

Harvesting and Selling Timber from Conifer Forests

A Step-by-Step Guide for Forest Owners





Foreword



**Dr. Nuala
Ní Fhlatharta**

*Head of Teagasc
Forestry Development
Department*

This publication is very timely as the forecasted increase in timber supply to the Irish market in future years will come almost exclusively from privately-owned forests. The mobilisation of this important supply is dependent on timely and active management of what is traditionally referred to as the ‘Farm Forest’. Active management commences with individual forest owners developing an awareness and understanding of their own forests. This allows for timely planning of activities such as providing suitable access to their forest.

Forest management is a relatively new venture for many forest owners. The steps involved in organising forest harvests and timber sales, including knowing where to start and who to approach, can be challenging, particularly if putting the initial ‘toe in the water’.

This book offers a step by step guide to forest owners in getting timber from their conifer forests to the market place. Teagasc recommends that planning for this process begins ‘in good time’; a few years out from the actual harvest. Gaining knowledge of timber assortments and products, the paperwork involved, the potential buyers, along with required preparation in the forest, all need a significant lead in time.

The Teagasc Forestry Development Department is available to owners and provides independent and objective advice and guidance. This is available via one-to-one contacts or through a range of initiatives designed to share knowledge. We can be contacted through local Teagasc offices or through our website www.teagasc.ie/forestry. Our Forestry advisers hold many events to demonstrate what is involved in harvesting and selling timber. Forest owners can also avail of opportunities to meet with foresters and timber buyers at focused events. Participation in local Forest Owner Groups is another great way to meet like-minded forest owners, swap experiences and share information. These groups can develop local supply chains for timber products, putting the ideas of ‘strength in numbers’ into action.

The key messages for owners considering forest management and timber sales are set out in this booklet; start the process in good time, access good advice, engage people who will work with you for the benefit of your forest and have a good contract in place to ensure a successful outcome. This approach will greatly help in optimising your valuable forest resource.

Nuala Ní Fhlatharta

Introduction

This booklet aims to take some of the mystery out of harvesting and selling your timber and to help you to maintain control of your valuable forest resource throughout the harvesting and sales process.

Ireland has a vibrant forestry sector and demand for timber is forecast to increase significantly in the coming years. Many farm forests are now at a stage where conifer timber harvesting can commence. Owners can generate income from their trees through thinning and clearfell operations.

It is important that you understand how best to initiate harvesting operations. Teagasc encourages owners to take an active interest in learning about their forests and become more familiar with the key steps involved in timber harvesting. There is a wide range of advisory and support services available to help you. This booklet provides key information on the timber harvesting process following six sequential steps:

- Step 1** Seek Advice & Training
- Step 2** Know your Forest
- Step 3** Plan your Timber Sale
- Step 4** Prepare for Harvesting Operations
- Step 5** Agree a Timber Sales Contract
- Step 6** Control your Harvest & Sale



It aims to take some of the mystery out of harvesting and selling timber, enabling you to maintain control of your valuable forest resource throughout the process. It will also recommend where to get further information and professional assistance along the way.

The start of harvesting operations is a time of opportunity, allowing you to further optimise the growth of your forest, maximise its potential timber yield, provide a source of income and meet other non-timber objectives.

Please note that this booklet focuses on the harvesting and sale of coniferous trees

Step 1



Seek Advice & Training

It is understandable that some forest owners may feel anxious about the processes involved in harvesting and selling timber, especially if it is their first experience. Information contained in this guide will help you to understand what is involved. Remember that knowledge is power. Acquiring relevant knowledge is an invaluable first step in the process. There is additional support readily available from a number of sources to help make the process easier to understand and execute.

Teagasc

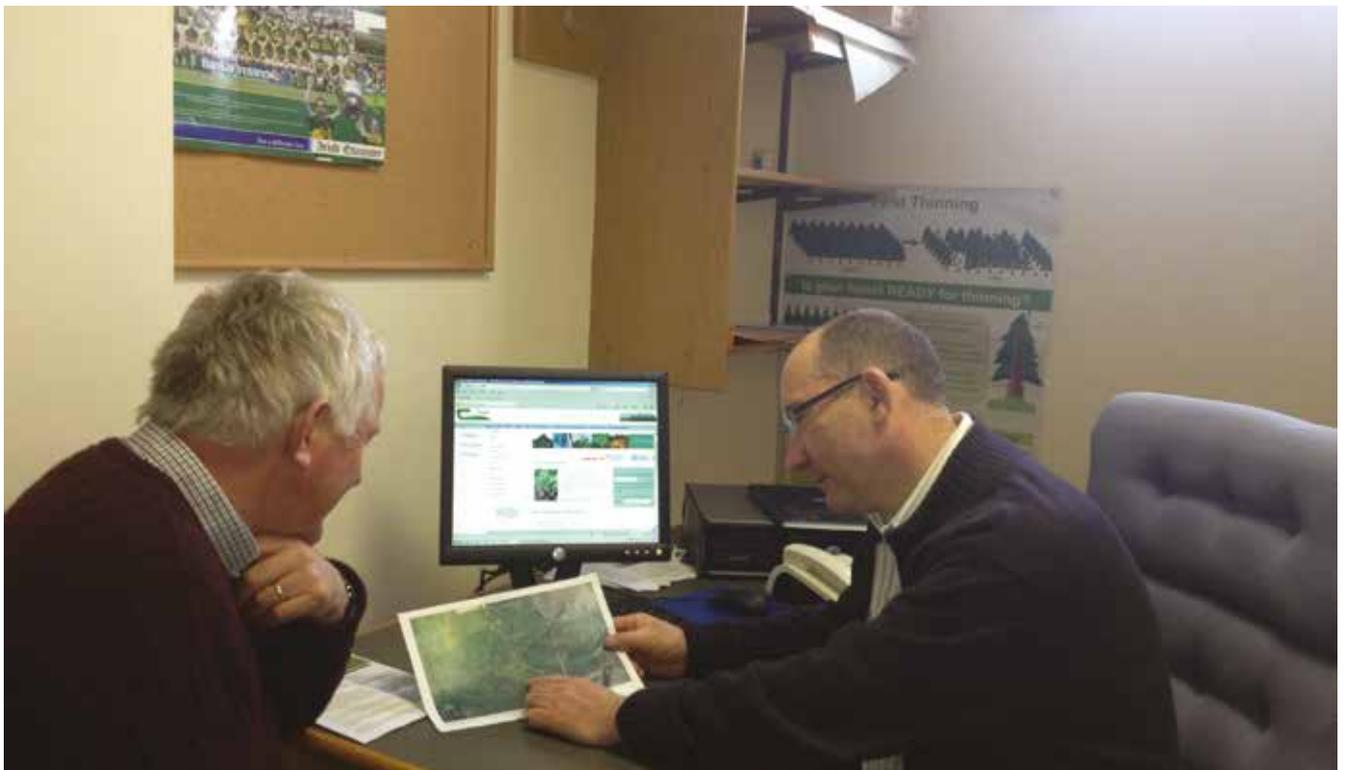
The Teagasc Forestry Development Department provides a wide range of services for all forest owners which are free, objective and independent.

Supported by on-going Teagasc research, these services include:

- one-to-one advice.
- local and national demonstration events.
- a wide range of information both online and in print.
- technical training.

Remember that knowledge is power. Acquiring relevant knowledge is an invaluable first step in the process of harvesting and selling your timber

Further information on the services Teagasc provides can be found at www.teagasc.ie/forestry



Forest owner groups

In addition to availing of Teagasc services, you can build up your knowledge base through peer-to-peer learning by joining a local Forest Owner Group. Here you will meet like-minded people who are willing to share information and discuss their experiences of harvesting and selling timber. Further information on Forest Owner Groups can be found at www.teagasc.ie/forestry.



Registered foresters

Registered Foresters are professional foresters, working either as consultant foresters or employed by forestry companies. It is recommended that you use the services of these foresters to assist with planning and executing your timber harvesting and sales operations. Applications for all forestry grant aided activities require their input. Registered Foresters are expected to provide forest owners with a high-quality service which meets the Department's grant and licencing application requirements.

Further information on Registered Foresters can be found on the Department of Agriculture Food and Marine website, www.agriculture.gov.ie

Department of Agriculture Food and Marine (DAFM) – Forestry Division



An Roinn Talmhaíochta,
Bia agus Mara
Department of Agriculture,
Food and the Marine

The DAFM (Forestry Division) has responsibility for the regulation of all timber harvesting activities in forests through the licencing of tree felling and forest road construction. Further information on how timber harvesting operations are regulated can be found on the Department of Agriculture Food and Marine website, www.agriculture.gov.ie.

Step 2



Know your Forest

Assessing how your trees are growing is important. It is the only way to know when to start your timber harvesting operations. While you may have management records from when your forest was originally established, nothing beats getting into your forest to monitor its current development. Having a clear understanding of your objectives for the forest crop is also very important. For example, you may wish to plan for a future clearfell, or to maintain forest cover indefinitely by using a continuous cover forest (CCF) management approach, or prepare for Forest Certification.

Gathering information

You should keep a **Forestry Folder** to store all relevant documents and records relating to your forest. One of your most important forestry documents is your Certified Species Map which was produced at the time of establishing your forest. This map contains important information about your forest such as plot boundaries, plot areas, the tree species planted, the planting date(s) and the estimated productivity (Yield Class).

Keep a Forestry Folder to store all relevant documents and records relating to your forest. These will be invaluable for future planning.

A **Biodiversity Map** (BIO Map) may also have been prepared at the establishment stage. This map will help highlight environmental or archaeological features within or close to your forest. Important information such as prescribed unplanted setback distances, hazard zones and exclusion zones and other protection areas and measures will be included.

Have a Forest Management Plan

The DAFM (Forestry Division) will require you to prepare and submit a Forest Management Plan, when your conifer forest reaches 10 years of age and is 10 ha or greater in area. The Plan must be prepared by a Registered Forester, following a field assessment. This plan is an important document that should be kept in your forestry folder. It will provide updated details on each of your forestry plots, including the tree stocking rate, nutrient status, average heights and Yield Class estimates of the different species. It will also include details on when further management interventions are required, including thinning and clearfell and the projected year for each operation. Recommendations for access and roading requirements to facilitate harvesting operations will also be included.



If your conifer forest is less than 10 hectares you do not have to prepare and submit a Forest Management Plan. However, this is a very useful exercise, and you should consider engaging a Registered Forester to assess your plantation and prepare a plan, irrespective of DAFM requirements.

All future applications to the DAFM, including Felling Licence and Forest Road Grant applications should be based on the details contained in the Forest Management Plan and associated Certified Species Map.

Inspection paths

Inspection paths are necessary to allow you access your conifer forest prior to first thinning. They serve three main functions:

- they allow easy access through the young conifer crop.
- they facilitate monitoring and gathering of crop inventory details.
- they make forests more presentable to foresters, prospective timber buyers and harvesting contractors.

They should be installed once canopy closure occurs and are cut about 100m apart following the planting lines. The lower branches of trees along the paths are removed (brushed) using a handsaw or chainsaw. It is not an expensive operation and is often carried out by forest owners themselves (taking appropriate safety precautions).



It is a good idea to record the location of your inspection paths on a map and to clearly mark their start and end points at the edge of your forest so that they can be easily located by others.

Further information and a video on installing inspection paths can be found on the Teagasc Forestry YouTube channel.

www.youtube.com/watch?v=9A47Lfm_Zfc

Measure your forest

Once your inspection paths have been cut, you can begin to carry out an inventory i.e. measure some important crop parameters such as:

Productive Area:	An estimate of the area of your forest in which trees are actually growing. It excludes unplanted setbacks, ditches, ride lines and roads and also any areas that have not established properly.
Stocking:	The average number of trees growing in a fixed area of your forest.
Mean Diameter:	The average diameter of your trees, measured at 1.3 metres above ground level. It is referred to as Diameter at Breast Height or DBH.
Top Height:	The average height of some of your largest diameter (DBH) trees.
Yield Class:	This is an estimate of the productivity of your forest and is expressed in cubic metres m ³ /ha/year. For example, a 'Yield Class 20' forest should yield an average of 20 m ³ /ha/ year over its lifetime. Yield Class can be calculated by entering the measured Top Height and age of your forest into a Yield Class lookup table. It can be a useful indicator of when and how to thin and clearfell your forest.

It is not practical to measure each tree in a forest. However, useful measurements can be collected by taking samples of trees in a number of plots representative of the whole forest. You may want to carry out some measurements yourself, using the useful guides available on the Teagasc website. However, as your forest develops and your timber crop becomes more valuable, you should engage a Registered Forester to carry out more detailed inventory and site assessment. Important site considerations should be reviewed at this stage including, the drainage status, crop stability, entrance and roading requirements. Information gathered in the inventory will help to determine when best to carry out harvesting operations.



Harvesting objectives

For any forest crop to achieve its full commercial potential along with achieving other objectives, management is required. This normally involves carrying out thinning interventions at the appropriate time and at the appropriate intensity. Thinning too late or at the wrong intensity can lead to increased windthrow risk or a reduction in potential growth. Well executed thinning operations will increase the quality and size of your remaining trees, allowing larger, more valuable commercial timber to grow. First thinning in conifer forests should normally start when your trees are between 10 and 12 metres in height. The Teagasc Thinning Ready Reckoner is an indicative tool that can help you determine the best time to start your first thinning operations. However, it is important to understand that not all forests may be suitable for thinning due to soil type or their location. These forests if thinned, may become excessively unstable and more liable to wind throw damage.

The Teagasc Thinning Ready Reckoner is a simple aid for working out when your conifer forest is ready for thinning. This is available on our website,

www.teagasc.ie/crops/forestry/advice/timber-harvesting/thinning-ready-reckoner

DBH cm	Not suitable for thinning			Get ready for thinning			Suitable for thinning		
	2500	2400	2300	2200	2100	2000	1900	1800	1700
7									
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Step 3



Plan your Timber Sale

Now that you have assessed your forest and know that it is approaching a harvesting operation, you need to decide how you will sell your timber. Being well informed about timber markets, knowing the various participants and understanding how best to interact with them will help you to successfully navigate the timber sales process and protect your interests along the way. Key questions include: “What can I do to ensure a quality harvesting operation, a good price for my timber and a prompt payment?”

What timber products will be harvested from my forest?

Timber is divided into categories or assortments based on the diameter and length of the logs cut during harvesting. The quantity (and price) of each category depends on the size, age and quality of the trees being harvested. Generally, there is a higher proportion of smaller, lower value assortments harvested from younger trees at first thinning stage. As your trees grow and mature, larger value assortments develop.

Being well informed about timber markets, knowing the various participants and understanding how best to interact with them will help you to successfully navigate the timber sales process and protect your interests along the way



Pulp

Trees removed during first thinning generally fall into the pulp category. Pulp wood is used for panel boards and wood energy. It also is cut from the top section of larger diameter trees. Poor quality large trees also fall into this category. It has a minimum small end diameter of 7cm. It usually has a lower value than the other larger assortments. Better quality small dimension trees can be cut as stakewood



Palletwood

Logs in this category have a minimum small end diameter of 14cm and a top end diameter of 20cm. It is used to manufacture products such as packaging, pallets, garden furniture and fencing and usually has a mid-range value compared with other assortments.



Sawlog

This is cut from the lower section of the tree and has a minimum small end diameter of 18 or 20cm. It is used to produce sawn timber for the construction industry and is the most valuable assortment. In general, your first and second thinnings will not include trees large enough to fall into this category.

Well executed thinning operations during the development of your forest will really help to maximise the percentage of higher value sawlog assortments in your later harvests.

Who will buy my timber?

Timber buyers have representatives to source timber and to ensure they get a good deal. Therefore, it is advisable to consider engaging an independent Registered Forester to act fully on your behalf when planning and executing your timber sale. Your forester will ensure that your timber sales process is properly planned with your best interests in mind. They will also assist with all the technical, regulatory and logistical aspects of a timber harvesting operation.

The main options for timber sales are:

- **Selling directly to a Sawmill:** Sawmills typically have a forester or operations manager working for them who will engage with you (or your forester) to agree a sale price, associated contract and execute the required timber harvesting and haulage operations. Depending on how you choose to sell your timber, the sawmill may be responsible for the harvesting operations or may simply collect harvested assortments from your forest.
- **Selling to a Timber Harvesting Contractor:** a harvesting contractor will agree to buy your standing timber from you, harvest it and then sell it on to a sawmill or other timber processors.
- **Selling to a Forestry Company, Forester or Timber Trader:** here a company or individual agrees to buy your timber from you, arrange for a harvesting contractor to harvest it and then sell it on to a sawmill or other timber processors.

How do I sell my timber?

Timber can be sold in a number of ways, depending on who you are planning to sell to and how involved you or your forester intends to be in the sales and harvesting processes.

Standing Sale: This is when timber is sold as it stands in the forest at an agreed unit price (€ per tonne or € per cubic metre) in advance of harvesting. The buyer is then responsible for all costs associated with harvesting and haulage operations. If your forest is being thinned, your agreed sale price will reflect the size of trees that should be removed during the thinning. If your forest is being clearfelled, your agreed sale price will reflect the size and quality of all of the trees in your final crop.

Harvested Roadside Sale: This is when timber is sold from harvested assortments stacked at your forest roadside, at an agreed unit price (€ per tonne or € per cubic metre). A harvesting contractor is contracted and paid to harvest your timber and present it at roadside for your timber buyer. The buyer is then responsible for costs associated with haulage operations.

Harvested Mill Gate Sale: In this case, harvested assortments are delivered to an agreed processing location, at an agreed unit price (€ per tonne or € per cubic metre). The seller will contract and pay a harvesting contractor to harvest the timber and a haulage contractor to deliver it to the buyer.

While the sale of timber is income-tax free, it is important to seek professional advice in relation to other tax implications (e.g. VAT) associated with your planned sale method.



By opting for a harvested sale, you will have more control of your forest harvesting operation, something that is particularly beneficial for thinning operations where the focus should be on improving the quality of your remaining crop. However, there is a risk associated with taking on the responsibility of producing agreed assortments. Depending on your control of operations, you may be responsible for a number of roles, e.g. Landowner and / or Forestry Works Manager. If the land owner is carrying out the work themselves then all of the requirements of the Health and Safety and Welfare at work Act 2005 rest with them. For these reasons, private forestry timber is often sold as Standing Sales.

See www.teagasc.ie/crops/forestry/advice/forest-protection/health-and-safety

How will my harvested timber be measured?

As part of planning your timber sale, it is important that you understand how your harvested timber will be measured in order to calculate how much you are to be paid. Your timber sale can be planned and agreed in units of volume (cubic metres) or weight (tonnes). Currently, timber from private forests is most commonly sold by weight, where the timber trucks are weighed at a saw mill or pulp mill weighbridge and the weight of the timber calculated. Timber density can vary considerably and harvested timber can dry out over time. It is important that you understand how to minimise the impact of weight loss by timber drying before it is weighed and paid for. Your timber sale contract should include specific incentives and penalties to avoid a long-drawn-out harvesting process.

Before embarking on your first timber sale it is worth engaging with other forest owners who have already begun the process of harvesting and selling their timber.

Once you have considered how you might sell your timber it is advisable to engage the services of a Registered Forester to help with the following tasks:

- process all necessary documentation to secure a Felling Licence.
- plan forest roading operations and associated grant claims (if you require one).
- carry out an inventory of your trees to estimate timber volumes and associated values ahead of your sale.
- source suitable harvesting contractors if you opt for a Harvested Sale.
- advertise your sale to prospective purchasers and secure competitive prices from reputable timber buyers.
- prepare a harvesting plan specific to your forest area being harvested. A replanting plan is also required if clearfelling.
- prepare a timber sales contract



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The following sections of this guide will help you to understand more about each of the necessary steps required to execute and control your timber sale. They will also help you to ensure that you get properly paid for what is harvested from your forest, while protecting your forest for future harvests.

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Step 4



Prepare for Harvesting Operations

There are a number of important steps to follow as you prepare for the start of your timber harvesting operations. These steps can involve securing your felling licence, planning and constructing a forest entrance, road and timber loading area (where applicable), measuring what you are selling, advertising and agreeing on your timber sale, drawing up a harvest plan and a contract.

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As these steps can involve several interactions with DAFM (Forestry Division) and other planning and regulatory bodies, they can take some time to complete and should be started up to two years before you intend selling your timber.
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Forward planning for harvesting operations can take considerable time. It is important to start well in advance

Secure your felling licence

Under the Forestry Act, 2014, you are required to notify the DAFM of your intention to fell trees in your forest. This is done through the felling licence application process. Currently a felling licence is valid for a period of up to 10 years and can cover a number of thinning operations. If you are planning to clearfell your forest, you must specifically apply for a clear-fell licence which must also incorporate a replanting plan.

For most sites, a high-level harvesting and environmental plan and associated mapping will be required at the felling licence application stage. Sites in more environmentally sensitive areas will require additional environmental assessments and operational planning to mitigate any negative environmental impact. It is advisable to use the services of a Registered Forester to help you prepare and submit your application. You may also require the services of an ecologist and / or an archaeologist to assist in the preparation of any additional environmental information required. As part of your felling licence application process there will be a public consultation period to allow individuals and non-statutory bodies to submit possible concerns on your planned felling operations.

Plan and construct a forest entrance, road and timber loading area.

To facilitate the haulage of harvested timber from your forest you must ensure there is suitable access for timber trucks. A good road infrastructure is critical to the success of any forest harvesting operation. The minimum requirement will be a safe entrance where trucks can enter from the public road, drive to a safe timber loading area and turn to exit safely. Larger forests will require additional internal roading to reduce the distances that harvesting machinery must move timber to roadside. A well-planned forest road system, incorporating areas for parking, stacking, loading and turning will assist harvesting and make your timber sales more attractive to potential buyers.

While road construction is often the single biggest investment involved in harvesting and selling your timber, it is supported by a specific DAFM grant. You will need the services of a Registered Forester to help you to apply for the roading grant. Your Forester will also assist in managing their construction in accordance with environmental and engineering guidelines. As with your felling licence application, you may also require the services of an ecologist, an archaeologist and a civil engineer. In certain circumstances, planning permission is required for forest entrances.

Measure what you are selling

A detailed pre-sale inventory should be carried out to give you an up-to-date estimate of timber volumes to be harvested. While prospective timber buyers will view your crop and make their own assessments, it is important that you have your own assessment in order to understand and describe what you are selling. Good pre-sale inventory measurements become increasingly important as your forest increases in value and develops towards the stage of final harvesting.



Advertise and agree on your timber sale

As with any sale, contact as many prospective buyers as possible. This is particularly important if you are clear-felling valuable sawlog assortments which are always in strong demand. Working with a Forester with experience in selling timber will help you to secure the best price. Having an up-to-date map of your forest, along with any inventory measurements, and felling licence will help prospective buyers assess your timber and determine its value with more accuracy.

It is important to understand that not all offers are the same and you need to compare like with like before agreeing on a buyer, their sale price and any conditions attaching to their offer. For example, in standing sales, some buyers might offer a price for different assortments while others might offer an average price across all assortments. It is also important to request references from any potential buyers. It is advisable to talk to other forest owners who have been through the harvesting process. Your local forest owner group can facilitate this.

Harvest plan

Before harvesting begins, additional information should be added to your harvest plan. This should include specific information on how your timber buyer and / or harvesting contractor plans to carry out harvesting operations while protecting the environment, the health and safety of operators and the general public.

This final harvest plan, accompanied by a detailed map showing specific site features and highlighting elements of the plan, should include items such as;

- health & safety planning to keep the harvesting site and its approaches safe for operators, yourself, and the general public (risk assessment);
- environmental planning with measures to protect soils, watercourses, wildlife habitats and any archaeological features;
- details on what harvesting machinery will be used (it is important that the correct machinery is used to protect your forest's soils and, in the case of thinning, protect your remaining trees);
- details on how your forest will be thinned if you are planning a thinning operation;
- details on what timber assortments are to be harvested and
- details on how timber will be extracted from your forest (forwarding routes) and where it is to be stacked ready for haulage.

This plan will form an important part of your Timber Sale Contract which is explained in Step 5.

Step 5



Agree a Timber Sales Contract

It is strongly recommended to have a written contract with anyone involved in timber harvesting and sales in your forest (e.g. your forester, timber buyer and/or harvesting contractor). Verbal agreements are not satisfactory as they can be open to misinterpretation.

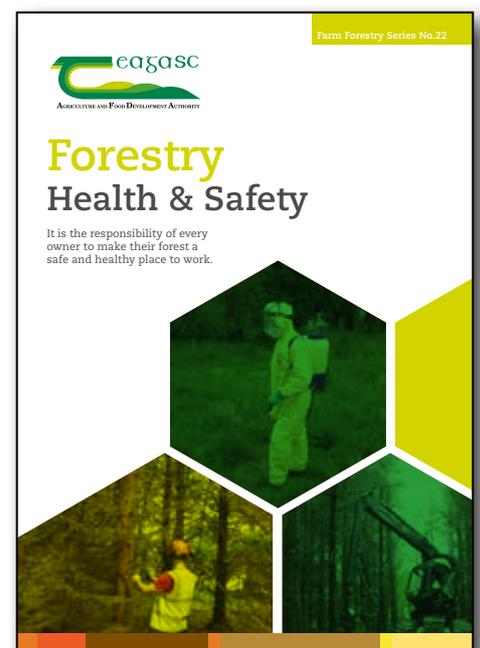
Engaging a forester to organise your timber sale

If employing a forester to oversee your timber sale, it is advisable to have an agreement drawn up setting out what services they will provide and the costs involved. Services may include;

- harvesting-related applications:
 - felling licence & harvesting plan
 - road grant
 - Nature Impact Statement (NIS – a study carried out to determine if a forest operation may pose a rise to a Natura site?)
- preparing a risk assessment and site health & safety plan;
- carrying out a forest inventory to get an estimate of the total timber volume and average volume per tree;
- estimating timber product assortments, percentages of pulp, stake, pallet and sawlog;
- securing quotes from a number of potential buyers;
- managing and supervising the harvesting operations and timber security;
- inspecting the work to see if operations are in line with the contract and
- liaising with the buyer on behalf of the forest owner/seller.

As the owner, you have responsibilities too. It is your responsibility to make sure that the conditions of the felling licence and the Health & Safety at Work Act are adhered to.

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Safety statement

A safety statement is a written document aimed at minimising exposure to risk or injury or ill-health for all people working in the forest. If the landowner is undertaking the work or is directing the work then he / she needs to prepare a safety statement. In turn all workers must abide by these measures.

For information on Forestry Health and Safety see;

www.teagasc.ie/media/website/crops/forestry/advice/Forestry-Health--Safety.pdf

Timber sales contract

A legally binding contract clearly sets down the conditions of the timber sale and the responsibilities of each party. Such a contract is necessary to protect both parties and clarifies what is expected on both sides. A forester / buyer / harvesting contractor prepared contract should be read through and understood to ensure it protects your interests.

A timber sales contract should incorporate:

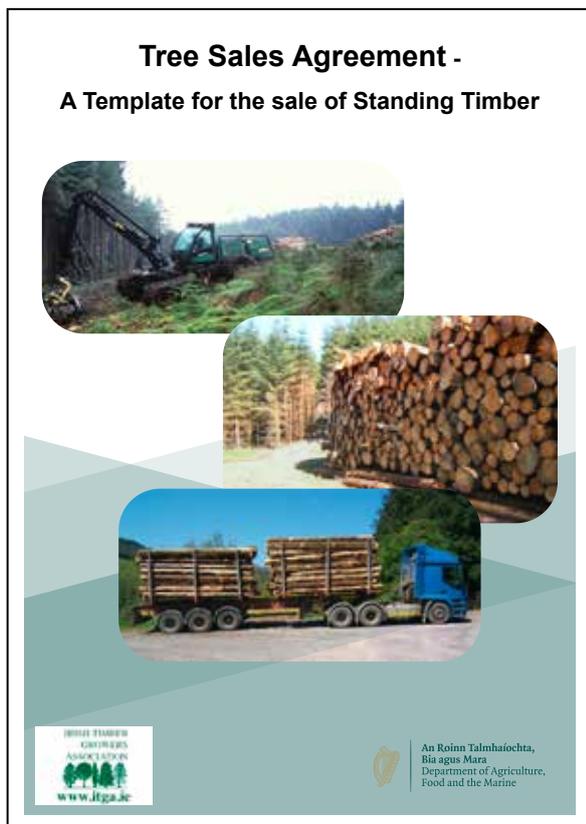
- your identity as the seller and proof of ownership of the timber;
- the identity and contact details of the buyer;
- the location of the site, relevant site features and the area to be harvested;
- the price to be paid, including an agreed deposit, instalment payment schedule and when the transfer of the timber ownership occurs;
- the method of measurement (m³ or tonnes) and the categories of products (pulp, stake, pallet and sawlog);
- agreement on road use, including maximum weights;
- the start and finishing dates;
- statement that harvesting will be carried out in accordance with best silvicultural practice and in compliance with the conditions of the felling licence;
- the correct application of urea and dye on freshly cut stumps;
- written proof that the buyer, their employees/contractor are fully compliant with, and are aware of their responsibilities under the Health & Safety at Work Act;
- written proof of operator's/contractor's insurance cover and qualifications;
- assign liability for property damage, including roads;
- provision for the protection of the residual stand with penalties for unnecessary felling and damage;
- the maximum length of time timber is left at roadside and the associated penalties imposed due to moisture loss when sold by weight;
- use of a "docket system" or other appropriate systems and designate times when timber lorries can enter the site;
- provide for the termination of the sales agreement if any of the provisions of the contract are not adhered to and
- arbitration in the event of disputes between parties.

This is not a comprehensive list of what should be in your timber sales contract. Reference should be made to the – ‘Tree Sales Agreement – a template for the sale of standing timber’. This document was produced by the Irish Timber Growers Association (ITGA) with support from the DAFM, Forestry Division. It is important to have your Solicitor give their professional advice on any contract drawn up. Your Forester should also feed into the process.

See www.itga.ie/services/information/sales-systems

Some foresters/forest companies may also offer you a package where they undertake to harvest, transport and sell your timber. Management costs are charged as a percentage of the net timber value. Transparency in all stages of this process is very important. Ensure the terms of such a package are covered under an appropriate contract. You should consider the following:

- who is buying the timber?
- what prices are being offered by the end user?, get a number of quotes;
- be clear of the costs involved;
- what is the method and timing of payment?
- what are the responsibilities of the forester / forestry company? and,
- what are the tax implications?





Step 6



Control your Harvest & Sale

When harvesting operations begin it is essential that you or your forester carefully monitor progress and ensure all procedures that were pre-agreed are being followed. This involves supervising thinning and clearfell operations, keeping track of timber harvested and getting paid for your timber.

While the clearfell harvest is relatively straightforward; thinning requires careful management to ensure the future development of your forest. Over-thinning may give some short term financial gain, but it can result in serious long term devaluation of the crop. Under-thinning does not sufficiently allow your forest to develop to its potential. Thinning control protects your forest in the long term by ensuring that thinning is carried out to the recommended prescription and that the correct intensity, volume and type of trees are removed.

Good supervision of thinning and clearfell operations allow you to keep track of the timber harvested and ensures that you get prompt payment for you timber.

Thinning prescription

An experienced forester can prescribe an appropriate thinning prescription based on the information gathered in the forest inventory.

For example in first thinning, the prescription might be to remove one third of trees with the aim of increasing the mean DBH of the remaining trees by 1cm - 2cm. In second and subsequent thinnings, a forester can recommend the thinning prescription using calculation based either on basal area or marginal thinning intensity.

Thinning control

In first thinning the value of the thinnings removed is low and simple thinning control systems are used (table 1).

One method involves looking at the size of the cut stumps. Excluding the lines removed; if there are a lot of large cut stumps with small trees left beside them, you should ask questions about the size of the trees being cut. Another method is to measure the average Diameter at Breast Height (DBH). In general you would expect the average DBH of the remaining trees to be about 1 - 2cm greater after thinning than before thinning.

Table 1 Thinning control field sheet

Harvesting Type: _____

Date plot taken	Plot number	Plot area		No. trees remaining in plot	No. trees removed in thinning	Trees/ha remaining	Mean DBH post thinning

(Adapted from Coillte Field Sheet)

In second and subsequent thinnings, the accuracy of thinning control becomes more important to reflect the increase in timber value. Before thinning begins, an estimate of the volume to be removed or intensity is calculated by laying down a series of thinning control plots throughout the forest. In these plots, the trees to be removed are marked and measured. Information from the plots should be used during thinning as a reference to the number of trees and volume to be removed.

Ideally all trees to be removed in the stand (in second and subsequent thinnings) should be marked. In doing so it will ensure that the correct volume (and trees) to be removed is controlled. This may appear as an extra expense but it more than pays for itself in the long run when you consider:

- it helps to ensure the removal of only appropriate trees
- it may reduce the length of the rotation
- it can increase the stability of the crop
- it can speed up the felling process, when the decision of which tree to remove is taken from the harvester operator.
- a good volume estimate and assortments are known before harvesting commences.

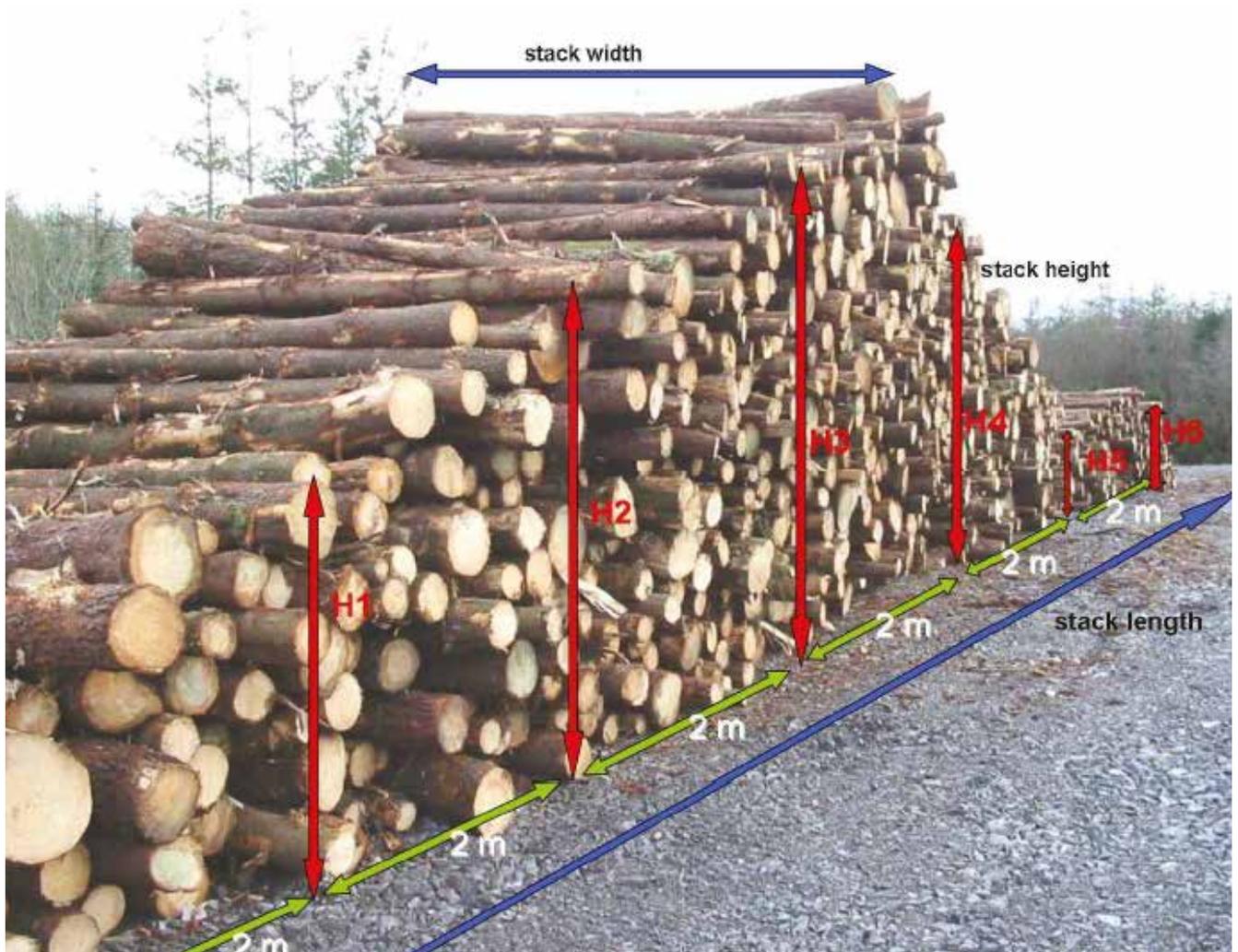
If trees for removal are not marked, the decision of selecting trees for removal is left to the harvester operator. In this case random plots should be taken by your forester to compare actual volume removed with that prescribed in the thinning control plots. Where over thinning or under thinning is identified corrective action should be taken.

A clearfell harvesting is relatively straight forward. A forester should carry out an inventory to include the number of trees/ha, the average harvesting volume/ tree, the volume/ha, and indication of product assortments (% pulp, pallet and sawlog) and an assessment of tree quality. This will provide valuable information when advertising the sale. It is important to be aware that on some sites not all trees cut will be extracted to the roadside. A small number may be left in the forest – used as bridges to cross drains, build up soft areas etc. Ideally these trees should be removed in the final extraction operations.



Harvester head printout

Real time information on the volume of timber being harvested is a useful way to monitor progress. All modern harvesting machines can provide a print out of the volume and categories of timber cut. The information is generated through length and diameter readings of the trees as they are processed through the harvester head. This is valuable information. Regular printouts or screen shots of the harvester's computer screen will show how much volume and what categories of timber (pulp, stake, pallet or sawlog) have been cut. These records will show if the correct size and number of trees are being cut and should be retained to compare against the final harvest outcome.



Stack measurement

Timber stacks can be measured by the forest owner or forester at roadside. It is a useful way to estimate the volume of different timber products. It involves measuring the length and width (log length) of the stack and getting the average height of the stack. These measurements are multiplied together; $(l \times w \times h)$. A correction factor is then used to take in to account the air spaces within the stack resulting in solid stack volume. 0.7 is the most commonly used conversion factor in the forest industry. However this correction factor can be calculated for individual stacks. A Teagasc guide to timber stack measurement is available at www.teagasc.ie/media/website/crops/forestry/advice/Timber_Stack_Measurement.pdf

Weight versus volume

Timber is generally sold by weight (tonnes) or by volume (cubic metres (m³)). When comparing weight and volume measurements it is important to understand that the weight of timber can change but the volume of timber generally remains the same.

The weight of timber can vary considerably depending on a number of factors such as tree species, the length of time at roadside, log size and the weather conditions. Timber begins to dry out as soon as it is felled. The longer timber is left sitting roadside, the more moisture it loses and the lighter it becomes. This should be taken into consideration where timber is sold by weight, as this may result in a loss of income to the owner. The converse is true if timber is going for wood energy as it is sold based on a low moisture content.

To avoid loss of income, the owner should insist, through the timber sales contract, that the logs are moved immediately after harvest or by a specified date (usually within 15 days of felling) to the weigh bridge. If the logs are not removed by the specified date, the agreed price per tonne should be increased by e.g. 3% for the logs for every additional 7 days or part thereof that the timber remains on site.

All sawmills also provide a system where timber is measured by volume. Timber arriving at the mill is converted from weight to volume using a correction factor. It takes into account the weight loss post-harvest. This system is used by some of the larger timber suppliers and may also be available to private growers.

Timber security



Harvested timber is a valuable commodity and as such should be protected. There are a number of precautions an owner can take to reduce the risk of theft:

- operate a Forest Docket System
- install a gate or barrier at the entrance to the forest to regulate access.
- erect temporary cameras (in accordance with data protection legislation)
- take regular photos of stacks to monitor roadside stocks
- assign an individual to supervise harvesting/delivery to market

Forest docket system

Having an appropriate system in place will help in accounting for all timber removed from the forest and to improve timber security. The ITGA Model Timber Sales Dispatch System provides a widely accepted template for managing timber sales in private forests. www.itga.ie/images/pdf/MTSSApril2010.pdf

The following is a brief summary of the docket dispatch system:

- the vendor (owner or agent) gives a standardised forest docket book to the purchaser. These dockets are available from the ITGA.
- the vendor is notified before every entry into the forest. This notification contains agreed information and is texted by the haulier at least one hour before arrival.
- on receipt of the text, a unique permit number is texted back to the haulier.
- entry to the forest is only allowed during agreed times.

Normally a deposit is paid to secure the purchase and payment instalments are made at intervals. As harvesting progresses and logs are extracted to roadside, the owner and forester should ensure that the agreed payment schedule is strictly adhered to. It is important for the owner to retain control of the timber on the site until payments are made in accordance with the contract.

Post-harvest sign-off

It is very important that the harvest site is left in good condition when harvesting is completed. Details of owners' requirements should be outlined in the contract. These may include road repairs, replacing damaged culverts, clearing and repairing drains, cleaning sediment traps, correctly disposing of hazardous material, debris, litter and removing log bridges and other temporary structures.



	Irish Timber Growers Association	Forest Certification Chain of Custody Information FM CoC Ref: _____
Forest Sales Dispatch System		Certified Pallet? Tick Yes <input type="checkbox"/> or No <input type="checkbox"/>
Forest Docket No. _____		Completing this Information Box is Optional
Reminder : Send text to agreed mobile number prior to collection of each load		
Section A: To be completed on ARRANGING COLLECTION of load		
Permit Number: _____	Date: _____	
Forest Name: _____	SP No. _____	FOREST CODE: _____
Vehicle Registration Number: _____		
Drivers Name & Haulage Company: _____		
Vehicle: (Please tick) 8 Wheel <input type="checkbox"/> Artic <input type="checkbox"/> 8W + trailer <input type="checkbox"/> Other <input type="checkbox"/>		
Product type: (Please tick) Sawlog <input type="checkbox"/> Pallet <input type="checkbox"/> Stake <input type="checkbox"/> Pulp <input type="checkbox"/> Other <input type="checkbox"/>		
Length: _____		
Estimated Tonnage: _____ Tonnes		
Destination: _____ Harvester: _____		
Section B: To be completed by DRIVER at arrival on site for lodging into Docket Box before loading		
Time of Arrival: _____ Date: _____		
Drivers Signature: _____		
Section C: To be completed at WIGHBRIDGE and attached to weight ticket/docket and returned to vendors address		
Weight Ticket/Docket No: _____ NET Weight: _____ Tonnes		
Signed on behalf of Sawmill: _____ Dated: _____		
<small>Top Copy/White Docket: After completion this is deposited in docket box on entry to forest and before loading commences. Pink Docket: Is returned to the vendor or his agent to their designated address with official weight docket attached. Green Docket: Is retained by the purchaser. Blue Docket: Is retained by the haulier (unless changes made during collection)</small>		





Contact details:
Teagasc Forestry Development Department
Mellows Campus, Athenry,
Co Galway H65 R718

Tel.: +353 (0)91 845200
Email: forestry@teagasc.ie

www.teagasc.ie/forestry
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An Roinn Talmhaíochta,
Bia agus Mara
Department of Agriculture,
Food and the Marine

