

A guide to

Classifying Land for Forestry in the Emissions Trading Scheme

October 2010

Ministry of Agriculture and Forestry



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About this Guide

The *Guide to Classifying Land for Forestry in the Emissions Trading Scheme* (the Guide) gives practical advice on determining the status of forested land under the Climate Change Response Act 2002 (the Act). The Guide covers the following topics:

- the definition of forest species and forest land under the Act;
- the treatment and implications of activities affecting forest land (clearing, harvesting and deforesting);
- how to determine whether forest land is pre-1990 or post-1989 forest land, or indigenous forest land established before 1990;
- examples of classifying different types of forest, and forest land.

The Guide also includes a glossary of key terms relevant to forestry in the Emissions Trading Scheme (ETS), summarised from the Act and the Climate Change (Forestry Sector) Regulations 2008 (the Regulations).

This Guide is one of a series prepared to assist the forestry sector, other landowners and potential investors understand the detailed operation of the ETS for forestry. These guides provide general guidance only, and do not purport to give advice regarding specific circumstances in relation to the ETS, New Zealand's climate change legislation in general, or the particular circumstances of individual land and forest owners.

Additional guides and standards

The series of guides that provide detailed information on the function, operation and information requirements of the forestry ETS can be found on the MAF website at www.maf.govt.nz. Information for the forestry ETS must also be collected, processed or submitted in accordance with prescribed rules and procedures, in order to comply with legislation or regulations. These rules and procedures are set out in documents termed "Standards" that will also be available at www.maf.govt.nz.

The guides provide not only a general introduction to all aspects of forestry in the ETS, but practical advice on, and examples of, how to interpret and obtain information compliant with the relevant Standards. The following guides and standards are currently available:

1. **A Guide to Forestry in the Emissions Trading System:** provides an overview of the ETS in general, and of the particular aspects that relate to forestry, including:
 - the definition of forest land, and of the different forest classifications within the ETS;
 - a description of how carbon is stored in a forest, and how the stored carbon may be calculated;
 - the entitlements and obligations of ETS Participants who own pre-1990 or post-1989 forests;
 - taxation implications for forestry ETS Participants.

2. **A Guide to Classifying Land for Forestry in the Emissions Trading Scheme (that is, this Guide):** gives practical guidance on how to determine whether an area of forest land is pre-1990 or post-1989 forest land under the Act.
3. **A Guide to Mapping Forest Land for the Emissions Trading Scheme, and The Geospatial Mapping Information Standard:** describe how to define an area of forest land in accordance with the Act and the Regulations, using either MAF's on-line mapping tool or the mapping tools in a Participant's own GIS.
4. **A Guide to Look-up Tables for Forestry in the Emissions Trading Scheme:** provides practical advice on using the look-up tables in the Regulations to calculate the amount of carbon stored in forests registered under the ETS.

When the Field Measurement approach for assessing forest carbon stocks is available, the following documents will also be provided on the web site:

5. **A Guide to Field Measurement for Forestry in the Emissions Trading Scheme, and The Field Measurement Standard for Forestry:** describe how to carry out forest inventory field measurements in accordance with the Act and the Regulations, and to provide data in the format required to calculate forest carbon stocks using MAF's on-line Carbon Calculator.

Legislation and Regulations

The legal requirements and definitions relating to forestry in the ETS are set out in the:

- Climate Change Response Act 2002; and
- Climate Change (Forestry Sector) Regulations 2008.

These are available at www.maf.govt.nz. Search for the title of the Act or Regulation.

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Carbon stored in forests as they grow can make a significant contribution to the reduction in greenhouse gases that New Zealand (NZ) is committed to achieving under the Kyoto Protocol. To enable increases in forest carbon to be recognised internationally, an approach to the definition and classification of forest land consistent with the Kyoto Protocol must be used. NZ has incorporated such an approach in the Climate Change Response Act 2002 (the Act). Rules that deal with the detail of how to assess increases (and decreases) in the carbon stored on forest land are provided in the Climate Change (Forestry Sector) Regulations 2008 (the Regulations).

The forestry provisions of the NZ Emissions Trading Scheme (ETS) give effect to the Act and Regulations by providing Participants with the means to register forest land, and to claim or surrender emissions units. Only those forested areas which meet the definition of forest land in the Act can be registered in the ETS. Whether a forested area will qualify depends on the type of forest on the land, the date at which the forest was established, and whether the tree species have the potential to reach Kyoto-compliant thresholds for minimum height and crown cover over an area of at least one hectare.

If an area of forest land comprising exotic and/or indigenous forest species qualifies as forest land after 31 December 1989, it is termed “post-1989 forest land”. Such forest land can be registered in the ETS on a voluntary basis. Alternatively, if a forested area met the definition of forest land prior to 1 January 1990, and remained forest land comprising predominantly exotic forest species on 31 December 2007, it is termed “pre-1990 forest land”. Pre-1990 forest land does not enter the ETS unless it is deforested – that is, harvested and converted to a non-forest land use – after 31 December 2007. There are liabilities under the Act for the loss of carbon formerly stored in deforested areas, if these areas do not have a deforestation exemption.

This Guide explains how to identify forest land, and how to classify it as either post-1989 or pre-1990 forest land, or as indigenous forest land established before 1990 – according to the tree species that are present, their date of establishment, the proportions they are expected to grow to, and the land-use or land management conditions that are present. Indigenous forest land established before 1990 is not directly subject to the Act, but if present may affect the status of future forests established on the land if the indigenous forest is cleared or deforested, and then replanted.

Included in the Guide is advice on the type of information that may be useful to determine the year in which an area of forest first qualifies as forest land, including naturally regenerating forests where establishment may be progressive. A set of examples is then provided that:

- show typical circumstances in which trees are either present or may have been harvested, and that may or may not comprise forest land under the Act;
- list the current and historical circumstances that need to be considered under the Act when determining the status of an area of forested land, or of land that was formerly forested;
- classify the areas into one of the following classes: post-1989 forest land, pre-1990 forest land, deforested land, indigenous forest land established prior to 1990, or non-forest land.

Other important information

Before reading the remainder of this document, readers should be familiar with information given in *A Guide to Forestry in the Emissions Trading Scheme* (available at www.maf.govt.nz). It provides explanations of key concepts and definitions that have special meaning under the Act and the Regulations.

The more important definitions are also reproduced here in a glossary, at the end of this guide.

A complete list of definitions can be found in the Act and Regulations, available at www.maf.govt.nz.

Forest species

A forest species is defined in the Act as a tree species that is capable of reaching at least five metres in height at maturity in the place it is located, but does not include tree species grown or managed primarily for the production of fruit or nut crops.

For the purposes of the ETS, any non-horticultural woody vegetation that is capable of reaching five metres in height where it is growing is regarded as a forest species. Forest species include common naturally regenerating indigenous species such as manuka, kanuka, mahoe, tree ferns and the taller *Coprosma* species. Shorter shrub species that rarely reach five metres in height (such as gorse, broom, tauhinu and the shorter *Coprosma* species) are not considered forest species.

In some situations, tree species that would normally be considered forest species may not be capable of reaching five metres in height because of conditions limiting seedling survivability, or growth, or because of land management practices. Determining whether tree species are considered forest species under such conditions is discussed further in Section 3 of this guide.

Forest land

Forest land is defined in the Act as an area of land of at least one hectare with forest species that has, or is likely to have:

- *a crown cover of more than 30 percent on each hectare; and*
- *an average crown-cover width of at least 30 metres.*

Forest land also includes an area of land that is likely to have a crown-cover of more than 30 percent, but an average crown-cover width of less than 30 metres, provided it is contiguous with an area that independently meets the primary definition of forest land.

Whether an area with forest species is likely to reach a crown cover of more than 30 percent, and qualify as forest land, will depend on factors such as seedling survival rates, growth conditions, and land management practices. Determining whether an area with forest species qualifies as forest land is discussed in more detail in Section 3 of this Guide.

Temporarily unstocked forest land

If an area of forest land has been harvested or cleared so that it temporarily does not meet the crown cover or forest species requirements but is likely to do so again in the future, that area of land continues to be considered forest land. In such situations the area is referred to as being “temporarily unstocked”. Temporarily unstocked land may arise, for example, because the forest has been harvested, or trees may have been blown over by strong winds, or planted seedlings have died.

Forest land that is temporarily unstocked need not be returned to forest land by planting or regenerating the same forest species as previously existed on the land. Thus, if forest land is harvested for the purpose of re-establishing it as forest land, but with a different species, it remains forest land throughout the harvest/re-planting cycle.

There are some restrictions on the time period an area of forest land may be temporarily unstocked before that land will be deemed to be deforested. These considerations are set out in the Deforestation section below.

Forest clearance

Clearing of trees is defined in the Act as:

- *felling, harvesting, burning, removing by mechanical means, spraying with herbicide intended to kill the tree, or undertaking any other form of human activity that kills the trees; or*
- *felling, burning, killing, uprooting or destroying by a natural cause or event such as windthrow and fire.*

Clearing of trees does not include pruning or thinning.

Deforestation

Deforestation is defined in the Act as the conversion of forest land to land that is not forest land.

That is, deforestation involves clearing an area of forest land followed by a change to another land-use – such as grazing. After deforestation, the deforested area is classified as non-forest land.

Deforestation due to lack of new growth after clearing

If an area of forest land is temporarily unstocked, it will be classified as deforested if sufficient new forest species and growth are not evident within a prescribed timeframe. The Act establishes the following milestones that determine whether a given hectare of forest land, that is temporarily unstocked, is to be treated as being deforested:

- i) if four years after clearing that hectare has fewer than 500 stems of forest species, whether planted or naturally regenerated (the four-year rule); or
- ii) if 10 years after clearing, predominantly exotic forest species are growing, but that hectare does not have a tree crown cover of at least 30 percent from trees that have reached five metres in height; or
- iii) if 20 years after clearing, predominantly indigenous forest species are growing, but that hectare does not have a tree crown cover of at least 30 percent from trees that have reached five metres in height.

In the circumstances outlined in i) to iii) above, deforestation is deemed to have occurred four, 10 or 20 years after clearance, respectively. However, deforestation liabilities (if any) are calculated as if the deforestation occurred at the time of forest clearing – four, 10 or 20 years earlier, respectively.

Areas that are temporarily unstocked (including from harvesting, windthrow, fire or disease) will also be considered deforested if there is evidence that the land is now being used in a way incompatible with forest re-establishment. In this case deforestation liabilities (if any) will be calculated according to the age of the forest at the time the forest land was cleared.

Pre-1990 forest land

An area of land is defined in the Act as pre-1990 forest land if it is forest land and:

- *the area was forest land on 31 December 1989; and*
- *the area remained as forest land on 31 December 2007; and*
- *the forest species on the forest land on 31 December 2007 consisted predominantly of exotic forest species.*

The predominant forest species on an area of forest land is that species with the most wood volume.

Deforestation of pre-1990 forest land

If an area of pre-1990 forest land is deforested after 31 December 2007, and the area is not exempt from deforestation liabilities under the Act, the landowner (in general) must meet the liabilities by surrendering the appropriate quantity of New Zealand Units (NZUs). To determine the number of NZUs to be surrendered, the participant must register the deforested area in the ETS and file an emission return.

Transitional provisions

Areas of exotic forest land which were cleared before 1 January 2008 as part of a deforestation programme, but had not been converted to the new land-use by 1 January 2008, would normally be considered temporarily unstocked pre-1990 forest land. Any subsequent land-use conversion would then trigger a deforestation liability. However, section 4(5) of the Act specifically exempts such areas from being classified as pre-1990 forest land provided that:

- a) on 1 January 2008, on any given hectare there were no standing exotic forest species (dead or alive), except for a strip that had or was likely to have an average crown-cover width of less than 30 metres; and
- b) on 1 January 2008, on any given hectare there was no other merchantable timber from exotic forest species; and
- c) four years after the date on which the land met the conditions in paragraphs a) and b), it is not forest land and no allocation has been made in respect of the land under the pre-1990 forest land allocation plan.

That is, if liabilities for the deforestation of pre-1990 forest land are to be avoided, not only must information confirming points a) and b) be available, but conversion to a non-forest land-use must also be complete (and remain) four years after the date both conditions a) and b) above were met. If information confirming points a) and b) is not available, the area will be considered temporarily unstocked pre-1990 forest land on 1 January 2008. Deforestation will be deemed to occur if there is subsequent conversion to a non-forest land use – including if any of the conditions in rules i) to iii) in the **Deforestation** section above are met.

Deforestation liabilities are calculated according to the age of the trees cleared prior to the land-use conversion associated with the deforestation. Information on calculation of deforestation liabilities is given in *A Guide to Look-up Tables for the Emissions Trading Scheme*, available at www.maf.govt.nz.

Post-1989 forest land

An area of forest land is defined as post-1989 forest land if at the time of application to join the ETS the area satisfies the definition of forest land, and in addition:

- was not forest land on 31 December 1989; or
- was forest land on 31 December 1989, but was deforested between 1 January 1990 and 31 December 2007; or
- was pre-1990 forest land that was deforested on or after 1 January 2008, and the liability arising from the deforestation has been met; or
- is ETS-exempt pre-1990 forest land that has been deforested, and the liability that would arise had the land not been exempt has been met.

Post-1989 forest land may include exotic and/or indigenous forest species. It may also include forest land that is eligible to be voluntarily transferred into the ETS from the Afforestation Grant Scheme.

More information on the eligibility conditions that apply to transfers of forest land from these schemes can be found at www.maf.govt.nz.

Deforestation of post-1989 forest land

Only those areas of post-1989 forest land voluntarily registered in the ETS are subject to the deforestation provisions of the Act, and deforestation of such areas always incurs a liability. However, the liability is capped such that the number of emission units required to be surrendered to meet the liability is not more than the number of units previously received for the deforested area. The deforestation is deemed to have occurred on the date of commencement of forest clearing associated with the deforestation.

Indigenous forest land established before 31 December 1989

If an area of forest land consists of predominantly indigenous forest species that were established prior to 31 December 1989, the forest land is not itself subject to the provisions of the Act or affected in any way by the ETS. However, this class of indigenous forest land does have implications for some activities that might be considered for the land area in the future:

- i) if the area of indigenous forest land remained as indigenous forest land on 31 December 2007, and is cleared or deforested after that date, any subsequent exotic or indigenous forest replanted in that area does not qualify as post-1989 forest land under the Act – and thus cannot be brought into the ETS;
- ii) if the area of indigenous forest land is deforested before 31 December 2007, and either an exotic or indigenous forest is re-established on that area of land at any later date, the new forest will be eligible to join the ETS as post-1989 forest land. Evidence that the land was deforested will be required, and in particular, that there has been a genuine alternative land-use between clearing the original forest land and re-establishment as post-1989 forest land. There are no liabilities under the Act for deforestation of the original indigenous forest, though of course the provisions of other Acts will often control clearing options for such forest lands;
- iii) if the area of indigenous forest land is cleared (but not deforested) at any time, the area will be considered (indigenous) forest land remaining forest land – that is, simply temporarily unstocked between clearing and replanting (subject to the provisions of the Act relating to deforestation due to limited new growth; see the **Deforestation** section, earlier). If the cleared land is then:
 - replanted or regenerated with sufficient indigenous forest species to continue to meet the definition of indigenous forest land, it is simply classified as indigenous forest land established before 31 December 1989 – and thus not subject to the Act;
 - replanted with exotic forest species that meet the definition of forest land on 31 December 2007, the area is then considered pre-1990 forest land under the Act.

The situation outlined in the last bullet point above commonly occurs when indigenous forest land established before 1990 has been cleared during the 1990s, and then replanted in exotic forest species without an intervening change in land use. For example, when *Pinus radiata* was planted soon after roller crushing, spraying or felling of the indigenous forest species. In this case, the exotic forest land will, if remaining on 31 December 2007, be classified as pre-1990 forest land, and not as post-1989 forest land.

DETERMINING WHETHER A FORESTED AREA IS FOREST LAND

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Plantation forest

It is expected that all commercial plantation forests established in New Zealand will readily meet the definition of forest land under the Act. This is because under normal stocking and thinning regimes, and the range of sites likely to be used for commercial forestry, it would be rare for plantation species not to exceed both five metres in height and 30 percent crown cover prior to harvest. For example, a *Pinus radiata* plantation forest with a final stocking of just 100 stems per hectare is expected to meet the definition of forest land, on typical sites at normal harvest age.

It is possible that occasionally – on very exposed, dry, cold or infertile sites – plantation species used in New Zealand may not achieve the height required to qualify as a forest species, or perhaps the crown-cover required to meet the definition of forest land. Depending on the size of such areas, they may have to be excluded when mapping areas of forest land. The *Geospatial Mapping Information Standard*, available at www.maf.govt.nz, specifies when small areas of non-forest land must be excluded from mapped areas submitted for registration under the ETS. Further information can also be found in *A Guide to Mapping Forest Land for the ETS*, available at the same web site.

Natural or human-assisted forest regeneration

Classifying regenerating areas as forest land

Whenever there are areas of at least one hectare with sufficient forest species that it is likely they will, as they grow, exceed 30 percent crown-cover, the area is forest land. However, many factors can influence the presence, survival and growth of naturally regenerated forest species. Therefore, both of the following conditions must be met if an area of naturally regenerating forest species is to be classified as forest land:

- forest species must be present as at least seedlings, and likely to survive; and
- the number of forest species expected to survive must be sufficient that, as they grow, it is likely they will reach a crown cover of more than 30 percent on each hectare.

Determining whether these conditions are met by an area of naturally regenerating forest species can sometimes be a complex exercise because, for example:

- site quality may result in a large variation in both regeneration success and survival, particularly as natural regeneration will often be occurring on poorer-quality sites (i.e. where plantation forestry is uneconomic);
- the timing of regeneration, and thus the stocking (stem numbers per hectare) of forest species present, may vary substantially over the area depending on distance from seed sources;
- forest species may be present but not visible in aerial photography or satellite imagery, so numbers can be difficult to assess (for example, if the forest species are very young, or are regenerating under a cover of non-forest species such as gorse or broom).

In addition, whether an area with regenerating forest species is classified as forest land will also depend on the land management practices that are present. For example, it is unlikely an area of regenerating forest species would qualify as forest land if:

- browsing animals are present from time to time in sufficient numbers to suppress regeneration or substantially reduce the survival of seedlings or saplings. Only quite low numbers of animals are required for this to occur if the forest species are highly palatable. Moreover, even relatively unpalatable regenerating forest species may not survive if livestock numbers are high (e.g. under mob-stocking, and especially if cattle or goats are present in reasonable numbers);
- clearing of regenerating species (e.g. through scrub-cutting, or by spraying) is routinely undertaken to maintain the area of grazing land. Where such land management practices are present, trees that might otherwise be forest species may not survive long enough to reach five metres in height, nor become sufficiently numerous that it is likely a crown cover of more than 30 percent would be achieved.

Given the expected variability in establishment and survival of naturally regenerated forest species, applicants registering regenerating areas under the ETS will usually need to provide information to confirm that the area meets the definition of forest land. For example, applicants may be requested to confirm that seedling establishment rates are sufficient, domestic livestock have been removed from the area, and that any necessary fencing has been erected to control future livestock access. Information showing that adequate pest control is in place will also usually be needed if the regenerating species are indigenous broadleaved hardwoods.

If the area is regularly subject to severe drought or other conditions strongly limiting growth, applications for registration may need to be accompanied by photographic evidence showing that regeneration is actually occurring at sufficient levels over the entire area proposed. Alternatively, information could be submitted to confirm the registered area is being managed in a similar way and has similar seed source availability to other nearby areas, where regeneration and growth of forest species is such that the areas are already clearly forest land.

Forest species regenerating on pastoral farmland

Scattered regeneration

On some classes of pastoral hill-country, low levels of natural regeneration of (usually relatively unpalatable) woody species may occur even in the presence of grazing livestock. Land management practices on such pastoral land normally involve routinely clearing such regeneration to maintain the area of grazing land.

Where it is apparent that such land management practices are routinely occurring as part of normal farming operations, areas with naturally regenerating woody species that include trees that are usually forest species will not be classified as forest land if, on any hectare:

- i) the trees are not expected to reach five metres in height, nor to exceed 30 percent crown cover, before being cleared; or
- ii) the trees although expected to reach five metres in height, are not expected to exceed 30 percent crown cover before being cleared.

More advanced regeneration

A well-established cover of woody species on former pastoral land indicates that land management practices have not been sufficient to control natural regeneration and so maintain the area of grazing land. In such areas it is most likely that woody cover will continue to increase, and if forest species are also present the area is likely at some point to qualify as forest land.

Studies show that regeneration of woody species to levels of crown cover greater than about 30 percent is not common in most areas that are actively pastorally-farmed. Areas with naturally regenerating woody species that include forest species will therefore be considered forest land, if on any hectare:

- a) the forest species have already reached five metres in height and also exceed 30 percent crown cover; or
- b) there are no natural conditions present that might restrict growth, and:
 - i) either the forest species (irrespective of height) already have a crown cover exceeding 30 percent;
 - ii) or the crown cover of all woody species exceeds 30 percent, and the stocking of the forest species component is such that the crown cover of those species (even if beneath other woody species) is likely to exceed 30 percent in the future if they were to continue to grow.

Case b), above, represents the default classification that will be applied under the ETS to areas of pastoral land on which there is more advanced regeneration of woody species. That is:

- unless good evidence is provided by the Participant to the contrary, it will be assumed that land areas with advanced regeneration of woody species are no longer being managed to maintain the area of grazing land – and thus will qualify as forest land if the stocking and/or crown cover of forest species is sufficiently high; and
- if such areas are cleared and then replanted in forest species, the areas will be classified as temporarily unstocked forest land from the time of clearing until replanting.

Forest species regenerating under nurse crops

Where non-forest species such as gorse or broom are acting as nurse crops for regenerating forest species, areas will qualify as forest land provided a sufficient stocking of forest species are present and likely to survive. That is, the area will qualify as forest land provided it meets the conditions given in Case b) in the last section above. Photographic evidence of the level of regeneration may be required to support an application to register such areas as post-1989 forest land – possibly taken at points or in plots located along several transects through the non-forest species. If the regenerating species are highly palatable, evidence of livestock exclusion, and pest control, should be submitted with any application.

Alternatively, the likelihood that areas with naturally regenerating forest species under nurse crops will meet the requirements for forest land can be confirmed if there are older blocks of retired land in the vicinity where the forest species have already supplanted the nurse crop. Photographs of such older blocks, where the management has been similar to that proposed to encourage regeneration within the ETS project area, should be included as a useful source of information to support an application. A description of the proposed land management plan, together with information showing adequate forest species seed sources are present, will also need to be provided in such cases.

Where non-forest species such as gorse or broom were present at 1990, and are later replaced by forest species that have been regenerating beneath them, there may sometimes be a question as to whether sufficient forest species already existed on 31 December 1989 to qualify the area as forest land. To answer this question definitively, the age distribution of the forest species may need to be determined.

Wilding trees and forest land

Wilding trees are those that have spread naturally but unintentionally by seeding from an adjacent planted, sown, or naturally regenerated forest area. If the wilding forest species occur in numbers sufficient that they are expected to exceed a crown cover of 30 percent before being cleared, the area will be considered forest land.

Where frequent land management actions to control wilding trees are being carried out because the trees are deemed to be “tree weeds”, areas with wilding forest species will often not meet the definition of forest land. This is because past land management actions to control regeneration will have often resulted in a highly fragmented pattern of forest species establishment. Contiguous areas of at least a hectare, with sufficient forest species present to likely exceed 30 percent crown cover over the time they are allowed to grow before clearing, will therefore generally exist less frequently than in a planted forest situation.

Where areas with wilding trees do meet the definition of forest land, liabilities for deforestation will exist. However, if the trees are deemed tree weeds, exemptions may be available for any deforestation. Exemptions cover not just areas of naturally-regenerated tree weeds, but also areas where trees now considered weeds have been planted or sown.

To be eligible for a tree-weed deforestation exemption, the area must be forest land at the time of the application. Also, the forest species must be one of those designated as a tree weed under the Biosecurity Act 2003, or listed in the Regulations. Areas of forest land for which the predominant forest species is a designated tree weed are not eligible to be registered under the ETS as post-1989 forest land. Current information on the status of tree-weeds, and associated deforestation exemptions, is available at www.maf.govt.nz.

Agroforestry

Pastoral land that is grazed, but also planted with forest species in sufficient numbers that it is likely they will exceed a crown cover of 30 percent on each hectare as they grow, qualifies as forest land. Thus, agroforestry plantings may qualify as forest land, as may both space- or close-planted poplars and willows used for erosion control on grazing land. *The Guide to Mapping Forest Land for the ETS* provides further details on delineating areas of agroforestry or erosion control plantings as forest land.

DETERMINING WHEN A FORESTED AREA BECOMES FOREST LAND

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The ETS is concerned with only two forest land classes: pre-1990 forest land, and post-1989 forest land. Further, when registering forest land under the ETS, an individual application can only include one of these classes. All other forest and non-forest land can be grouped into a single category that for convenience is termed “non-eligible land” – in the sense that it is not eligible to be part of that particular application.

To classify an area of forest land as pre-1990 or post-1989 forest land, the first step is always to determine the year of forest land establishment: that is, the year in which the forested area under consideration first qualified as forest land. As noted in Section 3, both the physical conditions under which forest species are growing, and the management practices on the land, will in general influence whether a forested area meets the definition of forest land.

Planted forest species

Most owners of planted forests will know the year in which their forests were first planted, and this will usually also be the date at which the area met the definition of forest land. ETS applicants need to list the evidence they have available to confirm the year of planting. Suitable evidence may include:

- invoices for land preparation or planting from contractors, farm accounts showing relevant payments related to forest establishment, historical management information such as farm plans or records, or other similar information;
- aerial or oblique photographs, or satellite imagery, acquired at known dates;
- publicly available land cover maps (e.g. the New Zealand Land Resource Inventory, the New Zealand Land Cover Database, or maps held by Regional or District Councils);
- tree ages determined directly from tree growth-ring counts, or from locally-calibrated age/stem-diameter relationships based on growth-ring counts.

Naturally regenerated forest species

Determining the year in which an area of naturally regenerated forest became forest land is often more difficult than for planted forests. This is because regeneration may be progressive, or strongly influenced by both physical growth conditions and the timing (and intensity) of land management practices.

Natural regeneration under simple circumstances

In general, there will be only two cases in which the year the area qualified as forest land is sufficiently clear that classification as pre-1990 or post-1989 forest land is simple:

- if an area of more than one hectare comprised predominantly exotic forest species (e.g. wilding pines) with a crown cover that exceeded 30 percent on 31 December 1989, the area is clearly pre-1990 forest land;
- conversely, if on 31 December 1989 an area had no or very few forest species present, but sufficient forest species have subsequently regenerated and grown such that their crown cover now exceeds 30 percent over an area of one hectare or more, the area is clearly post-1989 forest land.

Natural regeneration under more complex circumstances

In other than the simple circumstances outlined above, determining when an area became forest land will usually require consideration of the land management practices that have prevailed since the time forest species began regenerating in significant numbers. In general, an area of naturally regenerating forest species of at least one hectare will be:

- i) Pre-1990 forest land, if:
 - land management practices had resulted in (or not prevented) the numbers of forest species present on 31 December 1989, that were expected to survive and grow, being sufficient to achieve a crown cover likely to exceed 30 percent in the future; and
 - the area was not deforested at any time after 31 December 1989 and before 1 January 2008; and
 - on 31 December 2007 the predominant forest species were exotic trees.
- ii) Post-1989 forest land, if:
 - land management practices had resulted in the numbers of forest species present on 31 December 1989, that were expected to survive and grow, being such that it was **not** likely a crown cover of more than 30 percent would be achieved in the future; and
 - after 31 December 1989 the land management practices were changed in such a way that sufficient numbers of regenerating forest species were then expected to survive and grow, and to exceed a crown cover of 30 percent in the future.

Where management practices have suppressed the regeneration, survival or growth of forest species, the land may qualify as forest land soon after these practices are removed – provided adequate seed sources are available, and conditions are favourable for germination, seedling establishment, and survival. The year in which substantial new regeneration, that is expected to survive, becomes obvious on a given hectare following a change in management practice can usually be taken as the year in which the hectare qualifies as forest land. However, if regeneration is patchy or slow, it may be some time after the land management is changed that the area has sufficient stocking for forest species to qualify as forest land.

Evidence of the year in which an area qualifies as forest land

Particularly when the date at which an area first qualifies as forest land is close to 31 December 1989, it may be necessary for applicants to provide additional evidence of adequate seedling establishment and survival when applying to register forest land under the ETS. The evidence will need to relate either directly to the age of the forest species, or to the change in management practice that removed conditions that were formerly constraining forest species survival and growth, as applicable.

The evidence ETS applicants might provide to demonstrate that an area qualified as forest land in a given year includes:

- aerial or oblique photographs, or satellite imagery, acquired at known dates;
- invoices for payments to fencing or scrub-cutting contractors; historical management information such as maps, farm records, or livestock sale receipts; and other similar information;
- tree ages determined directly from tree growth-ring counts, or from locally-calibrated age/stem-diameter relationships based on growth-ring counts.

When regeneration has occurred very close to 1990, the only definitive way of determining the year the area qualified as forest land may be by sampling forest species present to get median tree age from tree-ring data. Such sampling is a specialist task, and should be referred to a forest consultant. For a list of registered forest consultants, see www.nzif.org.nz. MAF regional advisers can also provide advice on suitable sampling designs and procedures. Contact details for MAF advisers can be found at www.maf.govt.nz.

EXAMPLES OF LAND CLASSIFICATION

5

This section provides a number of examples that illustrate how areas of land are classified as either forest land or non-forest land under the Act. The examples cover:

Post-1989 forest land

1. Exotic forest established in pasture
2. Young regenerating indigenous forest – closed canopy
3. Young regenerating indigenous forest – scattered cover
4. Agroforestry

Pre-1990 forest land

5. Second rotation radiata pine
6. Other exotic forest
7. Willows and poplars on farmland

Indigenous forest land

8. Mature indigenous forest
9. Regenerating indigenous forest

Non-forest land

10. Grazing land
11. Shelterbelts
12. Dense gorse shrubland
13. Grazed regenerating shrubland
14. Cleared regenerating shrubland
15. Scattered regeneration

Harvesting and deforestation

16. Harvested exotic forest with no replanting
17. Harvested exotic forest with regeneration
18. Windthrow within existing exotic forest
19. Conversion of exotic forest land established before 31 December 1989

The examples are not a comprehensive list, but rather have been selected to demonstrate application of the main criteria used in classifying land under the ETS. The land use history given in some of the examples is hypothetical, in order to better illustrate key aspects of the Act or Regulations.

Unless otherwise stated, the area under consideration in the examples is taken to be greater than one hectare.

Post-1989 forest land

Figure 1: Exotic forest established in pasture



Young *Pinus radiata* planted into pastoral grassland (foreground; 1992 photo).

Land use history

Pinus radiata was planted in July 1990 at 800 stems per hectare, onto an area that had been continuously pastorally farmed since the 1960s. Livestock numbers prior to planting were sufficient to suppress regeneration of any woody species through grazing pressure.

Classification process and criteria

- i) Land status: the area was non-forest land (grassland) on 31 December 1989. The area is therefore eligible for establishment of post-1989 forest. The area remained non-forest land until the time of planting.
- ii) Forest species: *Pinus radiata* is expected to reach five metres in height everywhere in this area, and is thus a forest species at this site.
- iii) Crown cover: the stocking of forest species at the planting date is easily sufficient to achieve a future crown cover of more than 30 percent.
- iv) Establishment date: the area met the definition of (exotic) forest land in 1990.

Classification

The area is post-1989 forest land, established in 1990.

Figure 2: Regenerating indigenous forest – closed canopy



An area (foreground, and to the right of the pines in the background) of manuka, some tree ferns, and patches of indigenous broadleaved species (2008 photo).

Land use history

The area had been continuously pastorally farmed since the 1960s, with livestock numbers sufficient to suppress regeneration of woody species through grazing pressure – except in a few small, steep gullies. However, in early 1994 it was decided to remove livestock from this remote part of the farm, cease fertiliser application, and let the area regenerate naturally. Manuka and kanuka colonised the area rapidly from the seed sources in the gullies, with extensive seedling regeneration visible over the whole area by November. Aerial photos held by the local Regional Council show a good scattered cover in 1996. More recently, some tree ferns and patches of broadleaved tree species have become evident.

Classification process and criteria

- i) Land status: the land was non-forest land (grassland) on 31 December 1989. The area is therefore eligible for establishment of post-1989 forest. The area would have remained non-forest land until at least the change in management practice in 1994.
- ii) Forest species: growth conditions are good, as indicated by the rapid regeneration and current cover, and the major indigenous regenerating species are all expected to reach at least five metres in height – and so are forest species at this site.
- iii) Crown cover: it is estimated by the Participant that the level of seedling establishment was sufficient in late 1994 to achieve a future crown cover of more than 30 percent, and there were no conditions present expected to impede seedling survival. The 1996 aerial photos provide adequate support for this.
- iv) Establishment date: the area met the definition of (indigenous) forest land in 1994.

Classification

The area is post-1989 forest land, established in 1994.

Alternative scenario

A drought occurred over the summer of 1994/95, killing many regenerated seedlings, and seedling establishment was also poor for the following two years. By November 1997, seedling establishment was such that a future crown cover of 30 percent was likely to be achieved, and no further adverse events occurred to disrupt growth or continued seedling establishment. However, no evidence such as photos is available to support this. To provide evidence of the date of forest species establishment, aging of a sample of the predominant forest species by a forest consultant was undertaken in 2009. This showed that, based on growth-ring counts, enough forest species were likely present about 1997/98 to qualify the area as forest land. The area was subsequently registered in the ETS as post-1989 indigenous forest land, established in 1997.

Figure 3: Regenerating indigenous forest – scattered cover



Land use history

The area has been continuously pastorally farmed since the 1950s, and continues to be grazed today. However, livestock numbers and fertiliser application rates were substantially reduced in the late-1980s due to economic conditions. Under the reduced grazing pressure, young regenerating totara began to survive as the seedlings are not very palatable to livestock. Until 1996, the landowner regularly cleared this regeneration, maintaining tree numbers at low levels (well below those likely to reach more than 30 percent crown cover if they grew) – as shown in a December 1990 aerial photo. In early 1996 the landowner removed livestock, and stopped tree clearing. Farm accounts show invoices for scrub-cutting ceased at this time. Regeneration of young seedlings occurred quite rapidly from that point, and the landowner – a farm forester with an interest in native timbers – has some photos dated 1997 showing the level of regeneration. Livestock (sheep) numbers were increased again to moderate levels in 2006, with the area effectively becoming an agroforestry block.

Classification process and criteria

- i) Land status: the area was non-forest land (grassland) on 31 December 1989. The area is therefore eligible for establishment of post-1989 forest. The area would have remained non-forest land until at least the change in land management practice in 1996.

- ii) Forest species: totara is expected to reach at least 5 metres under practically all growth conditions, and is therefore considered a forest species.
- iii) Crown cover: because totara grows to be a large tree, it is likely that there was sufficient regeneration before the end of 1997 to achieve a future crown cover of more than 30 percent. The farm accounts and photos support this.
- iv) Establishment date: the area met the definition of (indigenous) forest land in 1997.

Classification

The area is post-1989 forest land, established at 1997.

Figure 4: Agroforestry



Land use history

The area had been continuously pastorally farmed since the 1960s, with livestock levels sufficient to suppress regeneration of woody species. In 2001, livestock were removed and the area was planted with *Pinus radiata* at 800 stems per hectare. Once the trees had become established, livestock were allowed back in. The trees have since been pruned and thinned, and stocking is now 250 stems per hectare.

Classification process and criteria

- i) Land status: the area was non-forest land (grassland) on 31 December 1989. The area is therefore eligible for establishment of post-1989 forest. The area remained non-forest land until it was planted.
- ii) Forest species: *Pinus radiata* is a forest species on all but the most growth-limited of sites, and already exceeds five metres in height in this area.
- iii) Crown cover: the stocking of forest species at the planting date is easily sufficient to achieve a future crown cover of more than 30 percent.
- iv) Establishment date: the area met the definition of (exotic) forest land in 2001.

Classification

The area is post-1989 forest land, established at 2001.

Pre-1990 forest land

Figure 5: Second rotation exotic forest



Area of young *Pinus radiata* planted into cutover (foreground; 2008 photo).

Land use history

The area was first planted in radiata pine in the 1940s, and has been in forest since. It was harvested most recently in 2005, replanted in 2006 at a stocking of about 850 stems per hectare, and remains in forest today.

Classification process and criteria

- i) Land status: the area was plantation forest on 31 December 1989, and continues as plantation forest today. It was temporarily unstocked for only about a year before being recently replanted.
- ii) Forest species: *Pinus radiata* is clearly a forest species in this area.
- iii) Crown cover: the stocking of forest species at the replanting date is easily sufficient to achieve a future crown cover of more than 30 percent.
- iv) Establishment date: the area met the definition of (exotic) forest land on 31 December 1989 and also on 31 December 2007, with no intervening land-use change.

Classification

The area is pre-1990 forest land.

Figure 6: Other exotic forest



Well established
redwood forest
(2008 photo).

Land use history

The area was planted in redwoods in the 1960s and has been in forest since. The stocking is 800 stems per hectare.

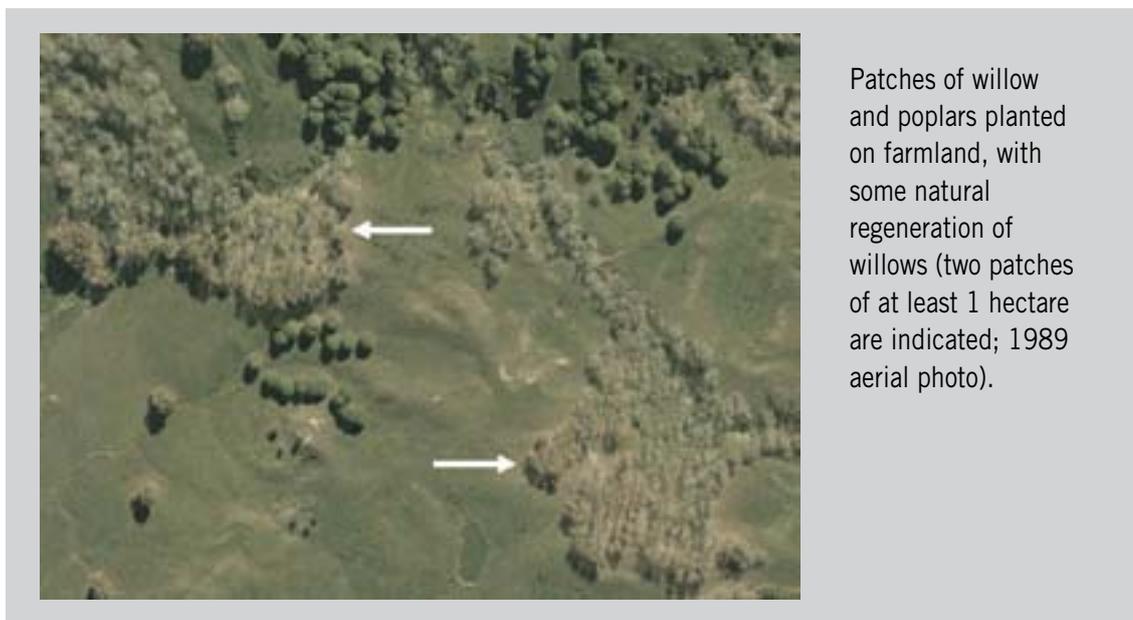
Classification process and criteria

- i) Land status: the area was in forest on 31 December 1989, and continues as forest today.
- ii) Forest species: the redwoods already exceed 5 metres in height, and so meet the requirements of a forest species at this site.
- iii) Crown cover: the stocking of forest species is sufficient to already have achieved more than 30 percent crown cover.
- iv) Establishment date: the area met the definition of (exotic) forest land on 31 December 1989 (and also on 31 December 2007, with no intervening land-use change).

Classification

The area is pre-1990 forest land.

Figure 7: Willows and poplars in farmland



Land use history

The area has been continuously farmed since the 1940s. Poplars were space- and close-planted in the 1960s on erosion-prone areas, and some of the planted areas are more than one hectare. Willows have been present as gully plantings since the 1940s, and have been spreading up the gully areas by natural regeneration. The stocking of both poplars and willows is unknown, and their coverage today remains much as shown in the photo.

Classification process and criteria

- i) Land status: the areas of poplars indicated are more than one hectare, and have a crown cover much greater than 30 percent. The areas were clearly present on 31 December 1989, and remain today. The willows in the gully plantings have a canopy width less than 30 metres, although some of these plantings merge with the areas of poplars.
- ii) Forest species: poplars and willows are normally forest species, and it is apparent that most already exceed 5 metres in height at this site.
- iii) Crown cover: the stocking of forest species is obviously sufficient in several areas of more than 1 hectare to have already achieved more than 30 percent crown cover.
- iv) Establishment date: the indicated areas of poplars met the definition of (exotic) forest land on 31 December 1989 (and also on 31 December 2007, with no intervening land-use change). Some narrow areas of willows in gully plantings, connected to these areas of poplars, also existed on 31 December 1989 and remain today, and will meet the definition of forest land (see the definition of forest land given earlier in this guide, in respect of including adjoining narrow areas of forested land less than 30 metres in width).

Classification

The indicated areas of forest are pre-1990 forest land, together with some of the connected gully plantings. Refer to *The Guide to Mapping Forest Land for the ETS*, Section 4, for an example of how to map forest land in the circumstances described in Figure 7.

Indigenous forest land

Figure 8: Mature indigenous forest



Mature indigenous beech forest (2008 photo).

Land use history

The area has been continuously in indigenous forest since at least the 1800s.

Classification process and criteria

- i) Land status: the area was clearly indigenous forest on 31 December 1989, and remains so at present.
- ii) Forest species: most trees already exceed 5 metres in height in this area, and are thus forest species.
- iii) Crown cover: the stocking of forest species is sufficient to have already achieved much more than 30 percent crown cover.
- iv) Establishment date: the area met the definition of (indigenous) forest land on 31 December 1989 (and also on 31 December 2007, with no intervening land-use change).

Classification

This area is indigenous forest land established before 1990. It is not, however, pre-1990 forest land, as such land must comprise predominantly exotic forest species.

Note

Areas that were indigenous forest land on 31 December 1989 are not subject to the Act or Regulations, provided they also remain indigenous forest land at all future times (which will include any periods when the areas are temporarily unstocked). However, if such indigenous forest land is:

- i) Cleared (but not deforested) after 31 December 1989, and is seeded as exotic forest land prior to 1 January 2008: the area is considered to be forest land remaining forest land, but a change to (predominantly) exotic forest species by 31 December 2007 changes the designation of the area under the Act to pre-1990 forest land. This situation occurred quite commonly in New Zealand in the early 1990s, where indigenous shrubland comprising forest species (usually manuka/kanuka) was roller-crushed, burned or felled, and then *pinus radiata* planted soon after. Because the areas

were not converted to a non-forest land-use between clearing and replanting, they are classified as temporarily unstocked forest land over the short period trees were absent. The presence of predominantly exotic forest species on 31 December 2007 then qualifies the area as pre-1990 forest land.

- ii) Deforested after 31 December 1989, and re-established as either indigenous or exotic forest land before 1 January 2008: the area is eligible to join the ETS as post-1989 forest land, provided evidence of an intervening land-use is available.
- iii) Cleared or deforested after 31 December 2007, and subsequently re-established as exotic forest land: the area is not classified under, and is not subject to, the Act or Regulations.

Figure 9: Regenerating indigenous forest



Land use history

The land was originally in indigenous forest, but was deforested and converted to farmland in the 1930s. It was farmed until the 1950s, then abandoned and left to revert. Reversion to indigenous forest has continued up to the present.

Classification process and criteria

- i) The area was clearly indigenous forest on 31 December 1989, and remains so at present.
- ii) Forest species: the tree species present are expected to exceed five metres in height in this area, and are thus forest species.
- iii) Crown cover: the stocking of forest species is sufficient to have already achieved much more than 30 percent crown cover.
- iv) Establishment date: the area met the definition of (indigenous) forest land on 31 December 1989 (and also on 31 December 2007, with no intervening land-use change).

Classification

This area is indigenous forest land established before 1990. It is not, however, pre-1990 forest land, as such land must comprise predominantly exotic forest species on at least 31 December 2007.

Any clearing or deforestation of the area is subject to the same conditions outlined in the note to Figure 8.

Non-forest land

Figure 10: Grazing land



Farmland with scattered shelter trees (2008 photo).

Land use history

The land has been intensively pastorally farmed since originally being deforested in the late 1800s. Isolated exotic trees have been planted as shelter for stock, about 30 years ago.

Classification process and criteria

- i) Land status: the area was non-forest land (grassland) on 31 December 1989, and continues to be so at present.
- ii) Forest species: some discrete individual or small areas of (exotic) forest species are present.
- iii) Crown cover: the areas of forest species present that are likely to have a crown cover of more than 30 percent do not comprise contiguous areas of at least one hectare (and so do not qualify as forest land).

Classification

The area is non-forest land.

Future scenario

If livestock are removed, and the grassland is planted in or regenerates to sufficient forest species to exceed 30 percent crown cover at maturity, the land will be classified as post-1989 forest land and therefore be eligible to join the ETS.

Figure 11: Shelterbelts



Land use history

The land has been intensively pastorally farmed since the 1900s. *Pinus radiata* was planted in 1992 as shelterbelts that are one tree wide.

Classification process and criteria

- i) Land status: the area was non-forest land (grassland), with some exotic tree species, on 31 December 1989, and remains so today.
- ii) Forest species: there are exotic forest species present.
- iii) Crown cover: the shelterbelts will always be less than 30 metres wide (and thus do not qualify as forest land unless contiguous with another valid area of forest land).

Classification

The entire area is non-forest land.

Future scenario

If livestock are removed, and the grassland is planted in or regenerates to sufficient forest species to exceed 30 percent crown cover at maturity, the land will be classified as post-1989 forest land and therefore be eligible to join the ETS.

Figure 12: Dense gorse shrubland



Area of dense gorse shrubland with a few scattered wilding pines (2008 photo).

Land use history

The land was pastorally farmed from the 1940s, but with reductions in both livestock numbers and fertiliser application rates after the 1980s gorse began to take over. By 2000 the gorse had become too dense to permit further grazing. A few wilding pines have established in the gorse, but otherwise there is no evidence of regenerating forest species (including indigenous species beneath the gorse canopy).

Classification process and criteria

- i) Land status: the area was likely to have had a fairly complete cover of gorse on 31 December 1989, and now has a continuous gorse cover. However, gorse is not considered a forest species, as it seldom gets to five metres in height.
- ii) Forest species: there are some exotic forest species present (wilding pines).
- iii) Crown cover: there are too few forest species present to achieve a crown cover of more than 30 percent over contiguous areas of at least one hectare.

Classification

This area is non-forest land.

Future scenario

If the gorse is cleared and planted with forest species, or if indigenous forest species regenerate in sufficient numbers beneath the gorse canopy, the land would be classified as post-1989 forest land and therefore be eligible to join the ETS.

Figure 13: Grazed regenerating shrubland



Indigenous shrubland (tauhinu, and low-growing *Coprosma* species) regenerating on grazing land (2008 photo).

Land use history

The land has been pastorally farmed since the 1940s, but since the late 1970s it has not been economically viable to maintain livestock numbers at levels such that grazing pressure suppresses natural regeneration of woody indigenous species. The present shrub cover is predominantly tauhinu, varying between 30 percent and 80 percent cover on any given hectare. No forest species are evident.

Classification process and criteria

- i) Land status: the area was grassland with scattered indigenous woody species on 31 December 1989, and further regeneration of these species is likely since then.
- ii) Forest species: the woody species present are not forest species (tauhinu seldom reaches five metres in height).

Classification

This area is non-forest land.

Future scenario

If livestock are removed, and the land is planted or regenerated in exotic or indigenous forest species in sufficient numbers to meet the crown-cover threshold for forest land, the area would be classified as post-1989 forest land and therefore be eligible to join the ETS.

Figure 14: Cleared regenerating shrubland



Farm land management practices (in this case spraying with herbicide, centre of photo; 2008) are used to control the spread of naturally regenerating manuka.

Land use history

The land has been pastorally farmed since the 1940s, but since the late 1970s it has not been economically viable to maintain livestock numbers at levels such that grazing pressure completely suppresses natural regeneration of manuka. Clearing of any larger clumped areas of manuka has been carried out periodically since the mid-1980s, most recently by spraying with herbicide – as demonstrated by invoices from contractors. The scattered cover of manuka visible now is also typical of that reached before clearing in the past: there appear to be no discrete areas of a hectare or more that are likely to have a crown cover of manuka of more than 30 percent at maturity.

Classification process and criteria

- i) Land status: the area was grassland with scattered manuka on 31 December 1989, and is currently grassland (i.e. the areas of clumped manuka are dead, and thus “cleared”, although still standing).
- ii) Forest species: manuka is present as a naturally regenerating species, and as it will reach at least five metres in height on most sites it is considered a forest species.
- iii) Crown cover: due to farm management practices, it is unlikely that on 31 December 1989 there were contiguous areas of a hectare or more with sufficient numbers of manuka trees to achieve a future crown cover of more than 30 percent, and this situation continues at present.

Classification

This area is non-forest land.

Future scenario

If livestock are removed and the area is planted as exotic forest land, or clearing stops and sufficient regeneration of manuka occurs to meet the crown cover threshold for forest land over contiguous areas of at least one hectare, this area would be classified as post-1989 forest and therefore be eligible to join the ETS.

Figure 15: Scattered regeneration



Scattered regeneration of kanuka, tauhinu and ring fern (2008 photo).

Land use history

The land has been pastorally farmed since the 1940s, and was last cleared of kanuka in the mid-1980s. Livestock numbers have generally been sufficient to ensure grazing pressure has kept rates of kanuka regeneration low, and maintenance of this management regime is continuing. Some isolated kanuka have established, and some are already more than five metres tall. Tauhinu and ring fern is present in gullies and on some faces (e.g. in the centre foreground).

Classification process and criteria

- i) Land status: on 31 December 1989 the area was grassland (with only a few scattered kanuka and some tauhinu likely present), and due to the slow regeneration rates remains in a similar state at present.
- ii) Forest species: kanuka is a forest species on practically all sites, and has already exceeded five metres in some places within this area. Tauhinu is not a forest species.
- iii) Crown cover: there were no discrete areas of a hectare or more that, on 31 December 1989, were likely to have a future crown cover of forest species (kanuka) of more than 30 percent, nor are there at present.

Classification

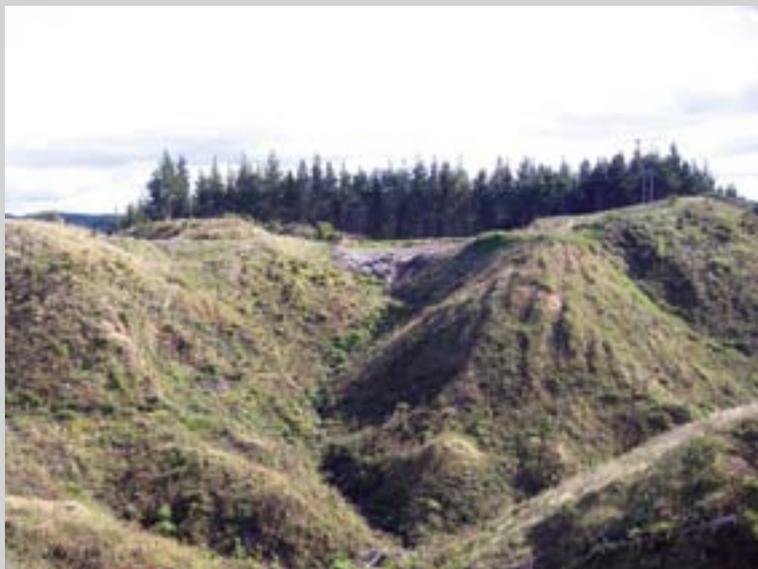
This area is non-forest land.

Future scenario

If livestock are removed and the area is planted as exotic forest land, or sufficient regeneration of kanuka occurs to meet the crown cover threshold for forest land, this area would be classified as post-1989 forest and therefore be eligible to join the ETS.

Harvesting and deforestation

Figure 16: Harvested exotic forest land – no replanting or regeneration of forest species



Harvested forest land that has been left fallow, and no regeneration of forest species has occurred (January 2010 photo).

Land use history

The land was first planted in *Pinus radiata* in the late 1930s and has been in forest since. The area was harvested most recently in February 2007. All trees were felled, and all merchantable timber was also removed, by mid-2007. The landowner intends to replant the forest, and to apply for an allocation of NZUs under the Forestry Allocation Plan once it is announced. However, planting has not yet occurred. The present land-cover is a mixture of grasses, Himalayan honeysuckle, annual weeds, and low-growing coprosma species (which do not grow to more than five metres in height on this site). No significant natural regeneration of exotic or indigenous forest species has occurred. It is now January 2010.

Classification process and criteria

- i) Land status: the area was exotic forest on 31 December 1989, and continued as exotic forest until it was cleared in early 2007. No attempt has been made subsequently to manage it in a manner inconsistent with the area remaining forest land.
- ii) Forest species: there has been very little generation of forest species up to the present time (January 2010, in this example).

Classification

As at January 2010, the area would be considered pre-1990 forest land that is temporarily unstocked – unless evidence to the contrary becomes available (see the possible future scenarios, below).

Future scenarios

A. Forest planting is completed later, but not more than four years after clearing

Provided there are at least 500 stems per hectare of forest species on the area within 4 years of clearing, the area will cease to be considered temporarily unstocked, and continue to be classified as pre-1990 forest land. An application to receive an allocation of NZUs under the Forestry Allocation

Plan can be made even though the area is temporarily unstocked pre-1990 forest land at the time the Forestry Allocation Plan is issued.

B. Forest planting is completed more than four years after clearing, and as intended an application had been made under the Forestry Allocation Plan

In this situation the harvested area will be considered deforested pre-1990 forest land four years after clearing, as the four-year rule under section 179 of the Act will apply (see **Deforestation** section). The deforestation will be deemed to have occurred in February 2011, and the deforestation liabilities will be calculated according to the age of the forest at the time of clearing in 2007.

As with the prior example, an application to receive an allocation of NZUs under the Forestry Allocation Plan can be made provided the Plan is publicly notified before the area is considered deforested under section 179 of the Act. Therefore, it is important that replanting (or human-assisted regeneration) of temporarily unstocked areas is not delayed for too long if deforestation liabilities are to be avoided, and the area is to be eligible to receive an allocation of NZUs.

Figure 17: Harvested forest land with regeneration



An area of harvested forest land with regeneration of *Pinus radiata* (2008 photo).

Land use history

The land was first planted in *Pinus radiata* in the 1930s, and has been in forest since. The forest was harvested in June 2006, and all merchantable timber was removed before 31 December 2007. The land has not been replanted or converted to another land use, however two years after harvest substantial regeneration of *Pinus radiata* is evident. In February 2009 stocking determined in a set of sample plots showed an average of more than 500 stems of forest species per hectare (including seedlings of any size), strongly dominated by regenerating pine but also with some kanuka.

Classification process and criteria

- i) Land status: the area was plantation exotic forest on 31 December 1989, and continued as plantation forest until mid-2006. No attempt has been made subsequently to manage it in a way that is inconsistent with it continuing to be forest land.
- ii) Forest species: within four years of clearing, the land has at least 500 stems per hectare of forest species, with a clear predominance of exotic over indigenous forest species.
- iii) Crown cover: the stocking of forest species is more than sufficient to achieve a future crown cover greater than 30 percent.

Classification

The area is pre-1990 forest land.

Future scenario

If there is not at least a 30 percent crown cover from exotic trees that have reached five metres in height within 10 years (June 2016), the land will be considered deforested at that date (June 2016) – but deforestation liabilities will be calculated according to the age of the forest on the land at June 2006.

Figure 18: Windthrow within existing exotic forest



Land use history

The area was pastoral farmland planted in *Pinus radiata* in 1988, and has been in forest since. Windthrow cleared an area of about three hectares within the stand in September 2008. Due to difficulties with access, it was not considered economic or feasible to replant the windthrown area immediately. Rather, it is intended to replant the area when the rest of the stand is replanted after harvesting. It is now January 2009, and no deforestation exemption applies to this forest land.

Classification process and criteria

- i) Land status: the area of windthrow was exotic forest land on 31 December 1989 and continued as forest land until it was cleared by windthrow in 2008. No regeneration has yet occurred, and neither has any attempt been made to manage it in a way that is inconsistent with it remaining forest land.
- ii) Forest species: no forest species are present in the area of windthrow.

Classification

At January 2009, the land is pre-1990 forest land that is temporarily unstocked.

Future scenario

If four years after the windthrow event there are not at least 500 stems per hectare of regenerating or planted forest species on the area it will be considered deforested. The deforestation liability will be calculated according to the age of the trees at the time the windthrow occurred. As the deforestation liability will probably substantially exceed the cost of replanting, the former decision not to replant the windthrown area should probably be reviewed. Aerial seeding may represent a least-cost option, if regeneration conditions are good.

Figure 19: Conversion of exotic forest land established before 31 December 1989



An area of exotic forest was harvested and converted to pastoral farmland (2009 photo).

Land use history

The area was planted in *Pinus radiata* in the late 1930s, and remained as exotic plantation forest until being clearfelled for conversion to dairying in June 2007. All merchantable timber was removed by August 2007, and the slash piled into heaps or windrows. Pasture grasses were sown in September 2007, and invoices for the work are available. The area has subsequently been fenced, and is part of a dairy farm. It is now January 2009.

Classification process and criteria

- i) Land status: the area was exotic forest land on December 1989, and remained so until the time of clearing as part of deforestation in June 2007. Land use conversion began in September 2007, with the sowing of pasture grasses.

Classification

On 31 December 2007 the area is non-forest land. Note that the previous forest is in this case not considered to be pre-1990 forest under the Act, as the area was not exotic forest land on both 31 December 1989 and 31 December 2007.

Alternative scenarios

A. Information is available confirming that clearing and removal of all merchantable timber occurred before 31 December 2007, and although land-use conversion has still not commenced it is intended to be completed shortly. The area does not have a deforestation exemption, and no application was made for an allocation of NZUs under the Forestry Allocation Plan

If the intended change in land-use occurs within four years of the date of clearing, no deforestation liabilities will apply. If land-use conversion has not occurred by this date, then provided the land does not qualify as forest land four years after clearing it will be regarded as deforested – and again no deforestation liabilities will apply. However, as it will take only limited natural regeneration of forest species on the area for it to qualify as forest land, landowners should complete land-use conversion within the four-year period from the time of clearing. If the area does meet the definition of forest land four years after clearing, any future deforestation is likely to incur liabilities.

B. No information confirming clearing and removal of all merchantable timber occurred before 31 December 2007 is available, and land-use conversion has occurred. The area does not have a deforestation exemption

The area will be classified as deforested pre-1990 forest land (irrespective of whether an application has been made for an allocation of NZUs under the Forestry Allocation Plan or not). As such, deforestation liabilities will apply, based on the age of the pre-1990 trees at the time of clearing. Landowners should therefore make every effort to obtain evidence confirming that the clearing of the forest, and removal of all merchantable timber, occurred before 31 December 2007 if they wish to avoid deforestation liabilities. Invoices from harvesting and trucking contractors, or weighbridge records, will likely be the most commonly available forms of acceptable evidence.

Clearing

Clearing in relation to a tree includes:

- the felling, harvesting, burning, removing by mechanical means, spraying with herbicide intended to kill the tree, or undertaking any other form of human activity that kills the tree; and
- the felling, burning, killing, uprooting or destroying by a natural cause or event.

Clearing does not include pruning or thinning.

Deforestation

Deforest, in relation to forest land, means:

- to convert forest land to land that is not forest land; and
- includes clearing forest land, where the following applies:
 - four years after clearing, a given hectare has not been replanted with at least 500 stems of forest species or has not naturally established a covering of at least 500 stems of forest species; or
 - 10 years after clearing, predominantly exotic forest species are growing, but a given hectare does not have tree crown cover of at least 30 percent from trees that have reached five metres in height; or
 - 20 years after clearing, predominantly indigenous forest species are growing, but a given hectare does not have tree crown cover of at least 30 percent from trees that have reached five metres in height.

Deforestation is generally treated as occurring on the date an area of forest land is cleared as part of the deforestation process. Exceptions are where deforestation is deemed to have occurred four, 10 or 20 years after clearance in the circumstances outlined above; however, in these circumstances any liabilities associated with deforestation are calculated as at four, 10 or 20 years earlier, respectively.

Areas that are harvested are not considered deforested provided replanting (or natural regeneration) occurs at sufficient stocking and sufficient future growth is achieved. During the time between harvest and replanting, the harvested area continues to be regarded as forest land, and is classified as temporarily unstocked.

Exotic forest

A forest in which the predominant species does not occur naturally in New Zealand – that is, is not an indigenous species.

Forest land

Forest land means:

- a) an area of land of at least 1 hectare that has, or is likely to have, tree crown cover from forest species of more than 30 percent in each hectare; and
- b) includes an area of land that temporarily does not meet the requirements specified in paragraph (a) because of human intervention or natural causes but that is likely to revert to land that meets the requirements specified in paragraph (a); but
- c) does not include:

- i) a shelter belt of forest species, where the tree crown cover has, or is likely to have, an average width of less than 30 metres; or
- ii) an area of land where the forest species have, or are likely to have, a tree crown cover of average width of less than 30 metres, unless the area is contiguous with land that meets the requirements specified in paragraph (a) or (b).

If an area of land temporarily does not meet the forest species and crown cover requirements because of human action or natural events (it may have just been harvested, or trees may have been blown over by strong winds), but is likely to meet these requirements again in the future, it is still considered to be forest land as per paragraph (b) above. Such areas are termed “temporarily unstocked”.

Forest species

A forest species is a tree species capable of reaching at least five metres in height at maturity in the place that it is located, but does not include tree species grown or managed primarily for the production of fruit or nut crops.

For the purposes of the forestry ETS, any non-horticultural vegetation (and including tree ferns) capable of reaching five metres in the place it is growing is considered to be a “tree”.

Harvesting

When forest species are cleared from the land, and new forest species’ seedlings either are planted or naturally regenerate. In this case, there is no land use change involved when the trees are harvested. The harvested area remains forest land, and in the period between harvesting and replanting is considered temporarily unstocked.

Indigenous forest

A forest that comprises tree species that occur naturally in New Zealand or have arrived in New Zealand without human assistance. Strict definitions may relate to the original method of forest establishment (and the direct involvement of people in the process), the mixture of flora and fauna, and the conditions believed to have been present prior to human intervention.

Kyoto Protocol

The protocol to the United Nations Framework Convention on Climate Change made in Kyoto, that includes emissions limitation or reduction commitments for ratifying countries listed in its’ Annex B (developed countries and Economies in Transition) – see unfccc.int/resource/docs/convkp/kpeng.html for further information.

Landowner

The legal owner, or owners from time to time, of the freehold estate in the land. Note a holder of a registered forestry right; leaseholder with a registered lease; or party to a Crown conservation contract may also be eligible to participate in the ETS.

Participant

A person becomes a mandatory Participant if they undertake certain activities covered by Schedule 3 of the ETS (for example, deforesting pre-1990 forest land). Other people may become Participants by voluntarily registering in respect of activities listed in Schedule 4 (for example, owning post-1989 forest land).

Post-1989 forest land

Forest land that:

- was not forest land on 31 December 1989; or
- was forest land on 31 December 1989 but was deforested (that is, converted to another land use) between 1 January 1990 and 31 December 2007; or
- was pre-1990 forest land, other than exempt land:
 - that was deforested on or after 1 January 2008; and
 - in respect of which any liability to surrender units arising in relation to deforestation has been satisfied; or
- was exempt land:
 - that has been deforested; and
 - in respect of which the number of units that would have been required to be surrendered in relation to deforestation, had the land not been exempt land, have been surrendered.

Both exotic and indigenous forest species are eligible to participate in the ETS as post-1989 forest land.

Pre-1990 forest land

Forest land that:

- was forest land on 31 December 1989;
- remained as forest land on 31 December 2007; and
- where the forest species on the forest land on 31 December 2007 consisted predominantly of exotic forest species.

But does not include any land that previously met the definition above and:

- has been deforested, and any liability arising from that deforestation has been satisfied; or
- was exempt land, has been deforested and the NZUs that would have been required to be surrendered had the land not been exempt, have been surrendered.

Woody species

A shrub or tree species with a woody stem or stems. Areas of woody species may comprise non-forest species (for example, gorse, broom, tauhinu), forest species, or a mixture of both.