The under-performance of human-induced regeneration (HIR) projects: Analysis of misinformation disseminated by the Clean Energy Regulator

Andrew Macintosh, Don Butler, Pablo Larraondo, Marie Waschka, Megan C. Evans and Dean Ansell

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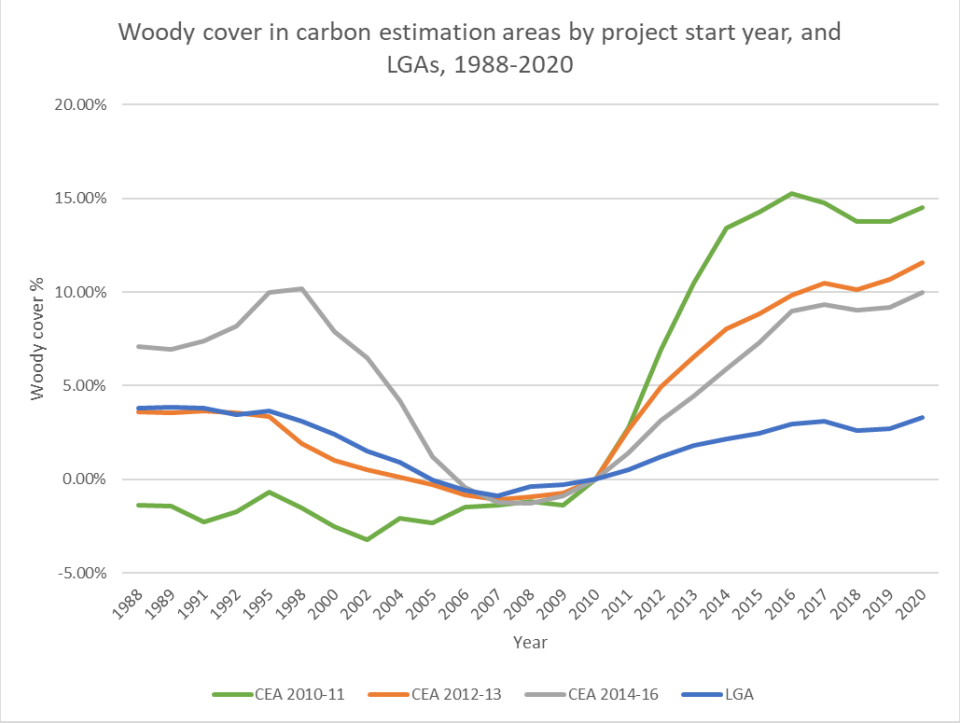
Executive summary

The Clean Energy Regulator has recently published several graphs, including Figure ES1 below, in response to concerns over the underperformance of human-induced regeneration (HIR) projects in regenerating native forests. Figure ES1 purports to show trends in woody cover (forest cover, or possibly forest and sparse woody cover combined) over the period 1988 to 2020 in the carbon estimation areas (CEAs) of projects whose project commencement dates were backdated to between 2010-11 and 2012-13, relative to the trends in the CEAs of projects that commenced over the period 2014-16 and an unspecified local government area (LGA).

The Clean Energy Regulator appears to claim its graphs demonstrate that HIR projects are increasing in woody cover as a result of the effects of HIR activities (predominantly grazing control), with the implication that the projects are performing well and in accordance with expectations. These claims are false and misleading.

Figure ES1. Woody cover in carbon estimation areas by project start year, and LGAs, 1988-2020



Source: Clean Energy Regulator (2023) ACCU Scheme – Human-induced Regeneration Method Graphs. Commonwealth of Australia, Canberra.

The Clean Energy Regulator's description of Figure ES1 is wrong. The figure does not show trends in woody or forest cover over the period 1988 to 2020. It shows the percentage change in woody or

forest cover relative to 2010 (see Figure 1, p 5 below). The Regulator appears to have chosen to display the data as percentage change relative to 2010 because:

(a) it obscures the fact that, in most projects in NSW and QLD, a significant proportion of the areas included in HIR CEAs had forest cover when the projects commenced; and

(b) it exaggerates the magnitude of the differences in the changes in woody cover between HIR CEAs and elsewhere in the LGA that do not contain HIR projects.

It is also clear from these graphs that almost all of the increase in woody cover in the HIR CEAs occurred **before** the HIR projects were registered.

The *Carbon Credits (Carbon Farming Initiative) Act 2011* (Cth) (CFI Act) did not come into effect until December 2011, the HIR method was not made until January 2013 and most of the HIR projects were not registered until after 1 January 2015. Most of the projects included in the analysis were not registered until 2015-2016.

The Regulator explains this by pointing out that the first versions of the HIR method allowed projects to backdate their project commencement dates, implying that the relevant HIR activities commenced prior to when the projects were registered. But it is not plausible that landholders changed land management practices in order to induce the regeneration of native forests prior to 2013, when there were no incentives, and strong disincentives, to promoting additional regeneration of woody vegetation at this time. In the regions where HIR projects are located, woody thickening was widely regarded as a form of land degradation – a view that is still common.

To the extent activities were being undertaken prior to when the projects were first registered that could assist native forest regeneration, like increased goat harvesting, they are likely to have been carried out for commercial reasons unrelated to the carbon market and would have occurred anyway. Not only that, the fact these activities may have been undertaken does not explain four key issues that are apparent from the Regulator's graphs.

1. **Woody cover was increasing in the CEAs, even before the backdated project commencement dates.**

   The method is built on the premise that, over the 10-year period before the project commenced, grazing by livestock or feral animals, weeds, or mechanical or chemical clearing were suppressing the regeneration of native forest. The project activities then involve the removal of the relevant suppressors, which allows the native forests to regenerate. Yet the Regulator's figures show that woody cover was increasing in the CEAs before the projects commenced. In the 2010-11 CEAs, woody cover started increasing in the early 2000s, then increased significantly from around 2010. In the 2012-13 and 2014-16 CEAs, woody cover also increased from around 2010.

   This raises the question: **why was forest cover increasing in the CEAs well before the projects commenced, over a period when grazing, clearing or other factors were meant to be suppressing regeneration?**

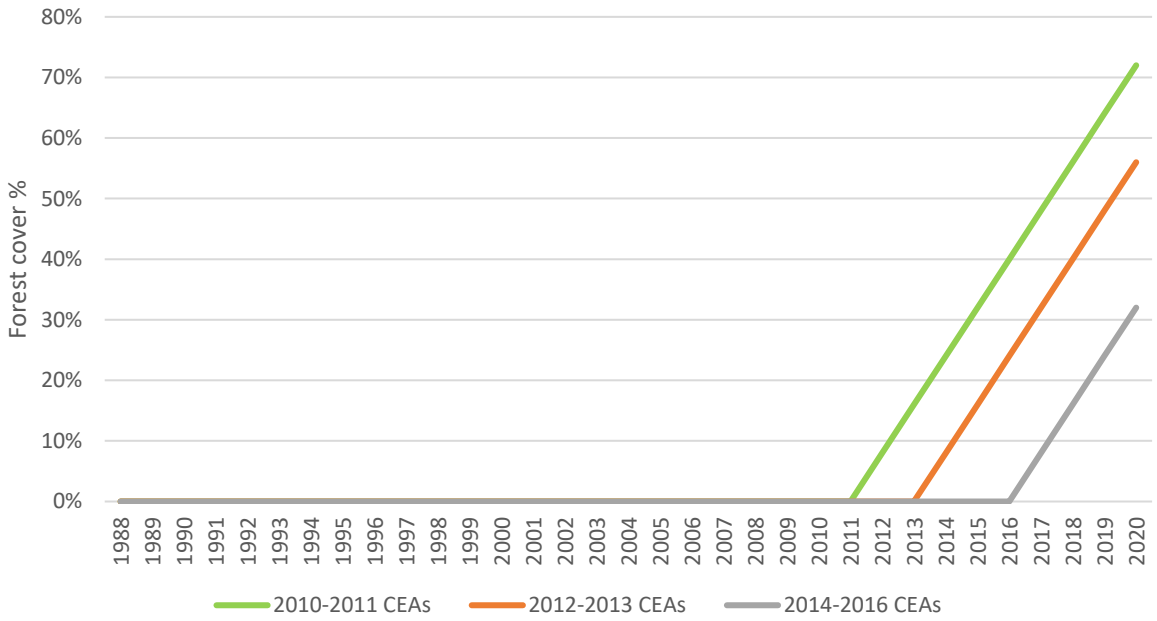
2. **Woody cover in all of the CEA cohorts, and in the surround LGA area, started increasing significantly at exactly the same time, around 2010.**

   If regeneration was dependent on the commencement of the project activities, the increases in woody cover should be staggered, as shown in the illustrative figure below (Figure ES2).

Forest cover in the CEAs should be at or near zero in the years before the project activities commenced, and then woody cover should start to increase, first in the 2010-11 CEAs, then in the 2012-13 CEAs, and then in the 2014-16 CEAs.

This raises the question: **why, if regeneration was supposed to be dependent on the commencement of the project activities, did woody cover increase in the CEAs (and in the surrounding LGA) at the same time, regardless of project commencement dates?**

Figure ES2. Expected forest cover response in 2010-11, 2012-13 and 2014-16 HIR CEAs

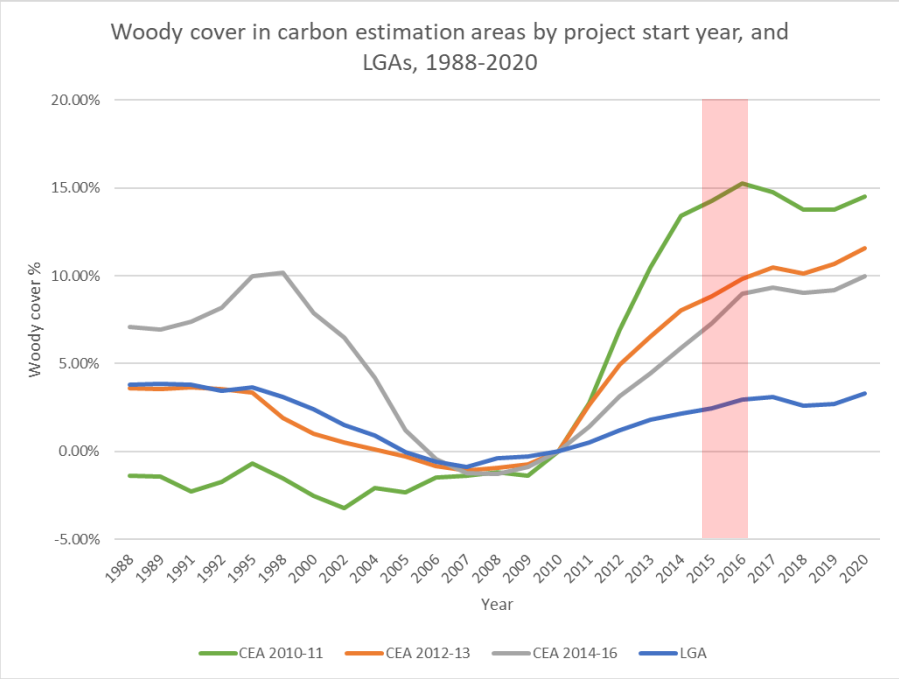


3. **Woody cover has barely changed since the projects were registered.**

The Regulator's graphs show clearly that, since the projects were registered (mainly from 2015 to end 2016), there has been very little change in woody cover in the CEAs, regardless of when the projects are purported to have commenced. Woody cover in the 2010-11 CEAs has stayed around 14-15%, relative to 2010 levels (approx. 2015-2016 to 2020, see red bar in Figure ES3 below), while there have been small increases in the 2012-13 and 2014-16 CEAs of approximately 1-2.5% relative to 2010 levels.

This raises the question: **why have the project activities had such little effect on forest cover since the projects were registered?**

Figure ES3. Vertical red band overlayed on Figure ES2 to show period most projects were actually registered



4. **The increases in woody cover from the backdated project commencement dates are small, particularly in comparison to the number of credits that have been issued in relation to the projects.**

   Even if it is accepted that the project activities commenced prior to when the projects were registered, and somehow they were responsible for the increases in woody cover, the increases are still small, particularly in comparison to the number of credits that have been issued in relation to the projects. For the time period covered in the Regulator's analysis, the projects are purporting to have been regenerating native forests for between 4 and 10 years. Given this length of time and the rate at which the projects have been credited, forest cover (not just combined forest and sparse woody cover) should be significantly above 60% for the 2010-11 CEAs, 40% for the 2012-13 CEAs and 20% for the 2014-16 CEAs. Assuming there are small amounts of forest cover in the CEAs at commencement, **the increases in cover relative to 2010 should be several hundred percent.** However, the Regulator's graphs show the increases have been negligible – at best, an increase of 15% relative to 2010 levels for the 2010-11 CEAs.

   This raises the question: **why are the projects performing so badly?**

The similar timing and quantum of trends in woody cover inside and outside the CEAs in the Regulator's graphs suggest that regeneration was not being suppressed in the CEAs and, to the extent there has been any regeneration, it is largely not attributable to HIR project activities. The main reason that woody cover increased, both inside the CEAs and the surrounding LGAs, is likely to be because of the above average rainfall associated 2010-12 La Nina event.

Why was the increase in woody cover (relative to 2010) greater in the CEAs than in the surrounding LGAs? This is likely because the CEAs were selected after the regeneration had commenced – proponents simply selected the areas that were already regenerating. Proponents were also

required to exclude areas of pre-existing forest and areas that did not have ‘forest potential’ (e.g. natural grasslands).

The projects were mainly registered over the period from January 2015 until the end of 2016, after most of the regeneration had already occurred. It is likely that proponents simply drew CEA boundaries around the areas that had already regenerated and other areas they thought could sustain additional regeneration. At the same time, the method requires proponents to exclude areas with existing forest cover and areas that do not have ‘forest potential’ from CEAs. In contrast, the surrounding LGAs are comprised of a mix of land types: some with forest cover, some with forest potential, and other areas with no forest potential. This means that, when the same amount of regeneration occurs, it appears to be more pronounced in the CEAs than in the surrounding LGAs.

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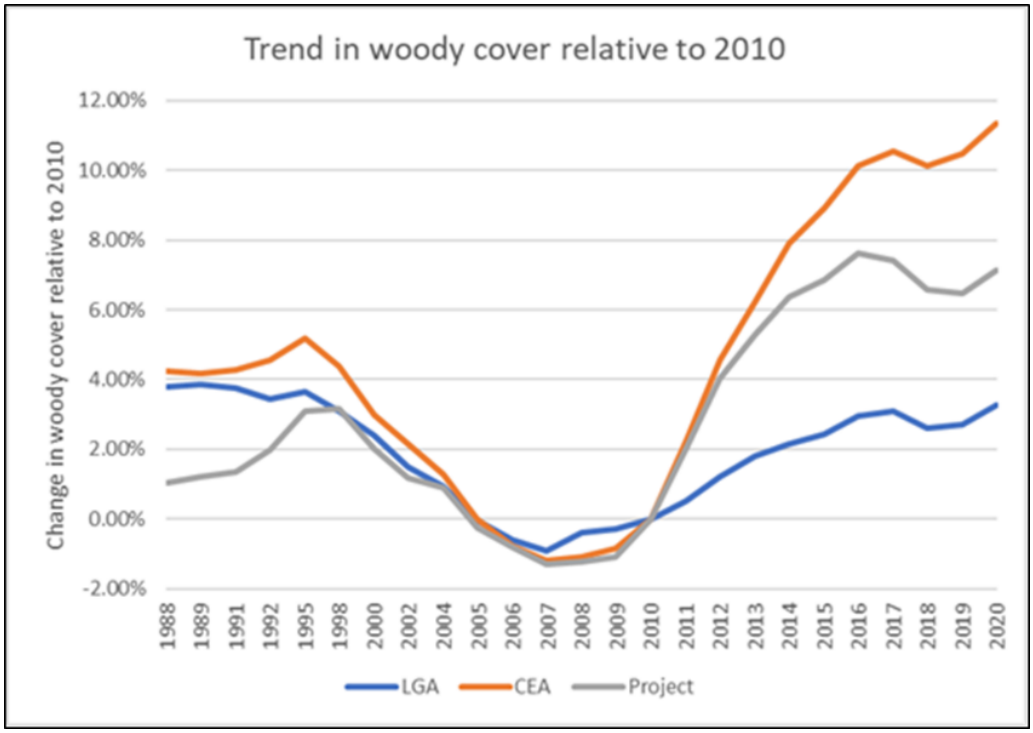
1. Introduction – the Clean Energy Regulator's graphs

The Clean Energy Regulator (the Regulator) has recently published several graphs in response to concerns over the underperformance of human-induced regeneration (HIR) projects in regenerating native forests. The purpose of the graphs appears to be to support the claim that, overall, HIR projects are performing well and in accordance with expectations.

The Regulator has disseminated Figure 1 below with the following commentary.

> *Figure 1 shows a comparison of trends in woody cover since 2010 in project areas and carbon estimation areas (CEAs) of Human-induced Regeneration (HIR) projects in NSW and Qld, compared with the Local Government Areas (LGAs) that they are located in. Only HIR projects registered prior to 2017 are included in this analysis to show the impact of project activities over time.*
>
> *The figure uses the 2020 National Forest and Sparse Woody Vegetation Data and demonstrates how CEAs have increased their woody cover percentages (relative to 2010 levels) considerably more than the surrounding LGAs. While forest cover in LGAs is beneath their historical maximum, HIR CEAs and projects are now well above any level recorded in the 30+ years since 1988. The higher increases in woody cover in CEAs compared to LGAs after 2010 demonstrate the effect of HIR activities (e.g. managing grazing, feral animal control, ceasing destruction of vegetation).*[1]

Figure 1. Trend in woody cover relative to 2010



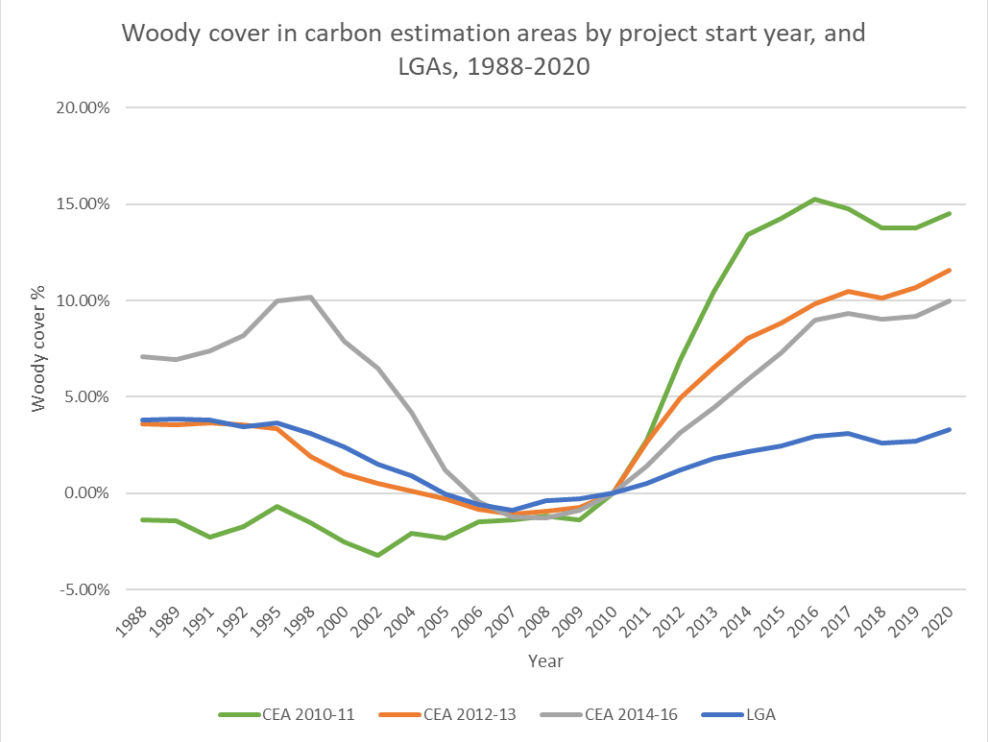
Source: Clean Energy Regulator (2023) ACCU Scheme – Human-induced Regeneration Method Graphs. Commonwealth of Australia, Canberra.

[1] Clean Energy Regulator (2023) ACCU Scheme – Human-induced Regeneration Method Graphs. Commonwealth of Australia, Canberra, p 1.

To further support these claims, it has also published Figure 2 below with these remarks:

> *Figure 2 shows woody vegetation response to HIR projects in NSW and Qld, demonstrating increased forest cover proportions in back-dated projects (2010-11, 2012-13) relative to cohorts of projects that started later.*
>
> *This figure demonstrates that HIR projects that have a longer project duration have an increased forest attainment (where the increased impact of back-dated projects can also be observed).*
>
> *Earlier versions of the HIR method back dated project start dates which was permitted where land holders had evidence of changed land management practices. Many HIR projects started well before 2015.*
>
> *There is a clear difference between those projects that started before 2015 to those that started after.*[2]

Figure 2. Woody cover in carbon estimation areas by project start year and LGA, 1988-2020



Source: Clean Energy Regulator (2023) ACCU Scheme – Human-induced Regeneration Method Graphs. Commonwealth of Australia, Canberra.

It should be noted that the Clean Energy Regulator published similar material in 2022 on behalf of the Emissions Reduction Assurance Committee.[3]

[2] Clean Energy Regulator (2023) ACCU Scheme – Human-induced Regeneration Method Graphs. Commonwealth of Australia, Canberra, p 2.

[3] Emissions Reduction Assurance Committee (2022) Emissions Reduction Assurance Committee findings on the Emissions Reduction Fund's Human Induced Regeneration method. Clean Energy Regulator, Canberra. Available at: http://www.cleanenergyregulator.gov.au/DocumentAssets/Pages/ERAC-findings-on-the-Human-

Below, we discuss the problems with how the Clean Energy Regulator has presented the data and the integrity problems that the data expose. We argue that this material is misleading and provides a distorted picture of the performance of relevant HIR projects.

2. Problems with the Clean Energy Regulator's graphs

Figure 1 purports to show trends in woody cover relative to 2010 in the project areas and carbon estimation areas (CEAs) of HIR projects in NSW and Qld registered before 2017, compared to the trends in woody cover in the Local Government Areas (LGAs) they are located in. While not stated, these appear to be mainly the Bourke and Cobar LGAs in NSW, and Quilpie and Paroo LGAs in QLD.

Figure 2 purports to show trends in woody cover over the period 1988 to 2020 in the CEAs of projects whose project commencement dates were backdated to between 2010-11 and 2012-13, relative to the trends in the CEAs of projects that commenced over the period 2014-16 and an unspecified LGA area.

In this context, areas with 'woody cover' typically refer to 25m x 25m pixels that are classified in the National Forest and Sparse Woody Vegetation Dataset, published as part of the National Carbon Accounting System, as having either:

- sparse woody cover – trees and shrubs that provide crown cover of between 5-19%; or
- forest cover – trees and shrubs ≥2 m in height that provide crown cover ≥20%.

In the Figures and commentary, it is unclear whether the Clean Energy Regulator is referring to woody cover (i.e. areas with either sparse woody or forest cover) or just areas with forest cover. The commentary flips between woody cover and forest cover, suggesting the data may be for forest cover only.

More significantly, the Clean Energy Regulator's description of Figure 2 and its y-axis (vertical axis) label is wrong. The Figure does not show trends in woody or forest cover over the period 1988 to 2020. It shows the percentage change in woody or forest cover relative to 2010, the same as Figure 1. This is clear from the fact that the lines pass through 0% in 2010 (and the fact that several of the lines are negative prior to 2010 – i.e. woody or forest cover was below the levels in 2010).

The Clean Energy Regulator appears to have chosen to display the data as percentage change relative to 2010 because:

(a) it obscures the fact that, in most projects in NSW and QLD, a significant proportion of the areas included in HIR CEAs had forest cover when the projects commenced; and

(b) it exaggerates the magnitude of the differences in the changes in woody cover between HIR CEAs and elsewhere in the LGA that do not contain HIR projects.[4]

In relation to (a), the HIR method explicitly requires areas with forest cover to be excluded from CEAs. This is because HIR projects are supposed to regenerate native vegetation to achieve forest

Induced-Regeneration-method.aspx. See Macintosh, A. et al. (2022) Integrity and the ERF's Human-Induced Regeneration Method: The Additionality Problem Explained. The Australian National University, Canberra.

[4] Note also how the y-axis (vertical axis) is limited to the range -2% to +12% in Figure 1 and -5% to +20% in Figure 2. Confining the Y-axis in this way accentuates the differences in the changes in cover.

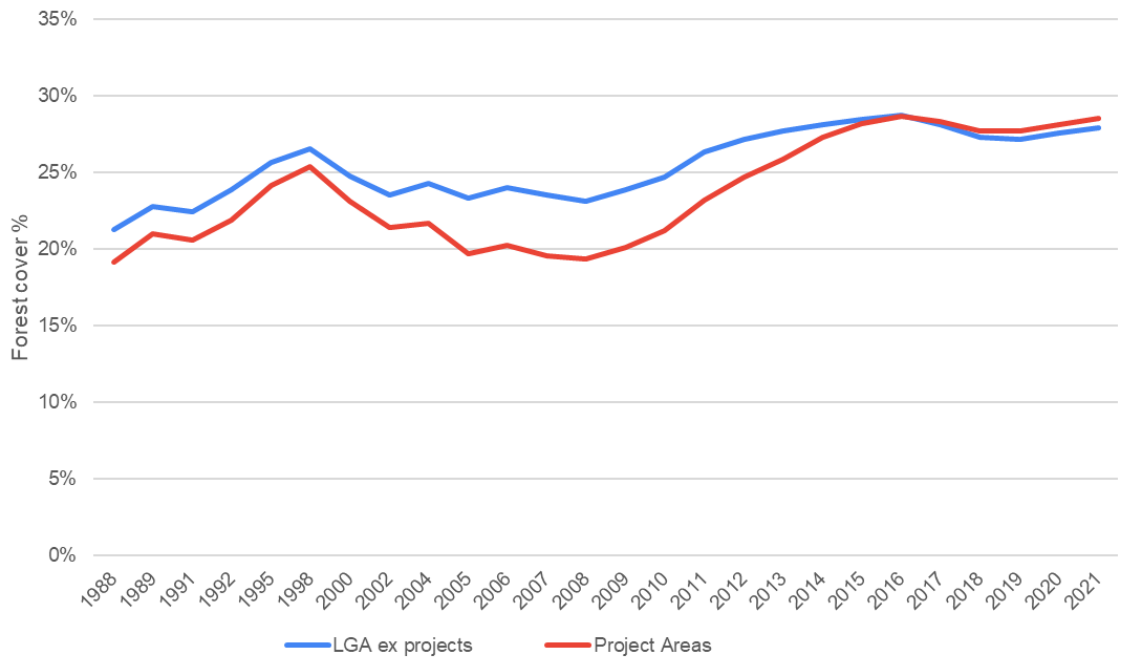
cover. It makes no sense to purport to do this in areas that already had forest cover when the projects started.

In relation to (b), if the data were presented as the trends in woody or forest cover over time—percentage of 25 m x 25m pixels in the relevant areas classified as having forest or sparse woody cover—it would look significantly different. This is illustrated in Figures 3 and 4 below.

Figure 3 shows the trends in forest cover over the period 1988 to 2021 in HIR project areas in the Bourke LGA and the trends in forest cover across the remainder of the Bourke LGA, excluding projects. Figure 4 shows the same data, only presented as percentage change relative to 2010. Bourke was chosen because it has the most HIR projects of any LGA and the trends in forest cover are roughly consistent with those shown in the Clean Energy Regulator's graphs.

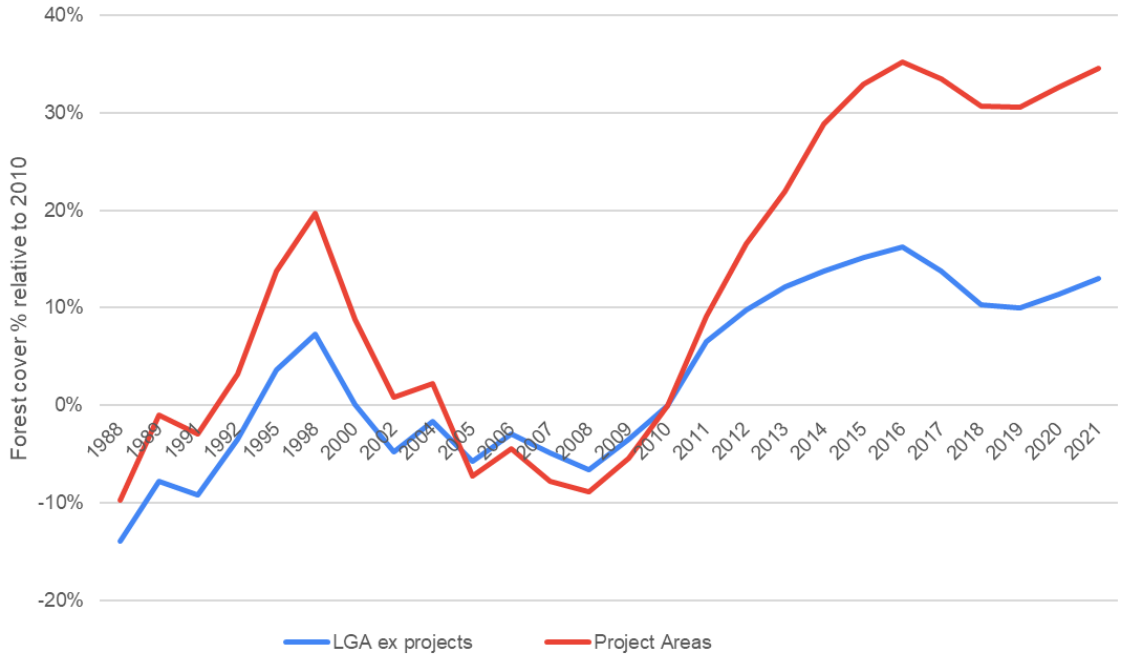
Looking at Figure 4, at first glance, there appears to be a significant difference in the trends in cover between the project areas and LGA. However, Figure 3 gives a more honest and complete picture, because it uses a natural scale, and shows that forest cover inside the HIR project areas and in the surrounding LGA tracked closely throughout the period since 1988. The main difference was that, during the Millennium Drought (2001 to 2009), forest cover fell more sharply in the HIR project areas than in the surrounding LGA, then it recovered more rapidly following the 2010-12 La Lina event. Since approximately 2014, the trends in forest cover in the two areas have been almost identical.

Figure 3. Percentage of HIR CEAs and LGA excluding projects with forest cover, 1988-2021



Source: Department of Climate Change, Energy, the Environment and Water (2022) National Forest and Sparse Woody Vegetation Data (Version 6.0 - 2021 Release).

Figure 4. Percentage change in forest cover in HIR project areas and Bourke LGA excluding projects relative to the levels in 2010, for the period 1988-2021



Source: Department of Climate Change, Energy, the Environment and Water (2022) National Forest and Sparse Woody Vegetation Data (Version 6.0 - 2021 Release).

3. What do the Clean Energy Regulator's graphs really tell us?

Noting the above issues with how the data have been presented, there are five notable issues that can be identified in the Clean Energy Regulator's graphs (Figures 1 and 2).

1. **Almost all of the increase in woody cover in the CEAs occurred before the HIR projects were registered**.

   The *Carbon Credits (Carbon Farming Initiative) Act 2011* (Cth) (CFI Act) did not come into effect until December 2011, the HIR method was not made until January 2013 and most of the HIR projects were not registered until January 2015. Most of the projects included in the analysis were not registered until 2015-2016. The Clean Energy Regulator explains this by pointing out that the first versions of the HIR method allowed projects to backdate their project commencement dates, implying that the relevant project activities commenced prior to when the projects were registered.

   This raises the question: **is it plausible that the project activities commenced before the projects were registered, and even before the HIR method and CFI Act existed?**

2. **Woody cover was increasing in the CEAs, even before the backdated project commencement dates.**

   The HIR method is built on the premise that, over the 10-year period before the project commenced, grazing by livestock or feral animals, weeds, or mechanical or chemical clearing were suppressing the regeneration of native forest. The project activities then involve the removal of the relevant suppressors, which allows the native forests to regenerate. Yet, the

Regulator's graphs reproduced in Figures 1 and 2 show that woody cover was increasing in the CEAs well before the projects commenced. In the 2010-11 CEAs, woody cover started increasing in the early 2000s, then increased significantly from around 2010. In the 2012-13 and 2014-16 CEAs, woody cover also increased from around 2010.

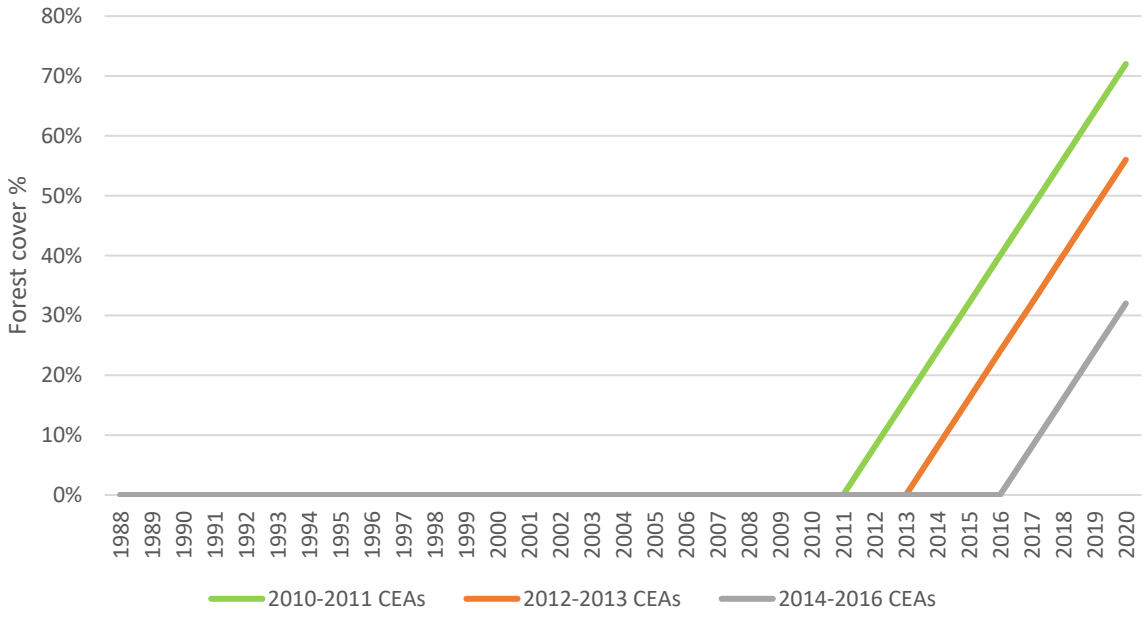
This raises the question: **why was forest cover increasing in the CEAs well before the projects commenced, over a period when grazing, clearing or other factors were meant to be suppressing regeneration?**

3. **Woody cover in all of the CEA cohorts, and in the surround LGA area, started increasing significantly at exactly the same time, around 2010.**

   If regeneration was dependent on the commencement of the project activities, the increases in woody cover should be staggered, as shown in the illustrative figure below (Figure 5). Forest cover in the CEAs should be at or near zero in the years before the project activities commenced, and then woody cover should start to increase, first in the 2010-11 CEAs, then in the 2012-13 CEAs, and then in the 2014-16 CEAs.

   This raises the question: **why, if regeneration was supposed to be dependent on the commencement of the project activities, did woody cover increase in the CEAs (and in the surrounding LGA) at the same time, regardless of project commencement dates?**

Figure 5. Expected forest cover response in 2010-11, 2012-13 and 2014-16 HIR CEAs

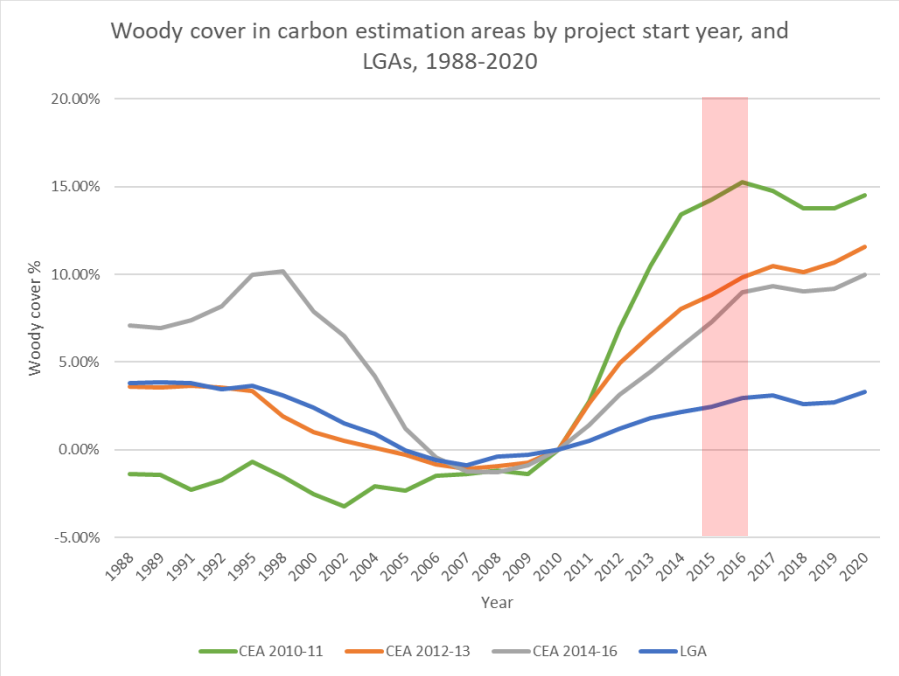


4. **Woody cover has barely changed since the projects were registered.**

   The Clean Energy Regulator's graphs show clearly that, since the projects were registered (mainly from January 2015 to end 2016), there has been very little change in woody cover in the CEAs, regardless of when the projects are purported to have commenced. Woody cover in the 2010-11 CEAs has stayed around 14-15%, relative to 2010 levels (approx. 2015-2016 to 2020, see red bar in Figure 6 below), while there have been small increases in the 2012-13 and 2014-16 CEAs of approximately 1-2.5% relative to 2010 levels.

This raises the question: **why have the project activities had such little effect on forest cover since the projects were registered?**

Figure 6. Vertical red band overlayed on Figure 1 to show period most projects were actually registered



5. **The increases in woody cover from the backdated project commencement dates are small, particularly in comparison to the number of credits that have been issued in relation to the projects.**

   Even if it is accepted that the project activities commenced prior to when the projects were registered, and somehow they were responsible for the increases in woody cover, the increases are still small, particularly in comparison to the number of credits that have been issued in relation to the projects. For the time period covered in the Clean Energy Regulator's analysis, the projects are purporting to have been regenerating native forests for between 4 and 10 years. As illustrated in Figure 5, given this length of time and the rate at which the projects have been credited, forest cover (not just combined forest and sparse woody cover) should be significantly above 60% for the 2010-11 CEAs, 40% for the 2012-13 CEAs and 20% for the 2014-16 CEAs. Assuming there are small amounts of forest cover in the CEAs at commencement, the increases in cover using the Regulator's tricky scaling relative to 2010 should be several hundred percent. However, the Regulator's graphs show the increases have been negligible – at best, an increase of 15% relative to 2010 levels for the 2010-11 CEAs.

   This raises the question: **why are the projects performing so badly?**

4. Did the project activities start before 2014?

Under the 2013 version of the method, projects could backdate their project commencement date to 1 July 2007 or later if there is:

> documentary evidence of a kind specified in subsection 2.3(3), that **suppression activities in the project area have ceased** or will cease and a **human assisted regeneration activity** will commence.[5]

'Suppression activities' are defined for these purposes as:

> a combination of land use and land management practices that **prevents the regeneration of native vegetation** on land due to the effects of one or more of the following:
>
> (a) livestock;
>
> (b) feral animals;
>
> (c) plants not native to the project area;
>
> (d) mechanical or chemical destruction, or suppression, of regrowth.

A 'human-assisted regeneration activity' is defined under the method as:

> one or more of the following activities undertaken **to induce the establishment of a native forest** from in situ seed, lignotubers or root stock (coppice) sources:
>
> (a) exclusion of livestock;
>
> (b) management of the timing, and the extent, of grazing;
>
> (c) management, in a humane manner, of feral animals;
>
> (d) management of plants that are not native to the project area;
>
> (e) cessation of mechanical or chemical destruction, or suppression, of regrowth.

For proponents to have been eligible for backdating, they are supposed to demonstrate that they took steps to eliminate suppression in order to assist native forest regeneration. Section 2.3 of the method provides that there must be a 'documented change to the land management regime of the project area to a human-assisted regeneration activity'. Section 2.3(3) then specifies that:

> there is a documented change to a human-assisted land management activity if the project proponent provides at least one of the following with respect to the project area:
>
> (a) an application to the Regulator for an eligible offsets project declaration;
>
> (b) records of activities that assist native forest regeneration such as records of fencing to exclude livestock, to remove feral animals, or to manage non-native plant species;
>
> (c) registration of carbon property rights under state or territory carbon rights legislation; or

[5] Carbon Credits (Carbon Farming Initiative) (Human Induced Regeneration of a Permanent Even-Aged Native Forest) Methodology Determination 2013 (https://www.legislation.gov.au/Details/F2015C00576), s 1.3 (definition of 'project commencement').

(d) other documents involving third parties indicating a clear intention of the project proponent to cease mechanical or chemical suppression of regrowth either to establish a forest or to commence a carbon project.

Eligibility of most of the projects with backdated project commencement dates is likely to turn on whether section 2.3(3)(b) is interpreted restrictively or permissively.

- A **restrictive interpretation** would require the proponent to demonstrate steps were taken to eliminate suppressors in order to induce the establishment of a native forest. This interpretation is consistent with the aims and purposes of the method, including the scope of the method as described in section 1.4, which provides that

  This Determination applies to a project if:

  (a) the project area was subject to suppression activity during the baseline period; …

  (c) there is a documented commencement of a human-assisted regeneration activity;

  (d) there is regeneration which is a direct result of a human-assisted regeneration activity; … .

- A **permissive interpretation** would merely require the proponent to demonstrate that any activities that could assist native forest regeneration were being undertaken at the relevant time, 'such as records of fencing to exclude livestock, to remove feral animals, or to manage non-native plant species'. The adoption of this interpretation would mean **almost any landholder in the regions in which HIR projects are undertaken would be eligible** because almost all landholders take some measures to control feral animals and have some fencing to control livestock grazing. The difficulty with this permissive interpretation is that it is inconsistent with the purpose of the method and its key underpinning concepts. For example, it would allow projects to be initiated without a 'human-assisted regeneration activity' (i.e. because, to satisfy the definition of a 'human-assisted regeneration activity', the activity must be taken with the aim of inducing the establishment of a native forest). Similarly, it would allow proponents to be credited for regeneration that is not the 'direct result of a human-assisted regeneration activity' (as per section 1.4(d), quoted above).

If a restrictive interpretation is preferred, **it is difficult to believe many projects could satisfy the backdating requirements**. The proposition is that, over the period 2007 to 2013, significant numbers of pastoralists took steps to reduce grazing pressure from livestock or feral animals in order to induce the regeneration of native forests, even though:

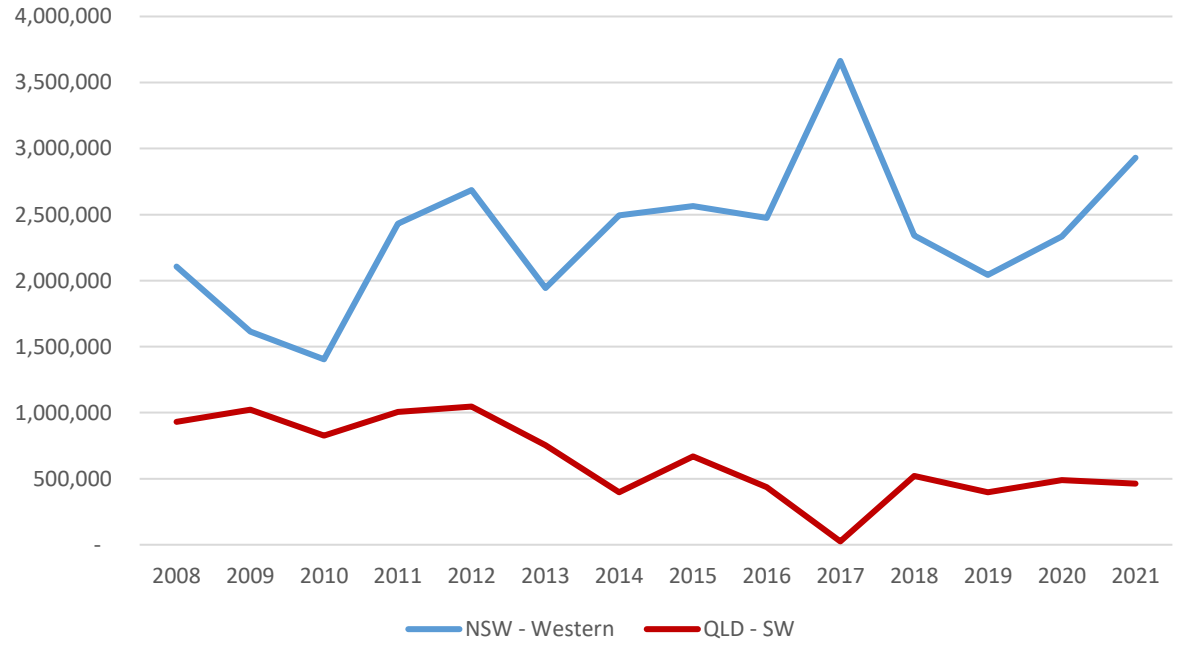
- this would reduce livestock production and reduce the value of their land (i.e. by reducing the area under pasture and increasing the wooded areas); and
- the CFI Act did not come into effect until December 2011, the HIR method was not made until January 2013 and most of the HIR projects were not registered until January 2015.

This is implausible on several levels. Most obviously, it begs the question: if the landholders did take these steps, why did most proponents wait more than 24 months, and in many cases significantly longer, to register the projects?

This suggestion is made more implausible by the fact that, throughout this period, in NSW and QLD, pastoralists in HIR regions argued strongly for the creation and retention of exemptions from land clearing laws to allow them to clear areas that had experienced 'woody thickening' (i.e. where there had been increases in tree and shrub cover). In these regions, woody thickening is generally regarded as a form of land degradation.[6] Until the HIR method was created in 2013, there was no incentive for landholders to actively regenerate native forests – it was actively discouraged.

A further fact that sits uncomfortably with the notion that significant numbers of pastoralists took steps to reduce grazing pressure in order to induce the regeneration of native forests in or around 2010 is that sheep and cattle numbers in the HIR regions were relatively stable over this period (Figures 7 and 8).

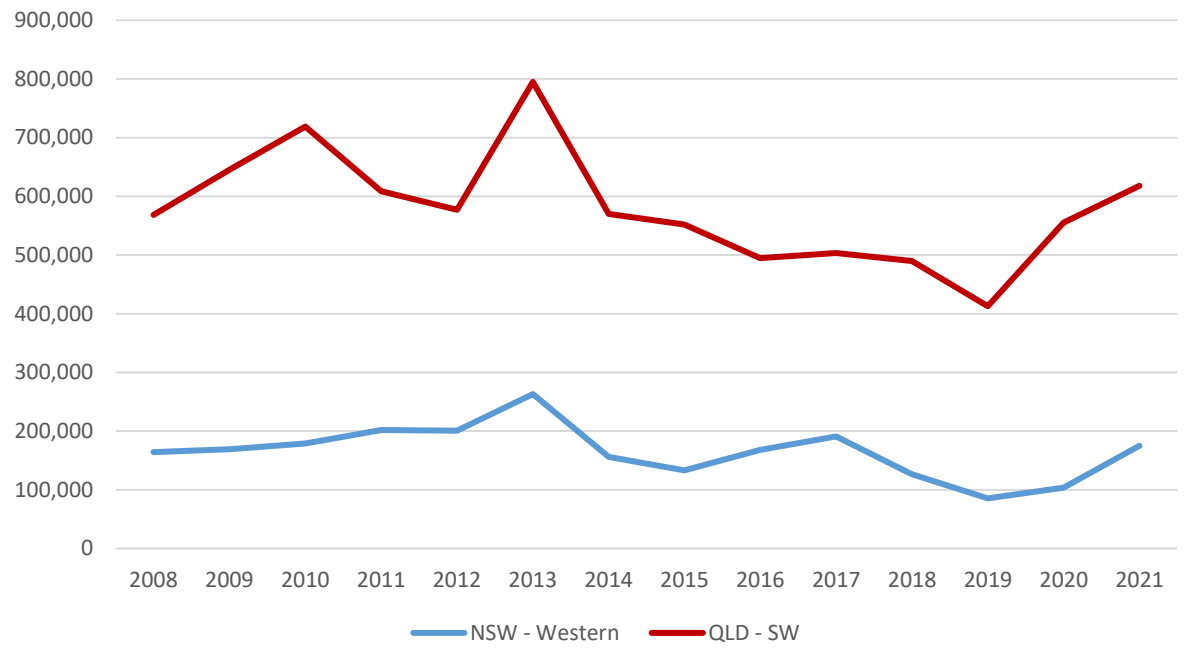
Figure 7. Sheep and lamb numbers, Western NSW and South West NRM regions, 2008-2021



Source: Australian Bureau of Statics (2009-2022) Agricultural Commodities, Australia. Agricultural commodity estimates by Natural Resource Management (NRM) regions (2016 edition. Commonwealth of Australia, Canberra.

[6] Central West and Western Local Land Services (2014) Managing invasive native scrub to rehabilitate native pastures and open woodlands: A Best Management Practice Guide for the Central West and Western Regions. NSW Government, Sydney.

Figure 8. Meat cattle numbers, Western NSW and South West NRM regions, 2008-2021



Source: Australian Bureau of Statics (2009-2022) Agricultural Commodities, Australia. Agricultural commodity estimates by Natural Resource Management (NRM) regions (2016 edition. Commonwealth of Australia, Canberra.

The most relevant and material trend in animal management related to the HIR regions is the increase in goat meat production that started in 2009 and carried through until 2017 (Figure 9). Most of the goat meat processed in Australia occurs in Victoria, Queensland and South Australia, and most of the goats are sourced from the HIR regions in NSW and QLD.[7] A 2017 survey found that around 70% of the goats produced in these regions were from the harvesting of wild populations, with the remaining 30% coming from managed or semi-managed enterprises.[8] In recent years, there appears to have been a significant increase in the number of producers running managed goat enterprises but the harvesting of wild populations still accounts for a substantial proportion of the industry.[9]

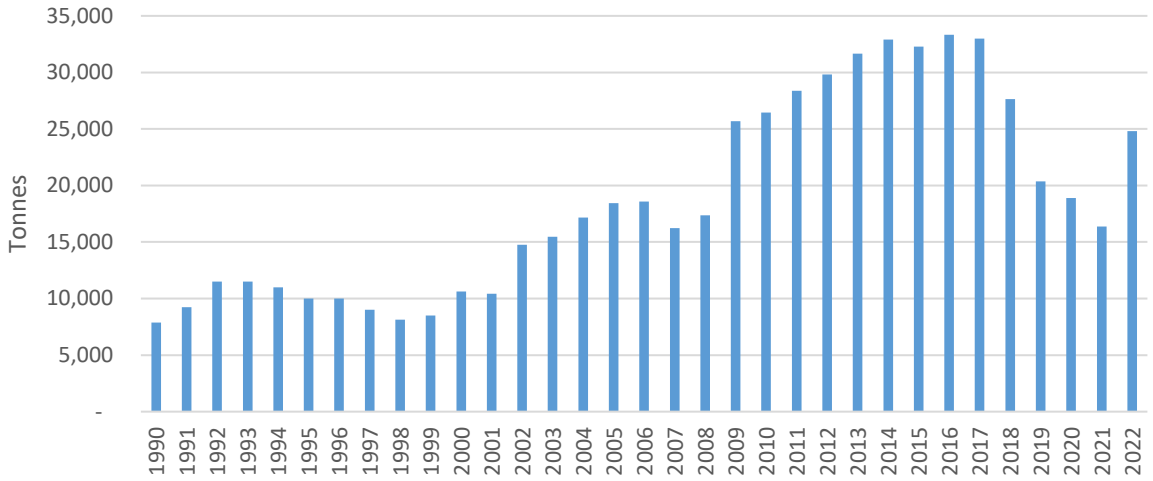
Was the increase in goat harvesting that started in 2009 undertaken to induce the regeneration of native forests?

This is very unlikely. As discussed, at this time, woody thickening from native vegetation was widely regarded in the HIR regions as a form of land degradation.[10] This view is still common. Given the

[7] NSW Department of Primary Industries (2022) Goat Industry Data Collation and Tracking: Industry Update 2021-22. NSW Government, Sydney.
[8] Meat & Livestock Australia (MLA) (2022) Global Snapshot: Goatmeat. MLA, Brisbane.
[9] NSW Department of Primary Industries (2021) Goat Industry Data Collation and Tracking: Industry Update – 2020/21. NSW Government, Sydney.
[10] Central West and Western Local Land Services (2014) Managing invasive native scrub to rehabilitate native pastures and open woodlands: A Best Management Practice Guide for the Central West and Western Regions. NSW Government, Sydney.

absence of incentives to induce native regeneration, the more likely cause of the increase in harvesting was the dynamics in the goat market.[11]

Figure 9. Goat meat production, Australia, 1990-2022



Source: Food and Agriculture Organization of the United Nations (2023) 'FAOSTAT - Crops and livestock products'. Available at: https://www.fao.org/faostat (10 June 2023); and NSW Department of Primary Industries (2022) Goat Industry Data Collation and Tracking: Industry Update 2021-22. NSW Government, Sydney. 2022 is an estimate based on number of goats slaughtered and assuming a 15.5 kg average carcass weight.

Goat harvesting is predominantly driven by the size of the goat population and demand factors, particularly processing capacity and prices.[12] From the 1970s through to the mid-2010s, there was a significant increase in the goat population in NSW.[13] The population peaked in 2016 at an estimated high of 5.8 million, before dropping by 40% to 3.4 million in 2017.[14] A combination of the high goat numbers and material increases in goat prices over the past decade increased the incentive for producers to harvest goats and, more recently, to establish managed goat enterprises.[15] These factors have translated into higher levels of production, moderated by seasonal fluctuations in the herd size.[16] Consistent with this, the 2017-2019 drought materially reduced the goat population and,

[11] Interestingly, HIR projects are likely to be contributing to the more recent switch to managed or semi-managed enterprises, including by providing landholders with access to capital to fund associated infrastructure, particularly exclusion (cluster) fencing. NSW Department of Primary Industries (2021) Goat Industry Data Collation and Tracking: Industry Update –2020/21. NSW Government, Sydney.

[12] Jago, B. (1999) Feral Goat in Queensland. Pest Status Review Series. Queensland Department of Natural Resources and Mines, Brisbane; Ballard, G., Fleming, P., Melville, G., West, P., Pradhan, U., Payne, N., Russell, B. and Theakston, P. (2011) Feral Goat Population Trends in Western New South Wales Rangelands. Report to the Western Catchment Management Authority.

[13] Ballard, G., Fleming, P., Melville, G., West, P., Pradhan, U., Payne, N., Russell, B. and Theakston, P. (2011) Feral Goat Population Trends in Western New South Wales Rangelands. Report to the Western Catchment Management Authority; NSW Department of Primary Industries (2018) General position paper: Development of the goat industry in NSW. NSW Government, Sydney.

[14] NSW Department of Primary Industries (2018) General position paper: Development of the goat industry in NSW. NSW Government, Sydney.

[15] Meat & Livestock Australia (MLA) (2022) Global Snapshot: Goatmeat. MLA, Brisbane.

[16] NSW Department of Primary Industries (2021) Goat Industry Data Collation and Tracking: Industry Update –2020/21. NSW Government, Sydney; NSW Department of Primary Industries (2022) Goat Industry Data Collation and Tracking: Industry Update –2021/22. NSW Government, Sydney; Meat & Livestock Australia (MLA) (2022) Global Snapshot: Goatmeat. MLA, Brisbane.

with it, goat meat production. However, the wet conditions brought on by the three consecutive La Nina events over 2020-2022 has triggered a rebound in the goat population, and in 2022 at least, increased goat slaughters. More recently, a marked decline in prices and wet conditions have dampened production expectations for 2023.[17] However, Thomas Foods International's decision to establish the goat processing facility in Bourke in September 2022 is a sign of the industry's confidence that, despite the extensive area covered by HIR projects in western NSW, production will remain healthy in coming years.[18]

These facts make it difficult to believe that many projects could satisfy the backdating requirements, when interpreted restrictively. That is, while many proponents may have been undertaking goat harvesting and other similar activities that can affect native forest regeneration, they were not doing these activities for these purposes. However, the fact they were carrying out these activities means that, in many cases, proponents are likely to satisfy the requirements associated with the permissive interpretation.

The Clean Energy Regulator has not given any public guidance on its preferred interpretation of the backdating provisions but the extent of project uptake under the original version of the method suggests it is likely to have adopted the permissive approach.

If the permissive interpretation is legally valid, it would overcome the legal questions surrounding the application of the backdating provisions to the projects included in the Clean Energy Regulator's graphs. However, it does not overcome the integrity problems with the projects. **It suggests the project activities were not additional**. In most cases, they are likely to have been carried out for commercial reasons unrelated to the carbon market and would have occurred anyway. Not only that, the fact there was increased goat harvesting for commercial reasons does not explain:

- why forest cover was increasing in the CEAs before the projects commenced, over a period when grazing, clearing or other factors were meant to be suppressing regeneration;
- why, if regeneration was supposed to be dependent on the commencement of the project activities, woody cover increased in all of the CEAs and in the surrounding LGA at the same time; and
- why the project activities been so ineffective since the projects were registered?

The trends in woody cover inside and outside the CEAs in the Clean Energy Regulator's figures suggest regeneration was not being suppressed and, to the extent there has been any regeneration, it is not attributable to any reduction in grazing pressure associated with the projects.

[17] NSW Department of Primary Industries (2023) Goat Industry Data Collation and Tracking: Industry Update – Quarter 1 2022/23. NSW Government, Sydney.
[18] NSW Department of Primary Industries (2018) General position paper: Development of the goat industry in NSW. NSW Government, Sydney ; NSW Department of Primary Industries (2022) Goat Industry Data Collation and Tracking: Industry Update –2021/22. NSW Government, Sydney.

5. Why was regeneration occurring when it was supposedly being suppressed?

Grazing from goats and other animals can have material impacts on tree and shrub growth. However, in rangeland areas, where animal densities are relatively low, grazing usually does not materially inhibit regeneration. It can in some circumstances but, generally, the effects of grazing on tree and shrub growth in these regions are relatively minor, particularly compared to the impacts of variable rainfall. In the rangelands where HIR projects are located, widespread regeneration events can occur following periods of above average rainfall. During these wetter periods, there are generally not enough livestock and feral animals to suppress the growth. This is exacerbated by the fact that, during these wetter periods, there tends to be extensive pasture available for the animals to eat (i.e. their preferred food source). This was illustrated in the regeneration that was triggered in western NSW by the 2010-12 La Nina event. Despite increasing goat numbers through the period 2010-2016 across western NSW, and no material reductions in sheep and cattle numbers, there appears to have been significant regeneration, both inside and outside of HIR project areas, at least until 2014-15. This would not have occurred if goats and other animals were effective suppressors.

6. Why did woody cover increase in the CEAs and in the surrounding LGA at the same time?

The answer is simple: because it was rainfall induced. The 2010-12 La Nina event triggered regeneration across the region and it was not a direct result of the project activities.

7. Why was the increase in woody cover greater in the CEAs than in the surrounding LGAs?

The reason for this is that the CEAs were selected after the regeneration had commenced. The projects were mainly registered over the period from January 2015 until the end of 2016, after most of the regeneration had already occurred. Proponents simply drew CEA boundaries around the areas that had already regenerated and other areas they thought could sustain additional regeneration. At the same time, the method requires proponents to exclude areas with forest cover and areas that do not have 'forest potential' (i.e. they do not contain juvenile trees and shrubs that have the potential to reach ≥2m in height and provide ≥20% crown cover over the land). In contrast, the surrounding LGAs are comprised of a mix of land types: some with forest cover, some with forest potential, and other areas with no forest potential. This means that, when the same amount of regeneration occurs, it appears to be more pronounced in the CEAs than in the surrounding LGAs.

8. Why have the project activities had such little effect on forest cover since the projects were registered?

The answer to this question is likely to lie in two main factors:

- there was not widespread suppression of forest regeneration by grazing from livestock and feral animals in the CEAs; and

- the areas in which the CEAs are located are at or near their carrying capacity for woody vegetation, which limits the extent to which woody cover can increase.

There is likely to be limited capacity to increase the amount of carbon that is stored in these areas because, when the projects commenced, they had about the number of trees and shrubs that they can naturally sustain.