Deforestation Survey 2011

Final Report

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Under the Kyoto Protocol New Zealand must account for emissions from deforestation that occurs during the period 2008-2012. Information on future rates of deforestation is needed to assist with projecting New Zealand's likely balance of emission units over the first commitment period of the Kyoto Protocol, to provide information needed to assist with future climate change negotiations and to assist with future policy development.

Information on planted forest deforestation is also required to understand future scenarios for the forest industry and to assess the broader impacts of changing land use.

This study was commissioned to:

1. Update deforestation intentions last collected in a survey in late 2010. Deforestation intentions are required under the current Emissions Trading Scheme (ETS) along with the level of deforestation that would occur without an ETS;
2. Identify and include any new information sources on deforestation;
3. Provide an estimate of the area deforested in the year ended December 2010 and an estimate of the area expected to be deforested in the year ended December 2011;
4. Quantify future deforestation intentions broken down into the following time periods: 2012; and 2013-2020;
5. Provide informed comment on the uncertainty around deforestation intentions; and
6. Gather information on how forest land-owners would respond should the Forestry ETS be modified in future commitment periods to allow forest owners to deforest higher quality land and afforest/reforest an equivalent land area.

The scope of this report is limited to New Zealand plantation forests.

The general approach followed is a structured review of the deforestation intentions of large-scale forest owners based on a telephone survey and other information gathering. Respondents were asked for their deforestation intentions under three different scenarios:

1. Emissions Trading Scheme – this assumes that the current legislation continues unchanged.
2. Offset planting allowed under the ETS – this assumes that amendments are made to the ETS enabling offsetting; i.e. landowners would be permitted (without incurring any deforestation liability) to deforest provided that they afforest/reforest an equal area elsewhere in New Zealand.
3. No ETS legislation – this assumes that the ETS is repealed and not replaced by any other legislation.

Results from the survey of large-scale forest owners were collated and interpreted. Allowance was made for deforestation by small-scale owners.

MAIN FINDINGS OF SURVEY

A summary of results is presented in Table 1. There is substantially less deforestation forecast under the ETS scenario than under the No ETS scenario. Although the level of deforestation is higher under the Offset Planting scenario compared to the ETS scenario, the increase in deforestation would be offset by afforestation/reforestation of new land.

The level of deforestation varies by region. Under the ETS scenario, 47 percent of deforestation by large-scale owners during 2008 to 2020 is forecast to take place in the Central North Island. This increases to 74 percent under the Offset Planting scenario.

Table 1: Forecast of deforestation of plantation forest for each scenario (thousand hectare)

	2008	2009	2010	2011	2012	2013 to 2020	2008 to 2012	2008 to 2020
ETS (large-scale owners only)	3	2	1	2	1	8	9	17
ETS (all owners)	3	3	2	3	2	16	13	29
Offset Planting (large-scale owners only)	4	3	2	3	3	20	15	35
Offset Planting (all owners)	5	4	4	5	4	32	22	54
No ETS (large-scale owners only)	5	4	3	5	5	36	22	58
No ETS (all owners)	6	6	5	7	7	52	31	83

Estimates for 2008 to 2011 differ by scenario because of the convention adopted that deforestation is reported as occurring in the year in which land intended to be converted into another land use (deforestation) is harvested. The future land-use for some area harvested in these years varies by scenario.

1. ETS Scenario

Under the ETS scenario total intended deforestation by large-scale owners between 2008 and 2020 is 17,000 hectares, compared to 19,000 hectares in the 2010 survey. Of the 17,000 hectares that is intended to be deforested, around 8,000 hectares is classified as post-1989 forest and 9,000 hectares pre-1990 forest. A further 12,000 hectares of deforestation is assumed to be undertaken by small-scale owners.

For the ETS scenario (large-scale owners) it is estimated that, of the 17,000 hectares of intended deforestation between 2008 and 2020, 78 percent of conversion will be to dairy, 14 percent to lifestyle/residential, and 8 percent to sheep & beef.

2. Offset planting scenario

Total forecast deforestation by large-scale owners for 2008 to 2020 is 35,000 hectares compared to 36,000 hectares in the 2010 survey. This would be partially offset by 18,000 hectares of afforestation.

3. No ETS scenario

Total deforestation by large-scale owners for 2008 to 2020 is 58,000 hectares compared to 61,000 hectares in the 2010 survey.

These forecasts are based on current intentions. These reflect perceptions about land-use economics, land prices, government policy implementation, emission unit price and other factors as they exist at the time of the survey. Clearly they are subject to change.

The survey was carried out in an environment where there is uncertainty about what will happen beyond 2012 both in terms of domestic policy changes and international carbon markets. This uncertainty arises because of the signalled changes to the ETS following the

2011 ETS Review and the implications of the ongoing international climate change negotiations.

The Offset Planting scenario that was presented to respondents specified that landowners would be permitted to deforest area provided that they afforest/reforest an equal area elsewhere in New Zealand. This equivalence of area may differ from what any future legislation may require. In the context of offset planting, the ETS Review 2011 used the term "carbon equivalence" while the 2011 National Party Environment and Climate Change Policy specified "an equivalent level of carbon sequestration".

It is important to note that the survey was carried out at a time when the carbon price was decreasing from $14/NZU to $10/NZU. At prices in this range the deforestation liability is still a deterrent to land conversion. However lower carbon prices are likely to result in an increased rates of deforestation.

Land-owners who intend using offset planting to avoid incurring a deforestation liability will instead incur costs in accessing new land and planting trees. With the subsequent reduction in carbon prices to $7/NZU some of these land-owners are likely to purchase the necessary units to meet deforestation liabilities and proceed with conversion without waiting for legislation allowing offset planting. If carbon prices were to reduce to around $5/NZU it is likely that deforestation would follow the forecast for the Offset Planting scenario. Offset Planting incurs both cost and time for land owners wishing to deforest potentially increasing the attractiveness of purchasing units.

If carbon prices reduce to even lower levels than $5/NZU the forecast for the No ETS scenario would become increasingly relevant.

Introduction

BACKGROUND

Under the Kyoto Protocol New Zealand must account for emissions from deforestation that occurs during the period 2008-2012. Information on future rates of deforestation is required to assist with projecting New Zealand's likely balance of emission units over the first commitment period of the Kyoto Protocol, to provide information needed to assist with future climate change negotiations and to assist with future policy development.

Information on planted forest deforestation is also required to understand future scenarios for the forest industry and to assess the broader impacts of changing land use.

OBJECTIVES

The key objectives for this project are to:

1. Update deforestation intentions last collected in a survey in late 2010. Deforestation intentions are required under the current Emissions Trading Scheme along with the level of deforestation that would occur without an ETS;
2. Identify and include any new information sources on deforestation;
3. Provide an estimate of the area deforested in the year ended December 2010 and an estimate of the area expected to be deforested in the year ended December 2011;
4. Quantify future deforestation intentions by the following time periods: 2012; and 2013-2020;
5. Provide informed commentary on the uncertainty around deforestation intentions; and
6. Gather information on how forest land-owners would respond should the Forestry ETS be modified in future commitment periods to allow forest owners to deforest higher quality land and afforest/reforest an equivalent land area.

The scope of this survey and report is limited to New Zealand plantation forests.

What is deforestation?

Deforestation is defined in the Marrakesh Accord as "the direct human-induced conversion of forested land to non forested land".

Deforestation includes:

- A decision not to replant following harvesting with the conversion to another land use.
- Early liquidation of a forest (i.e. removing immature trees with conversion to another land use).

Deforestation excludes:

- Forests harvested and replanted[1].
- Harvested forests that are not replanted but naturally regenerate back into forest.

[1] The ETS requires that reestablishment occurs within four year of harvest otherwise deforestation is deemed to have occurred.

The Marrakesh Accord also defines afforestation and reforestation:

"Afforestation" is the direct human-induced conversion of land that has not been forested for a period of at least 50 years to forested land through planting, seeding and/or the human-induced promotion of natural seed sources; "Reforestation" is the direct human-induced conversion of non-forested land to forested land through planting, seeding and/or the human-induced promotion of natural seed sources, on land that was forested but that has been converted to non-forested land. For the first commitment period, reforestation activities will be limited to reforestation occurring on those lands that did not contain forest on 31 December 1989.

Note that these definitions do not include replanting or regeneration following harvest or natural disturbance, because these temporary losses of forest cover are not considered deforestation. Harvest followed by regeneration is considered a forest management activity.

Approach

The general approach followed is a structured review of the deforestation intentions of large-scale forest owners (owners with more than 10,000 hectares of forest as at 31 March 2005[2]), based on a telephone survey and other information gathering. This approach was taken because:

- The New Zealand plantation forest estate is well understood in terms of ownership, land tenure and age-class.
- The majority of area that will be harvested over the next 10 - 15 years, and hence be most susceptible for deforestation, is owned by relatively few owners.
- Owners are generally open about their intentions.
- There is a large amount of information available from other sources in the forest industry that can be used to corroborate the stated intentions of forest land-owners.

The dominant role that the large-scale owners will play in the New Zealand plantation harvest until 2020 is illustrated in Table 2. Forest owners with over 10,000 hectares account for 61 percent of the total plantation estate but they own 77 percent of plantations of age 21 years and older (as at 31 March 2010). There are relatively few owners in this category and therefore it makes sense to focus on their deforestation intentions.

Table 2: Plantation area by age-class and size of ownership [Source NEFD as at 2010]

	Age-class (hectares)							
	1-5	6-10	11-15	16-20	21-25	26-30	> 30	Total
Owners with > 10 000 hectares	145037	177365	220515	137192	182232	143288	46384	1052013
Other	34364	122920	215559	200518	48532	36848	26837	685578
Total	179401	300285	436074	337710	230764	180136	73221	1737591

In some cases forest owners only have the right to harvest the existing crop and do not have the right to replant. Consequently the survey also included large-scale forest land-owners.

Large-scale forest owners and forest land-owners (or managers) were contacted in November/December 2011 and asked about their deforestation intentions. In addition, individuals in other organisations were contacted to obtain their views.

The information received was collated and interpreted. It was then converted into a “best estimate” of future deforestation based on current intentions. Results were aggregated to a national level.

[2] Forest ownership as at 31 March 2005 is used as the basis for this study. This defines a forest estate prior to recent deforestation and aligns with the date the first deforestation intentions survey was conducted. For consistency the same forest owners have been included in the survey each year.

ALTERNATIVE SCENARIOS

Respondents were asked for their deforestation intentions under three different scenarios:

1. Emissions Trading Scheme (ETS) – this assumes that the current legislation continues unchanged.
2. Offset planting allowed – this assumes that amendments are made to the ETS enabling offsetting; i.e. landowners would be permitted (without incurring any liability) to deforest area provided that they afforest /reforest an equal area elsewhere in New Zealand.
3. No ETS legislation – this assumes that the ETS is repealed and not replaced by any other legislation.

YEAR OF DEFORESTATION

In this report deforestation is reported as occurring in the year in which land intended to be converted into another land use (deforestation) is harvested. The year of harvest is the year in which any deforestation liability is calculated.

Limitations

INCOMPLETE INFORMATION

The general response to the telephone survey of the large companies was very good. All individuals contacted were willing to provide information. However sometimes the information provided was incomplete because the company was not willing or able to provide details. For example:

- Some companies were prepared to give a general overview of their intentions but were not prepared to provide detailed information on their harvesting (and hence deforestation) profile.
- Some forests are grown on land under a single rotation lease. As such the replanting decision will be made by the land owner rather than the current crop owner.
- Some negotiations between land-owner and crop-owner about future land use are ongoing.
- Some companies need to do further evaluation of their options under the ETS.
- The focus of companies is deciding what to do under the current ETS. What they would do under the No ETS scenario is hypothetical.

INCONSISTENT INFORMATION

The information obtained from different sources was not always consistent. In particular, some information was for a calendar year, some was for a March year, while some was for a June year.

CURRENT INTENTIONS

In a previous report "Review of methodology options to forecast future deforestation" I made the observation "a limitation that applies to all approaches is that forecasts are likely to be biased by the current situation or what has occurred in the recent past. Whichever approach is used, it will be difficult to accurately forecast deforestation in New Zealand."

Forecasts are based on current intentions. These reflect perceptions about land-use economics, Government policy implementation, emission unit price and other factors as they exist at the time of the survey. Clearly they are subject to change.

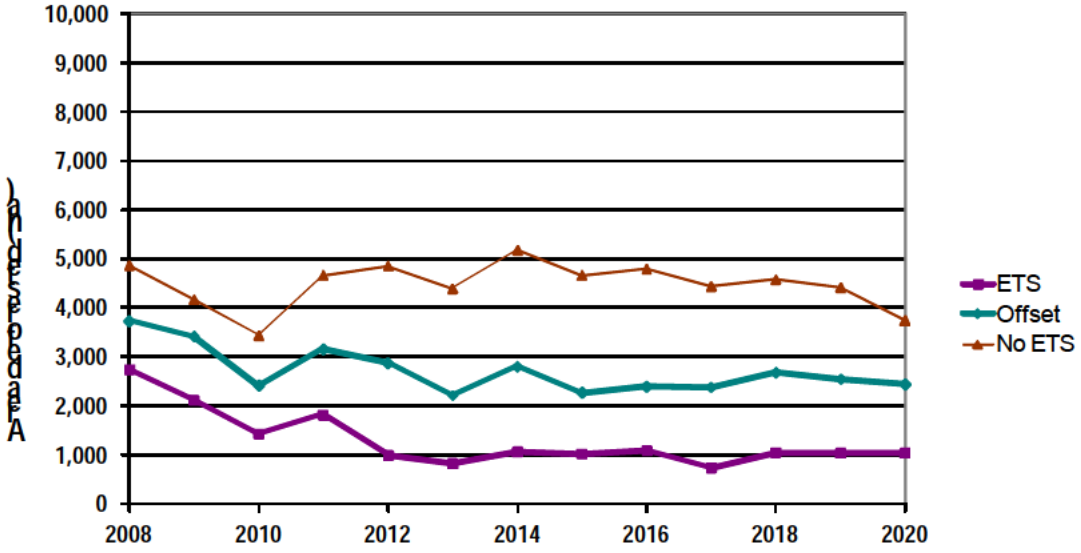
Results

The combined deforestation intentions of large-scale owners are shown in Figure 1. It is important to review Figure 1 in the context of the convention adopted that deforestation is reported as occurring in the year in which land intended to be converted into another land use (deforestation) is harvested. The years 2008 to 2011 include area that has been converted to another land use as well as area that has been harvested but will be converted in 2012 or a later year.

Results for each of the three scenarios are presented. There are some clear trends:

- The ETS scenario has lower levels of deforestation than the scenarios in which the ETS is amended to allow offset planting or is repealed.
- Under the Offset Planting scenario there is an additional 18,000 hectares of deforestation between 2008 and 2020 compared to the ETS scenario. However this additional deforestation would be offset by 18,000 hectares of planting elsewhere (afforestation/reforestation).
- The No ETS scenario leads to the highest levels of deforestation.

Figure 1: Deforestation forecast for New Zealand (large-scale owners only). Under the offset planting scenario 18,000 hectares of new planting would be done to offset area deforested between 2008 and 2020.



Deforestation under the ETS

It is estimated that about 2,000 hectares was deforested in 2011 by large-scale owners. From 2012 to 2020 a further 9,000 hectares of deforestation is forecast. Of the 17,000 hectares of deforestation by large-scale owners between 2008 and 2020, some 8,000 hectares is deforestation of post-1989 "Kyoto" plantations.

The 9,000 hectares of pre-1990 forest forecast to be deforested between 2008 and 2020 includes:

- Residential and lifestyle land of sufficient value to make payment of the deforestation liability affordable.

- Dairy conversion for part of a company's forest estate. The deforestation liability will partially be met by allocation units received for the owner's total estate.

Impact of carbon price

The survey was carried out at a time when the carbon price was decreasing from $14/NZU to $10/NZU. An attempt was made to find out whether intentions would change if carbon prices were lower or higher. However most respondents who intend to deforest either had not calculated the breakeven carbon price or were not prepared to disclose it. One respondent indicated that conversion becomes viable on better sites at a carbon price of $13/NZU and is viable on the best sites at $17/NZU.

Carbon price has an impact on the cost/benefit of offset planting. One respondent said that at a carbon price of $10/NZU offsetting had only a marginal advantage compared to paying the deforestation liability. It was estimated that it would cost $4,000/hectare to buy land and plant trees to carry out offset planting. In comparison, with carbon at $10/NZU, the deforestation liability for a 28 year old radiata pine stand would be $7,090/hectare in the Bay of Plenty and $5,190/hectare in Canterbury.

Deforestation if offset planting is allowed

A number of respondents still intend using offset planting to provide them with flexibility in land use.

Deforestation by large-scale owners in 2011 would be 3,000 hectares if the ETS was amended to allow land offset planting. The increase over the level of deforestation under the ETS scenario relates to some of the land harvested in 2011 that has been left unplanted but which would be converted if offsetting is allowed. From 2012 to 2020 a further 23,000 hectares of deforestation is forecast.

The total area of deforestation forecast for the Offset Planting scenario between 2008 and 2020 is 35,000 hectares. This would be partially offset by the planting of 18,000 hectares of afforestation; i.e. 18,000 hectares of conversion from forest to non-forest land would be offset by the change in land use of an equivalent area from non-forest to forest.

Deforestation if ETS is repealed

Deforestation by large-scale owners would be 5,000 hectares in 2011 if the ETS was repealed with a further 41,000 hectares from 2012 to 2020.

The ETS deforestation liability means that several deforestation projects have been on hold. Land that was harvested between 2009 and 2011 has been left unplanted by owners who want to convert but do not want to pay the deforestation liability that would be incurred under the current ETS. The ETS requires that land has to be re-established within four years of harvest or be deemed to be deforested. Consequently in 2011 some owners have re-established area harvested in 2008. As this area would be converted if the ETS is repealed it has been included in the deforestation estimates. Because these re-established stands would be less than 9 years old at the time of conversion they have been included in the forecast at the date that the previous stand was harvested (i.e. 2008).

Where is most deforestation occurring?

Under the ETS scenario, 47 percent of deforestation by large-scale owners during 2008 to 2020 is forecast to take place in the Central North Island. The Central North Island percentage increases to 74 percent under the Offset Planting scenario.

What land-use is area being converted into?

Based on the information provided, it is possible to make a broad estimate of the land-use into which deforested land is being converted. Under the ETS scenario, conversion is mainly to dairy followed by lifestyle/residential and then sheep & beef agriculture (Table 3).

Table 3: Land-use into which deforested area is being converted in 2008-2020 by large-scale owners for ETS and Offset Planting scenarios (figures are approximate)

	ETS policy percent	Offset Planting percent
Dairy	78	87
Lifestyle	14	8
Sheep & beef	8	5

What are small-scale forest owners doing?

The same general assumptions were made this year as they were for the 2007 to 2010 forecasts. A profile of the area harvested by small-scale owners was generated based on the 2006 NEFD age-class distribution for this group of owners (but with a reduction of 15 percent to adjust to net stocked area). Generic assumptions were made about the percentage of area that is replanted following harvest. These percentages were varied for each scenario:

- 90 percent of area will be replanted (10 percent deforestation) in the ETS scenario.
- 85 percent of area will be replanted (15 percent deforestation) in the Offset Planting scenario.
- 80 percent of area will be replanted (20 percent deforestation) in the No ETS scenario.

In a survey of small-scale forest owners (with 20-200 hectares of forest) 71.4 percent of respondents said they would replant on the same site, 5.4 percent said they would not replant and 23.2 percent were not sure if they would replant (Rodenberg & Manley 2011[3]).

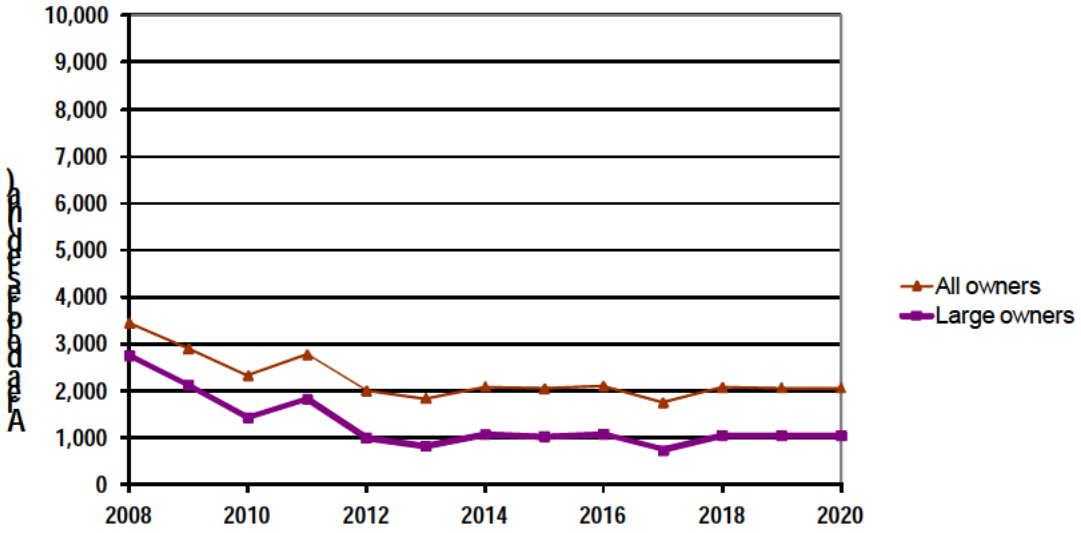
Data provided by MAF indicates a deforestation rate of 7 percent for softwood plantation owners with 40 to 10,000 hectares. The deforestation rate for owners with less than 40 hectares could be higher as they were eligible for the threshold exemption for land-owners with less than 50 hectares of pre-1990 forest.

Overall this information indicates that the 10 percent deforestation rate adopted for small-scale owners under the ETS scenario is reasonable.

Figure 2 shows the deforestation intentions under the ETS scenario.

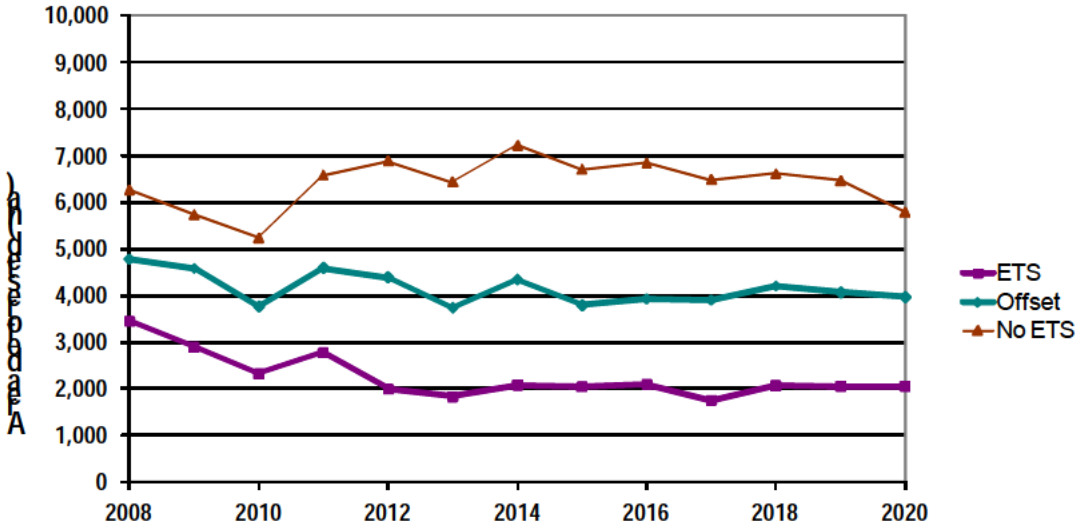
[3] Rodenberg, J; Manley B. 2011: Small forests in New Zealand. A survey of landowner objectives and management. New Zealand Journal of Forestry, 56(2): 15-19.

Figure 2: Deforestation forecast for New Zealand (all owners) under ETS scenario. (Large-scale owner intentions and small-scale owners assuming 10 percent deforestation)



Forecasts of deforestation by all owners are presented in Figure 3 for each scenario.

Figure 3: Forecasts for alternative scenarios (all owners). Under the Offset Planting scenario 25,000 hectares of new planting would be done to offset some of the area deforested between 2008 and 2020.

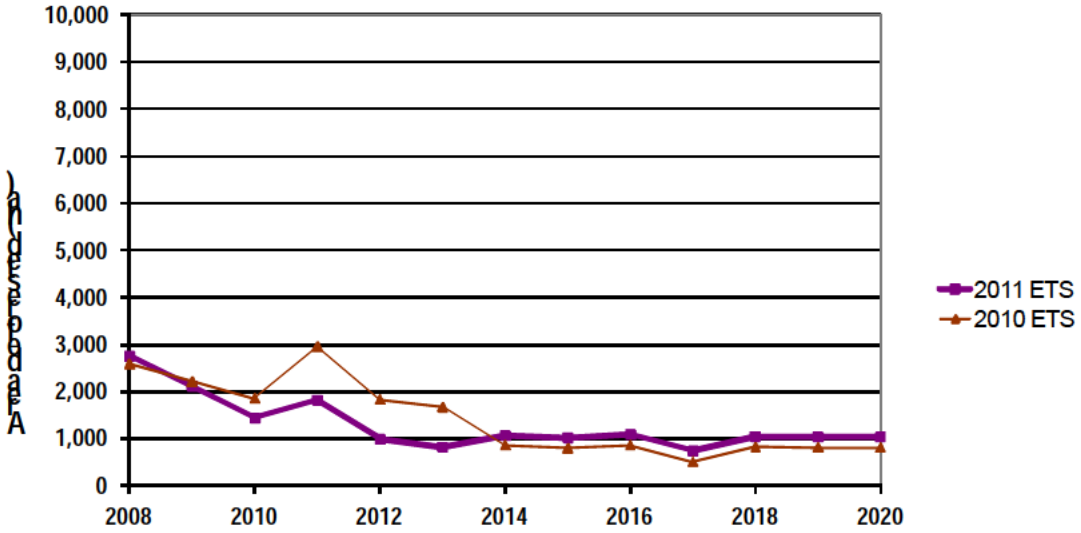


Comparison with 2010 survey

Deforestation under ETS

Total forecast deforestation by large-scale owners for 2008 to 2020 is 17,000 hectares. This is less than the total of 19,000 hectares in the 2010 survey. The main difference is that a project involving deforestation for a windfarm that was included in the 2010 forecast is now unlikely to proceed.

Figure 4: Comparison of the 2011 survey results with those from the 2010 survey (ETS) – large-scale owners

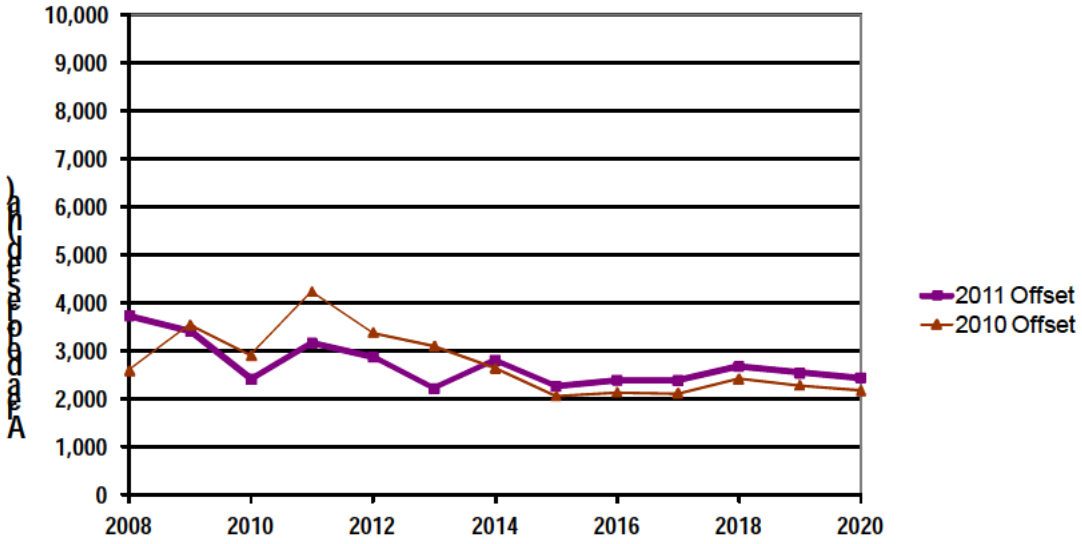


Deforestation if offset planting is allowed

Total forecast deforestation by large-scale owners for 2008 to 2020 is 35,000 hectares compared to 36,000 hectares in the 2010 survey. The main changes are:
The assumed unlikely establishment of the windfarm project.

- The inclusion of area harvested in 2008 that, despite being replanted to avoid ETS liabilities, is likely to be converted if offset planting is allowed.

Figure 5: Comparison of the 2011 survey results for the Offset Planting scenario with those from the 2010 survey – large-scale owners

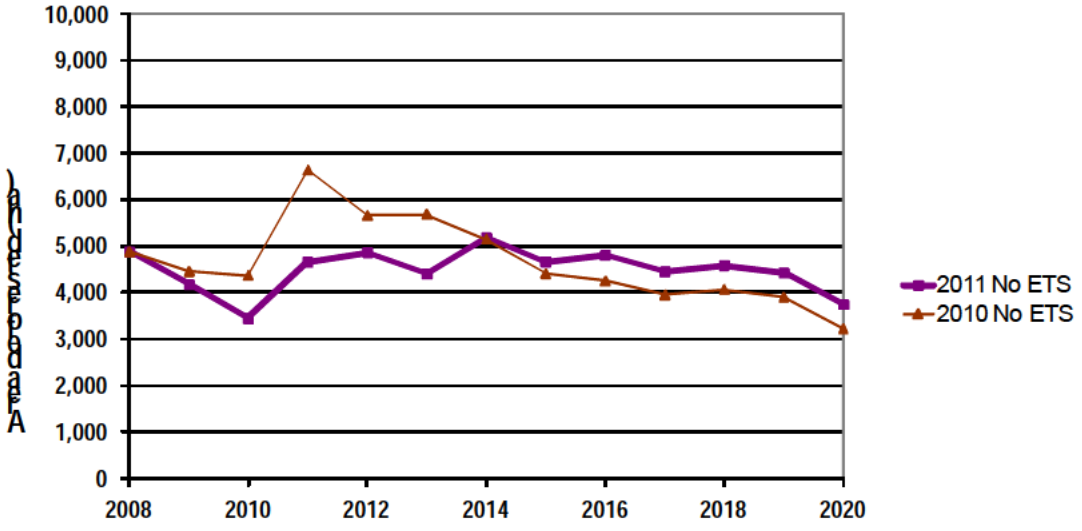


Deforestation if ETS is repealed

Total deforestation by large-scale owners for 2008 to 2020 is 58,000 hectares compared to 61,000 hectares in the 2010 survey. The main changes are:

- The assumed unlikely establishment of the windfarm project.
- Revised intentions for a number of owners including the new manager for one forest indicating that some deforestation is likely to occur if the ETS is repealed.

Figure 6: Comparison of the 2011 survey results for No ETS with those from the 2010 survey – large-scale owners only



Uncertainty

Land owners are making decisions in an environment where there is considerable uncertainty. This uncertainty arises because of factors such as:

- Whether recommendations of the ETS Review 2011 will be implemented.
- Ongoing international negotiations for any post-2012 commitments. Will there be a successor to the Kyoto Protocol and what form will it take?
- The relative profitability of different land-uses changing with changes in product prices.
- The level of NZU prices.

Details of Offset Planting scenario

Some owners are taking a wait-and-see approach. For example, as land is handed back to them by the forestry right holder, some land owners are leaving, for as long as possible, the land unplanted (but not converted) in the hope that offset planting will be allowed from 2013.

The Offset Planting scenario that was presented to respondents specified that landowners would be permitted without liability to deforest provided that they afforest/reforest an equal area elsewhere in New Zealand. Although respondents answered on this basis, most were unclear about what any legislation would actually require. For example, paragraph 206 of the report of the ETS Review 2011 states that "To meet the intention of the ETS, the Panel considers any future offset planting regime (i.e. flexible land use) should focus on the carbon equivalence of the offset forestry rather than on equivalence in area."

The 2011 National Party Environment and Climate Change Policy states that "The introduction of offsetting will allow land owners to change land use, as long as they provide an equivalent level of carbon sequestration by replanting on another site".

It is unclear what is meant by the terms "carbon equivalence" and "equivalent level of carbon sequestration" or how they will be translated into legislation. The results for the offsetting scenario in this survey reflect an equivalence in area – this may well be different to what is legislated.

Carbon prices

The current level of deforestation of pre-1990 forests is low. For the first half of 2011 carbon prices were in the range $17/NZU to $20/NZU. The survey was carried out at a time when the carbon price was decreasing from $14/NZU to $10/NZU. At this level the deforestation liability is still a deterrent to land conversion. Consequently the responses to this survey were very similar to those from the 2010 survey. Despite the reduction in carbon prices they are still high enough for some respondents to intend using offset planting.

Subsequent to the survey carbon prices have continued to fall. For example on Friday 16 December 2011 Carbon News reported "Carbon has hit a new low.

[On 15 December 2011] spot CERs were trading at $NZ6.58 – down nearly 30 per cent on last Friday's prices, and down more than 60 per cent on prices in the first four months of the year." Although the NZU price is higher than this CER prices, if it decreases further it is likely that deforestation projects that were dependent on offsets will instead proceed but with deforestation liabilities met. For the example of a 28 year-old stand and a cost of

$4,000/hectares to buy land and plant trees to carry out offset planting, the breakeven carbon price (at which offset planting has no financial benefit) is $7.71 in Canterbury and $5.64 in the Bay of Plenty.