harvesting method to be used.



Machinery and vehicle load sizes should be appropriate to soil and road bearing capacities.

6. POLLUTION

Pollution during harvesting operations may occur from leakage of fuels, hydraulic fluids, lubricants and stump treatment chemicals into streams and rivers.

The type of spillage incident likely to occur can range from minor hose bursts, refuelling or maintenance spillages, to more serious losses where machines are damaged, overturn, or are subject to vandalism.

The most effective control measure is to keep as much distance as possible between the potential pollutants and the watercourses and their feed-drains. Machines, fuel, oil, or chemical containers and bowsers should not be left beside streams or drains. All machinery and bowsers should be made secure against acts of vandalism. Refuelling and maintenance and repair work should be carried out a safe distance from watercourses. **Suitable parking, stacking, storage and maintenance areas should be identified and agreed before work commences.**

Operators and managers should ensure that harvesting, extraction and haulage machines are in good repair and are not leaking fuels, engine oil or hydraulic fluids. Repairs should be immediate and not be deferred until the end of the shift or job. All reasonable care should be taken to ensure that all oils, fuels, materials and containers resulting from maintenance operations are contained and disposed of safely.

All persons supervising or working on the site should be aware of the procedures for summoning assistance in the event of an accident involving serious pollution risk and emergency spillage kits should be available on site at all times.

It is more difficult to avoid contamination during actual felling and extraction operations. The best option is to minimise the time that machines are working in close proximity to streams or feed-drains, by avoiding stacking timber beside streams or on top of active drains and manually felling trees away from stream edges rather than using harvesters.

Any accidental spillage that does occur should be dealt with immediately. Minor spillages such as burst pipes, where the volume of hydraulic fluid is probably less than ten litres, can be dealt with using proprietary oil-absorbent materials that are readily available. Provided that the spillage occurs away from water courses, absorbent pillows or blankets will be adequate.

In the event of a watercourse contamination incident the contractor/operator must immediately follow the emergency procedure laid down in a pollution contingency plan for the forest.

Where the incident occurs beside a watercourse or its feeder drains, and there is a genuine risk of contamination, absorbent booms will be required.

It is worth considering using biodegradable lubricants and hydraulic fluids where practical. Clearfelling using chainsaw will release in the order of 75 litres of chain oil per felled hectare and many suppliers now offer vegetable chain oils which will break down in water.

Urea and other materials for stump treatment should be treated as any other chemical substance and kept away from watercourses in secure labelled containers. They must not be mixed beside drains or watercourses.

All containers should be removed from site and properly disposed of when empty. Not only are these hazards to forest animals but they can also be a risk to forest users, especially children.

All users of the forest should remove their litter when they leave. This applies equally to harvesting operators who are expected to contain their litter, (including burst pipes, filters, food containers, plastic wrappers, etc.) and remove it on a daily basis.

Lop and top and other harvesting debris should only be burned where there is a demonstrable management benefit and after full consideration of the environmental impact.

7. ARCHAEOLOGICAL SITES

Before any harvesting work starts, all historic monuments should be clearly identified, both on maps and on the ground, including any not on the site but near to extraction routes and stacking areas. Markers should be placed outside the monument boundary and not on the monument itself. **There are no circumstances under which machinery should be permitted to travel over historic monuments** and any crop trees growing on monuments should be felled and lifted or winched off the



monument. Tree roots on monuments should be left in the ground to avoid soil disturbance and any windblown stumps should be pushed back into their original position.

Problems can arise when trying to assess the extent of archaeological sites, as in many cases the ground lying between obvious features forms an integral part of the site and must not be disturbed. If any doubt exists, advice should be sought from Environment and Heritage Service of the Department of the Environment.

Buildings or other man-made structures, including former industrial sites, within forests can have a high conservation or heritage value, possibly providing habitat diversity and valuable niches for plants, animals and birds. They should therefore be avoided during harvesting operations.

8. WILDLIFE

About forty species of birds, insects and mammals especially protected by the 1985 Wildlife (NI) Order are associated to some degree with forests and woods, which provide shelter, food and protection at different times of the year. Forest managers and contractors should be aware of their responsibilities and duty to protect them and the habitats upon which they depend, as well as their responsibilities to all other species.

Harvesting causes a major change in forest structure that can have a significant effect on the resident wildlife at the time of harvesting.

An inspection of the harvesting site should be carried out shortly before felling commences and should focus on different wildlife indicators and seasonal needs of the wildlife. **All locations requiring protection should be identified, on maps and on the ground, in order to make everyone concerned aware of their presence.**



Nests of protected birds found during the pre-harvesting inspection or during subsequent harvesting operations should not be destroyed or disturbed while they are in use. Nesting periods vary for different birds. For example herons can be found at traditional nesting sites as early as January and young buzzards may still be receiving food from their parents in the vicinity of the nest as late as August.

If unusual nests are found professional advice should be sought immediately, as it may be necessary to demarcate a harvesting exclusion zone. It should be remembered that nests might be on the ground as well as in trees.

All species of bats are protected and have different roost sites in winter and summer. If bats or their roosts are discovered during harvesting operations professional advice should be sought.

Badger setts are protected and may be in use throughout the year. Setts should not be disturbed at any time. Machines should not be permitted to travel over setts. Crop trees growing on setts should be felled and winched or lifted away. Markers should be placed outside sett boundaries and not on the sett itself.

Badgers are particularly sensitive to disturbance during the breeding season, which lasts from December to June.

All markers used to protect sensitive wildlife sites should be removed at the end of the operation.

9. PLANTS AND TREES

Some plants which may occur on harvesting sites are protected by law. These are rare and must not be disturbed at any time. More commonly there are plants and trees, which are not part of the commercial crop, but make a contribution to the diversity of the forest and therefore have a high conservation value. The latter category includes both conifer and broad-leaved trees which are retained to grow to large sizes and extreme age.

Good planning and careful harvesting should protect these trees and plants. Felling should be directed away from areas to be protected.

Extraction routes should be designed to avoid sensitive areas as far as is practical, not only to protect these areas but also because ground conditions are often softer and the lack of conifer brush adds to the likelihood of soil damage due to bogging.

Areas to be protected should be identified and their status taken into account in the design of the re-planting.



10. PEOPLE

Local people and relevant organisations should be made aware of harvesting plans. Forest managers should also be aware of the views of local people. Consultation with neighbours is advisable, as is informing all forest users about restrictions to their movements and the likely duration of these. This also provides an opportunity to make the public aware of the intentions behind long-term forest changes.



The possible impacts on the public should all be taken into account. These include changes to landscape, noise, traffic, dust and debris on roads.

The likely impacts of harvesting operations on forest recreation should be considered and it may be possible to adjust the timing of operations to reduce the impact. Adequate warning signs should be used, both to ensure public safety, and to provide information to the public about the harvesting operation and alternative routes through the forest.

Appendix I

LEGISLATION

Fisheries Act (Northern Ireland) 1966

Water Act (Northern Ireland) 1972

The Wildlife (Northern Ireland) Order 1985

The Nature Conservation and Amenity Lands (Northern Ireland) Order 1985

Environmental Assessment (Afforestation) Regulations (Northern Ireland) 1989

The Litter (Northern Ireland) Order 1994

Historic Monuments Order (Northern Ireland) 1995

EEC Directive 75/440 (Quality of surface water intended for drinking)

EEC Directive 78/659 (Quality of water for fish)

EEC Directive 79/409 (Conservation of wild birds)

EEC Directive 92/43 (Conservation of natural habitats)

Appendix 2

OTHER REFERENCES

Conservation Guidelines	DANI 1987
Forests and Water Guidelines	FC 1993
Forest Operations and Badger Setts	FC 1995
Whole Tree Harvesting	FC 1997
Forests and Soil Conservation Guidelines	FC and DANI 1998
Forest Design Planning	FC and DANI 1998
The UK Forestry Standard	FC and DANI 1998

Appendix 3

ADDRESSES FOR FURTHER INFORMATION

Forest Service
Dundonald House
Upper Newtownards Road
Belfast
BT4 3SB
Tel: 01232 520100

Forestry Commission
231 Corstorphine Road
Edinburgh
EH12 7AT
Tel: 0131 3340303

Appendix 4 CHECKLIST

FOREST	COMPARTMENT	DATE

1. Have all natural watercourses and active drains on the site been identified?
2. Are all bridging points at agreed locations?
3. Are all bridges of a suitable construction?
4. Are all access points to bridges suitably protected?
5. Are all natural watercourses and active drains clear of harvesting debris?
6. Has machinery worked in, over or crossed watercourses without bridges?
7. Are all machinery and traction aids appropriate for the site?
8. Are stacking areas appropriately located at agreed sites?
9. Are all extraction routes correctly located?
10. Are all extraction routes sufficiently bedded and maintained?
11. Have adequate measures to prevent silt run-off from extraction routes been taken?
12. Are fuel dumps securely located at agreed sites?
- 13 a. Have there been any spillages of fuel, oil or chemicals?
- 13 b. Have these been correctly treated?
14. Is there a contingency plan to deal with siltation or pollution incidents and is the plan being complied with?
15. Have all possible historic monuments on the site been clearly identified?
16. Have all crop trees on monuments been felled and correctly extracted?
17. Have extraction routes and stacking areas clearly avoided historic monuments?
18. Has harvesting avoided any damage to recent structures and their surroundings?
19. Have all possible nests of protected birds been identified and a suitable exclusion zone clearly marked?
20. Have all badger setts been clearly identified?
21. Have all crop trees on badger setts been felled and correctly extracted?
22. Have extraction routes and stacking areas clearly avoided badger setts?
23. Have all non-commercial trees and areas of conservation value been protected during harvesting operations?

This checklist is a summary of the points covered in the publication and may be copied for field use.

