

FullCAM Guidelines

Requirements for using the Full Carbon Accounting Model (FullCAM) in the Australian Carbon Credit Unit (ACCU) Scheme methodology determination: *Carbon Credits (Carbon Farming initiative) (Reforestation by Environmental or Mallee Planting—FullCAM) Methodology Determination 2024*

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1. Introduction

1.1 Purpose of this Guideline

This Guideline provides a step-by-step guide for using the required version of the Full Carbon Accounting Model (FullCAM) for reforestation projects registered under the *Carbon Credits (Carbon Farming Initiative) (Reforestation by Environmental or Mallee Plantings—FullCAM) Methodology Determination 2024* (the Determination).

FullCAM must be used consistent with the requirements of this document. Project proponents must only change FullCAM default settings as indicated in this document, and all other settings must not be changed.

FullCAM must be used to perform simulations for each carbon estimation area (CEA) in the project at the time of reporting. The method requires simulations to include management activities and disturbance events that occur in the CEA. Outputs from these simulations are used to determine the net abatement amount. The Determination requires outputs from FullCAM simulations to be included in offset reports provided to the Clean Energy Regulator.

Where content of this document relates to provisions of the Determination, references are given to the location of those provisions.

1.2 Format of this document

This document provides:

- an overview of FullCAM relevant to the Determination, its features relevant to users and important requirements for using this document (Section 1)
- a step-by-step walkthrough of using FullCAM to run the simulations correctly (Section 2); and
- an overview of the FullCAM outputs as they relate to equations within the Determination (Section 3).

1.3 Determining which FullCAM option to use

The Department of Climate Change, Energy, the Environment and Water (DCCEEW) updates FullCAM from time to time to reflect the latest science, provide access to additional functionality or to support Commonwealth Government initiatives. At the time these Guidelines were published, the latest version of FullCAM released for public use was the version provided in 2020 on the Department's website (<https://www.dcceew.gov.au/climate-change/publications/full-carbon-accounting-model-fullcam>). Therefore, for this Determination, and for the period that this document is the latest version of the FullCAM Guidelines for this method, the latest publicly released version of FullCAM that project users must use is 'Default: 2020 FullCAM option'. Users of the 2020 FullCAM option can access the browser-based application at <https://www.fullcam.gov.au/>. Note when you open the browser-based application, by default, new users are assigned access to the 2024 Public

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Release version when they make an account. To request access to the 2020 Public Release version, you will need to click on your name in the top right, and then “User profile” (see Figure 1). Then under “Request access to FullCAM applications”, tick the box for FullCAM 2020 (see Figure 2). All users who select that they are ACCU scheme participants will automatically be granted access to the 2020 Public Release version.

Figure 1 Screenshot showing how to select “User profile” in FullCAM

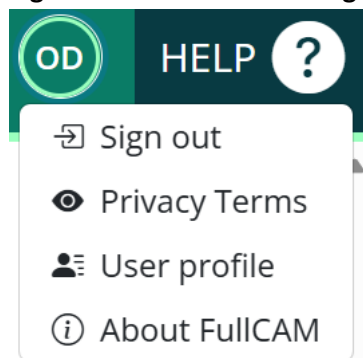


Figure 2 Screenshot showing how to select FullCAM 2020

Request access to FullCAM applications

Which version(s) of FullCAM do you require access to, and why

✓ FullCAM 2024

☒ FullCAM 2020

☒ ACCU scheme user
☐ Collaboration with DCCEEW
☐ Research and/or study
☐ Other

The 2020 FullCAM Public Release version requires fewer data entries than the former 2016 FullCAM Public Release version. Proponents transferring from the *Carbon Credits (Carbon Farming Initiative) (Reforestation by Environmental or Mallee Plantings—FullCAM) Methodology Determination 2014* (the 2014 Determination) to this Determination may be familiar with the 2016 FullCAM Public Release version. Differences between the 2016 and 2020 Public Release versions of FullCAM are described in Appendix 1.

These Guidelines will be updated in the future and, at that time, will provide details of the version of FullCAM that must be used to determine the net abatement amount when reporting under this Determination.

1.4 FullCAM background

FullCAM is software used in Australia’s National Greenhouse Accounts for international reporting of Australia’s greenhouse gas dynamics in the land sector. FullCAM was developed in 2000 under the National Carbon Accounting System (NCAS) at the then Australian Greenhouse Office to provide a dynamic account of the changing stocks of carbon and greenhouse gas emissions in Australia’s land systems since 1970.

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The tool integrates data on land cover change, land use and management, climate, plant productivity, and soil carbon over time. FullCAM estimates carbon stock change and greenhouse gas emissions at fine spatial and temporal scales and uses a wide range of spatially referenced data. It provides fully integrated estimates of carbon pools in forest and agricultural systems, accounting for both natural and human-induced changes in emissions and sequestration of major greenhouse gases.

Australian Carbon Credit Unit (ACCU) Scheme projects can use a publicly released version of FullCAM to determine estimates of carbon stock change and greenhouse gas emissions.

1.5 FullCAM plots and running simulations

FullCAM runs simulations on a 'plot'. A plot, for modelling purposes, is defined as a piece of land for which a common event history is modelled in FullCAM. For ACCU Scheme projects, (formerly known as Emissions Reduction Fund (ERF) projects) separate plot files must be created for each CEA.

In the 2020 FullCAM Public Release version, plot type selection is automated through the creation of a default template. When users choose to create a new plot file, they must select the appropriate template from a drop-down list and FullCAM is then populated with the template plot.

FullCAM modelling uses a single 'model point' location. Proponents using this Determination do not need to define plot boundaries within FullCAM, rather proponents must input the coordinates for a single location (the model point). The Determination requires proponents to select a model point roughly in the middle of the CEA *and* that is representative of the CEA (that is, the point is a rough average of what is in the CEA).

The latest spatial data for a plot must be downloaded using the Location Info tab each time the software is run.

To ensure all settings are correct, including defaults, it is recommended that a new plot file is created each time a new version of FullCAM or these Guidelines are released or required to be used. Plot files created under previous versions are likely to contain different settings that will result in errors in the outputs. Users are responsible for ensuring they use the correct FullCAM version and accurately follow the associated FullCAM Guidelines.

1.6 Overview of the FullCAM interface

The FullCAM software user interface displays menus and a series of tabs. Each tab has a suite of fields in which information may either be required to be completed or required to be left unchanged – as instructed through these Guidelines. The tool is designed so that certain tabs in a plot file are made available only if required fields have valid information entered in earlier tabs. If the text of a tab or field is red, then FullCAM requires information in that tab or field before a simulation can be run. When all the required fields within a tab have valid information entered, the tab text will become blue. Table 1 provides a general overview of each tab selectable within FullCAM once a plot has been created.

Data entry requirements for this Determination, under the 2020 FullCAM option, are described in detail in section 2 of these Guidelines.

Help is provided within FullCAM by clicking on the  button in the top right of the 2020 FullCAM interface.

Table 1 FullCAM tabs

Tab	Explanation
About	Includes a free text field where users can enter information about the plot file that they have created. This is a good space to keep track of changes that have been made or editing of event parameters.
Configuration	Users select the system (e.g. forest, agricultural) they want to simulate in the plot.
Timing	Enter the timing for starting and ending the simulation and the time steps required for output data.
Location info	In this tab users enter the latitude and longitude of the 'Model Point Location' for the CEA where they wish to simulate a plot file. By choosing to Query FullCAM spatial data , the associated soil and climate data for that latitude and longitude are automatically loaded into relevant parts of the remaining tabs. In the tab users can then load tree and/or crop species information and management regimes as appropriate. This information is also automatically loaded into relevant parts of the remaining tabs.
Site	Specific parameters (e.g. rainfall, temperature, productivity) are described.
Trees	Description of the properties of the tree species.
Soil	Description of soil properties.
Initial Conditions	In this tab the values for carbon at the start of the simulation are described. Values will automatically be populated by Location Info using data loaded from the FullCAM server.
Events	All of the events for the entire simulation period are listed in this tab. Users can add or remove events. Care must be taken not to violate requirements for modelling management activities and disturbance events within the Determination.
Output Window	Defines what outputs are presented in output windows.
Explorer	Display of the parameter settings for each tab.

2. 2020 FullCAM - setting up simulations for each Carbon Estimation Area

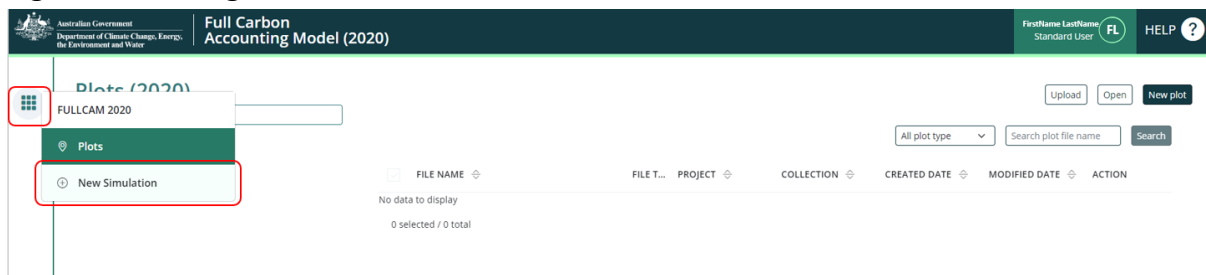
The Determination requires simulations for each CEA must use 'plot files'. Project proponents must use the following steps for entering data into a plot file for each CEA in their reforestation project registered under the Determination.

All steps must be followed when creating new plot files. When reopening plot files, 2020 FullCAM users must first navigate to the Location Info tab and click **Query FullCAM spatial data**, before running the simulation. This ensures the latest spatial data is used for the simulation.

1.1 Creating a new plot file

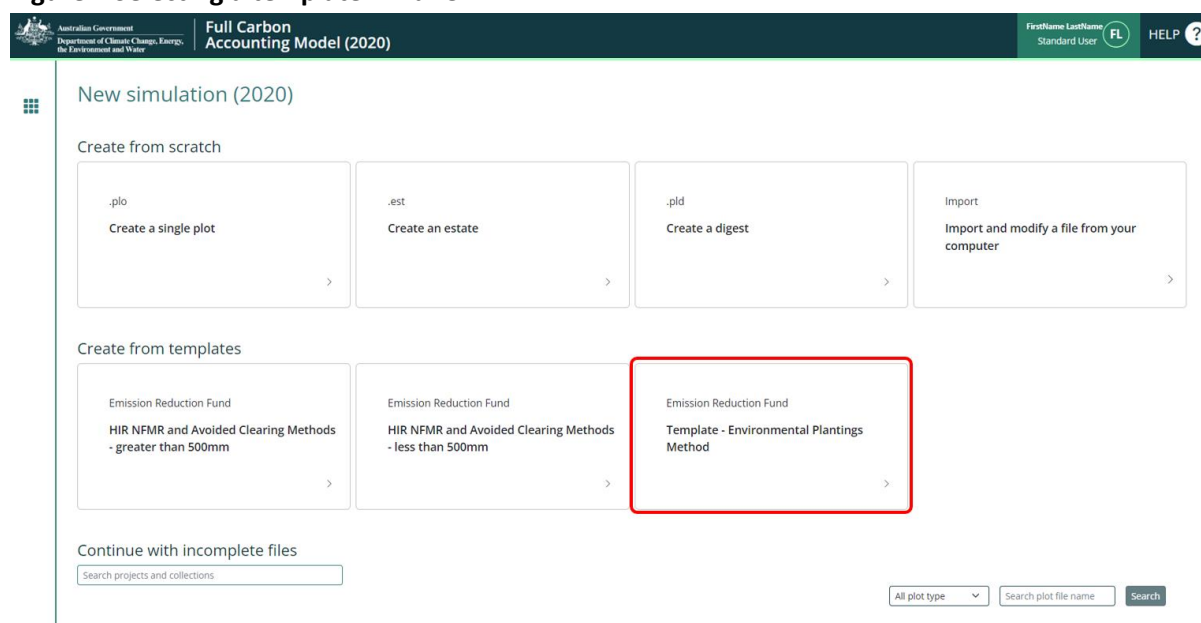
1. With FullCAM open, click on the menu grid on the top left of the screen, and select **New Simulation**.

Figure 3 Selecting a new simulation in FullCAM



2. In the Create from templates section, click on **Template - Environmental Plantings Method**.

Figure 4 Selecting a template in FullCAM



3. In the About tab, you must name the plot and assign it to a project and collection. It is recommended that you use a name for the plot file that reflects the identifier for the CEA and model scenario, e.g. 'CEA1_project_east_2020 offsets report'.
4. Once you have completed the About tab, it is best to save your plot immediately. Do this by clicking the **Save Plot File** button in the top right corner of the interface.

1.1.1 Saving a plot

1. You will need to click **Save Plot File** before logging out or leaving the system for an extended period of time, as it will not save the information you enter without doing this.
2. You can then click **Update Plot File** to save the changes as you continue.
3. If you log out, you will find your plot on the list when logging back in. Click on the **Edit** button (with the pencil icon) to continue entering and editing the information of this Plot.

2.2 The Timing Tab

1. Turn the '**Do you want to use Calendar dates instead?**' slider to the **OFF** position.
2. Enter the modelling start and end dates for the simulation that you will run in the start date and end date text fields. The accepted format is YYYY, MM.

The Determination specifies that the modelling commencement date for a FullCAM simulation must be the planting date for the CEA.

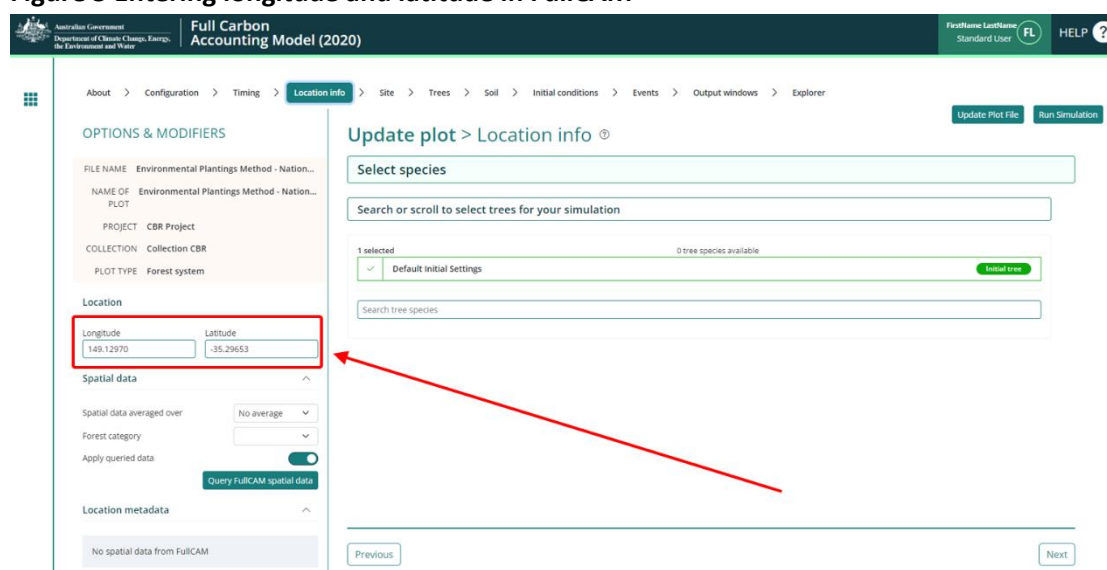
The end date will be a date after the end of the period for which the simulation is being run.

2.3 The Location Info Tab

2.3.1 Entering Longitude and Latitude

Enter the longitude and latitude (in decimal degrees i.e. xx.xxx xx, xx.xxx xx) of the model point location in the longitude and latitude text fields. This point should be the approximate centre of the CEA and representative of the CEA (see Division 2 of Part 4 of the Determination). Note that FullCAM may appear to round off the decimal degrees entered after clicking out of the text fields. Users must enter the full five decimal places as these will be recorded within the plot file itself.

Figure 5 Entering longitude and latitude in FullCAM



The screenshot shows the 'Full Carbon Accounting Model (2020)' interface. The 'Location info' tab is selected. In the 'OPTIONS & MODIFIERS' section, the 'Location' subsection has 'Longitude' set to '149.12970' and 'Latitude' set to '-35.29653'. These fields are highlighted with a red box. A red arrow points from this box to the 'Update plot > Location info' section on the right. The right section has a 'Select species' dropdown, a search bar, and a 'Default Initial Settings' checkbox. The 'Spatial data' section on the left shows 'Spatial data averaged over' set to 'No average' and 'Forest category' set to 'Forest system'.

2.3.2 Downloading tree species

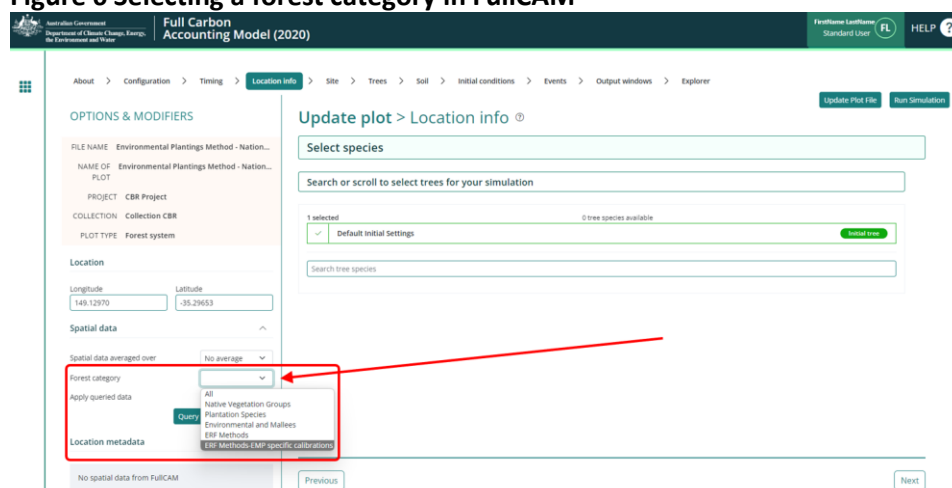
The final steps in creating the plot file are selecting and downloading the applicable tree species from the Location info tab.

Note that changes to the FullCAM model since the 2016 FullCAM PR version have removed some previous distinctions between calibrations and introduced new sub-options¹. Appendix 1 provides more details on these changes. It is the proponent's responsibility to ensure they meet the Determination requirements for the calibration they are using.

The following steps are accessed from the Spatial data section and **Forest category** drop down menu on the left of the screen:

¹ This is based on work by CSIRO. A detailed explanation of factors considered and tested by CSIRO to determine model efficiency of biomass prediction is provided in CSIRO's technical report: <https://doi.org/10.25919/5d24e4430726a>

Figure 6 Selecting a forest category in FullCAM



1. Select **ERF Methods**. Note: ERF is the former terminology for the ACCU Scheme and remains in the title of many methods.
2. Click **Query FullCAM spatial data**. This will filter the available tree species in the centre of the screen.
3. Select **Mixed species environmental planting** (see section 20 of the Determination), unless the planting is comprised predominantly of mallee-eucalypt species, in which case select **Mallee eucalypt species** (see section 19 of the Determination).

The Determination allows proponents to establish a mixed species environmental planting or a mallee eucalypt planting. The name for the species calibration in FullCAM that corresponds to each of these may change over time as FullCAM is updated. Table 2 shows the calibration name that should be chosen from the species list in Location Info tab for FullCAM 2020. Note that the use of these species' calibrations must be in accordance with any other requirements of the Determination.

Table 2 Species calibration as named in the Determination and FullCAM 2020

Species calibration named in the Determination	Species calibration named in FullCAM 2020
Mixed species environmental planting	Mixed species environmental planting
Mallee eucalypt planting	Mallee eucalypt species

2.4 The Site, Trees, Soil, and Initial Conditions Tab

Ignore these tabs, do NOT change any settings here. Instead, progress to the Events tab.

2.5 The Events Tab

2.5.1 Modelling Events

2.5.1.1 Permitted Events

The below section introduces the events that may be modelled in accordance with the Determination. All permitted management practices that are undertaken in a project, along with wildfires, must be included as events in the simulations for each CEA in which they occur. If a CEA is re-stratified for any of the reasons specified in the Determination (see section 18 of the Determination), then the simulations for each resulting new CEA must have all the permissible management practices and wildfires included as events.

Wildfires must be included as they occur, and the effect on the carbon stock will be reflected by the severity of the fire event. For a wildfire event where the burnt area is patchy and difficult to demarcate, you must enter the affected portion of a CEA as a percentage—other values remain unchanged. However, if a clearly defined area or areas of a CEA have been impacted uniformly (e.g. all trees killed), then re-stratification of the CEA may be appropriate.

All project modelling must commence with a Plant Trees event.

2.5.1.2 Requirements for modelling the planting event, and the associated planting configuration and stocking density requirements

In FullCAM 2020, the following sets of three growth calibrations are available:

- Mixed species environmental plantings: on land managed for environmental services
- Mixed species environmental planting: Belt plantings <1500 sph
- Mixed species environmental planting: Belt plantings >1500 sph
- Mallee eucalypt species: on land managed for environmental services
- Mallee eucalypt species: Belt plantings <1500 sph
- Mallee eucalypt species: Belt plantings >1500 sph

Together, these cover all eligible planting types under the Determination, provided the planting geometry and sampling requirements are met. Belt plantings refer to both narrow and wide linear plantings as defined in the Determination.

Table 3 outlines the growth calibrations to be selected according to the planting geometry and sampling requirement for stocking density (requirements for planting geometries and sampling stocking densities are provided under Divisions 6 and 7 of Part 3 of the Determination).

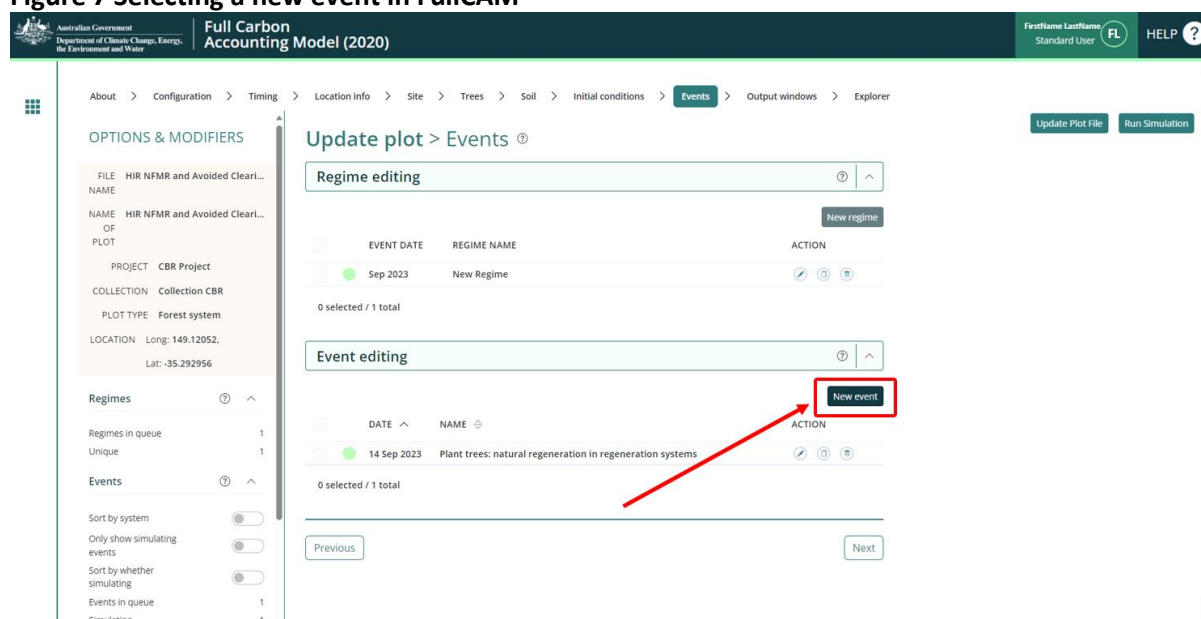
Table 3 FullCAM calibrations in 2020 FullCAM

Calibration type	Planting Type (FullCAM Tree species)	Planting geometry	Stocking density sampling (stems per hectare) required	FullCAM Standard Plant Event
Mixed-species	Mixed species environmental planting	Block	No	Mixed species environmental plantings: Block plantings >200 stems per hectare
Mixed-species	Mixed species environmental planting	Low density Linear	No	Mixed species environmental planting: Belt plantings <1500 stems per hectare
Mixed species	Mixed species environmental planting	High density Linear	Yes	Mixed species environmental planting: Belt plantings >1500 stems per hectare
Mallee	Mallee eucalypt species	Block	No	Mallee eucalypt species on land managed for environmental services. Block plantings >200 stems per hectare
Mallee	Mallee eucalypt species	Low density Linear	No	Mallee eucalypt species: Belt plantings <1500 stems per hectare
Mallee	Mallee eucalypt species	High density Narrow Linear	Yes	Mallee eucalypt species: Belt plantings >1500 stems per hectare

2.5.2 Adding a New Event

1. To add a new event, click on the **New Event** button. A new pop up window will appear.

Figure 7 Selecting a new event in FullCAM



2. Select the event type from the **Type** drop-down menu that corresponds to the activity/event as given in the below sections 2.5.2.1 to 2.5.2.7. There are six event types, of which four are permitted under this Determination. For each event to be added, select the appropriate event type identified for the management activity you are modelling, as indicated in the following table.

Table 4 Event types corresponding to each management activity

Management Activity	FullCAM Event Type
Planting trees	Tree planting
Wildfire – trees not killed	Forest fire
Wildfire – trees killed	Forest fire
Prescribed fire	Forest fire
Thinning of forest	Forest thinning

Note that the forest treatment activities of weed control or fertilisation do not need to be modelled in FullCAM. This is because the calibration data sets for FullCAM 2020 did not isolate the impact of these management activities. The effects of forest treatment activities of weed control or fertilisation are assumed to be represented within the calibrations applicable in this guideline.

Figure 8 Selecting an event type in FullCAM

The screenshot shows the 'Full Carbon Accounting Model (2020)' interface. On the left, the 'Event (Invalid)' section has a 'Name' field (marked as required), a 'Generate name automatically' button, and a 'Type' dropdown menu. The 'Type' menu is open, showing options: 'Tree planting' (highlighted in green), 'Forest thinning', 'Forest fire', 'Forest treatment', 'Chopper roller', and 'Termite change'. A red box surrounds the dropdown, and a red arrow points to the 'Tree planting' option. Below the dropdown are 'Timing' and 'Simulate' (checked) sections. On the right, the 'Plant Trees' section has a 'Select a species' dropdown (set to 'Please select one'), a 'Specify tree size by' dropdown (set to 'Masses'), and input fields for 'Masses [dmt/ha]', 'Stems', 'Branches', 'Bark', 'Leaves', and 'Coarse roots'. A 'Save and close' button is in the top right.

2.5.2.1 Adding a Tree Planting Event

1. Select the **Tree Planting** event type.
2. In the **Select a species** field, select the appropriate species name which you selected in section 2.3.2.

Figure 9 Selecting a species in FullCAM

This screenshot shows the same 'Plant Trees' form as Figure 8. The 'Select a species' dropdown menu is now open, showing options: 'Please select one', 'Please select one', 'Default initial Settings', and 'Mixed species environmental planting' (highlighted in green). A red box surrounds the dropdown, and a red arrow points to the 'Mixed species environmental planting' option. The 'Type' dropdown on the left is now set to 'Tree planting'.

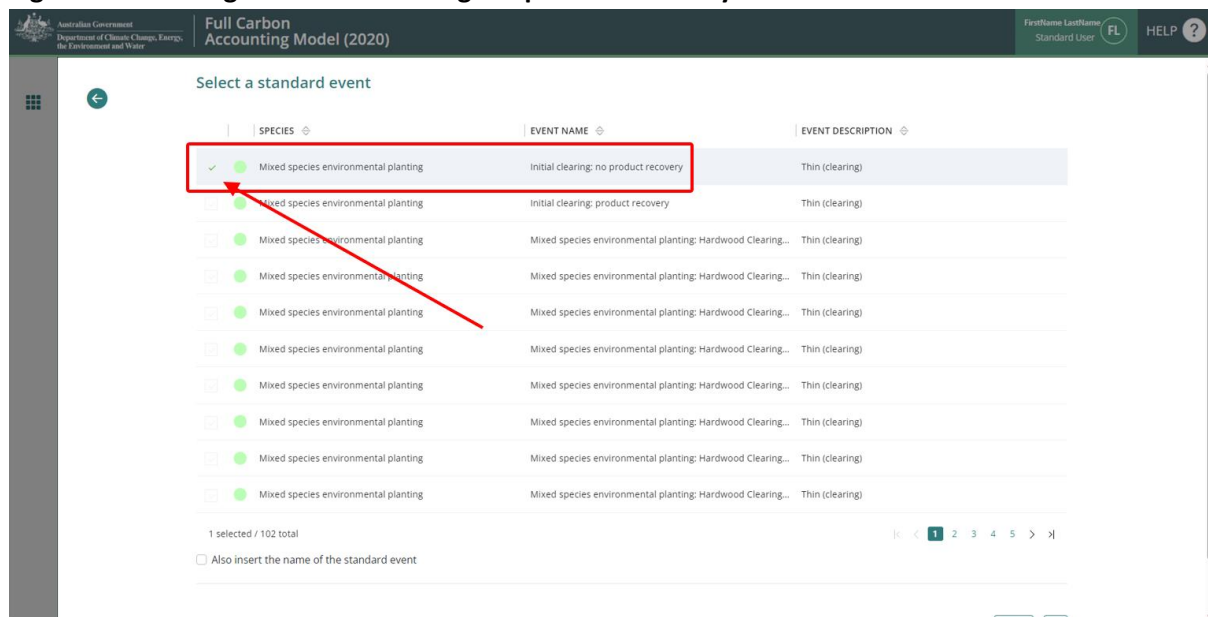
3. Click the **Insert standard values** button. This will open a pop-up window.
4. In the checkbox on the left, select the event with the appropriate name of these choices (Only the standard event options available for the applicable species will appear. See section 2.5.1.2 outlining the sampling and other requirements for selecting one of these options.):
 - a. Plant trees: [species name] on land managed for environmental services; *or*
 - b. Plant trees: [species name] Belt plantings <1500 sph; *or*
 - c. Plant trees: [species name] Belt plantings >1500 sph; *or*
5. Click the **Generate name automatically** button in the top left of the window.
6. Insert the calendar date for the Event in the **Event date** field. The accepted format is DD/MM/YYYY. This will be the planting date as defined by the Determination.

- Click the green **Save and close** button in the top right of the window. This will close it, add the Event to the list, and create a Regime for it.

Adding a Thinning of Forest Event

- Select the **Forest thinning** Event Type.
- Click the **Insert standard values** button. This will open a pop-up window.
- In the checkbox on the left, select the event named **Initial clearing: no product recovery**.

Figure 10 Selecting the 'Initial clearing: no product recovery' standard event in FullCAM



- Click **Ok** at the bottom right. This will close the pop-up window.
- In the Affected portion section, in the **Percentage of forest affected by thin** field, enter the percentage of the forest that was thinned. You must report on how the estimate was derived in your project offset report.
- Click the **Generate name automatically** button in the top left of the window.
- Insert the calendar date for the Event in the **Event date** field. The accepted format is DD/MM/YYYY.
- Click the green **Save and close** button in the top right of the window. This will close it, add the Event to the list, and create a Regime for it.

2.5.2.2 Adding a Wildfire – Trees not Killed Event

- Select the **Forest fire** Event Type.
- Click the **Insert standard values** button. This will open a pop-up window.
- In the checkbox on the left, select the event named **Wildfire – trees not killed**.

Figure 11 Selecting the 'Wildfire – trees not killed' standard event in FullCAM

Select a standard event

	SPECIES	EVENT NAME	EVENT DESCRIPTION
<input type="checkbox"/>	Mixed species environmental planting	Forest fire on 100%	Forest fire on 100%
<input type="checkbox"/>	Mixed species environmental planting	Prescribed burn	Forest fire on 100%
<input type="checkbox"/>	Mixed species environmental planting	Site prep: Windrow and burn	Forest fire on 100%
<input type="checkbox"/>	Mixed species environmental planting	Wildfire - trees killed	Forest fire (clearing)
<input checked="" type="checkbox"/>	Mixed species environmental planting	Wildfire - trees not killed	Forest fire on 100%

1 selected / 5 total

☐ Also insert the name of the standard event

Cancel Ok

- Click **Ok** at the bottom right. This will close the pop-up window.
- In the Affected portion section, in the **Percentage of forest affected by fire** field, enter the percentage of the CEA that was *affected* by fire. You must report on how the estimate was derived in your project offset report.
- Click the **Generate name automatically** button in the top left of the window.
- Insert the calendar date for the Event in the **Event date** field. The accepted format is DD/MM/YYYY.
- Click the green **Save and close** button in the top right of the window. This will close it, add the Event to the list, and create a Regime for it.

2.5.2.3 Adding a Wildfire – Trees Killed Event

- Select the **Forest fire** Event Type.
- Click the **Insert standard values** button. This will open a pop-up window.
- In the checkbox on the left, select the event named **Wildfire – trees killed**.

Figure 12 Selecting the 'Wildfire – trees killed' standard event in FullCAM

The screenshot shows the 'Select a standard event' window in FullCAM. The window has a header bar with the Australian Government logo and the text 'Full Carbon Accounting Model (2020)'. Below the header, there is a table with the following columns: SPECIES, EVENT NAME, and EVENT DESCRIPTION. The table contains 5 rows of standard events. The fourth row, 'Wildfire - trees killed', is highlighted with a red box and a red arrow pointing to its checkbox. The table has a footer that says '1 selected / 5 total' and a checkbox labeled 'Also insert the name of the standard event'. At the bottom right, there are 'Cancel' and 'Ok' buttons.

SPECIES	EVENT NAME	EVENT DESCRIPTION
<input checked="" type="checkbox"/> Mixed species environmental planting	Forest fire on 100%	Forest fire on 100%
<input checked="" type="checkbox"/> Mixed species environmental planting	Prescribed burn	Forest fire on 100%
<input checked="" type="checkbox"/> Mixed species environmental planting	Site prep: Windrow and burn	Forest fire on 100%
<input checked="" type="checkbox"/> Mixed species environmental planting	Wildfire - trees killed	Forest fire (clearing)
<input checked="" type="checkbox"/> Mixed species environmental planting	Wildfire - trees not killed	Forest fire on 100%

1 selected / 5 total
☐ Also insert the name of the standard event

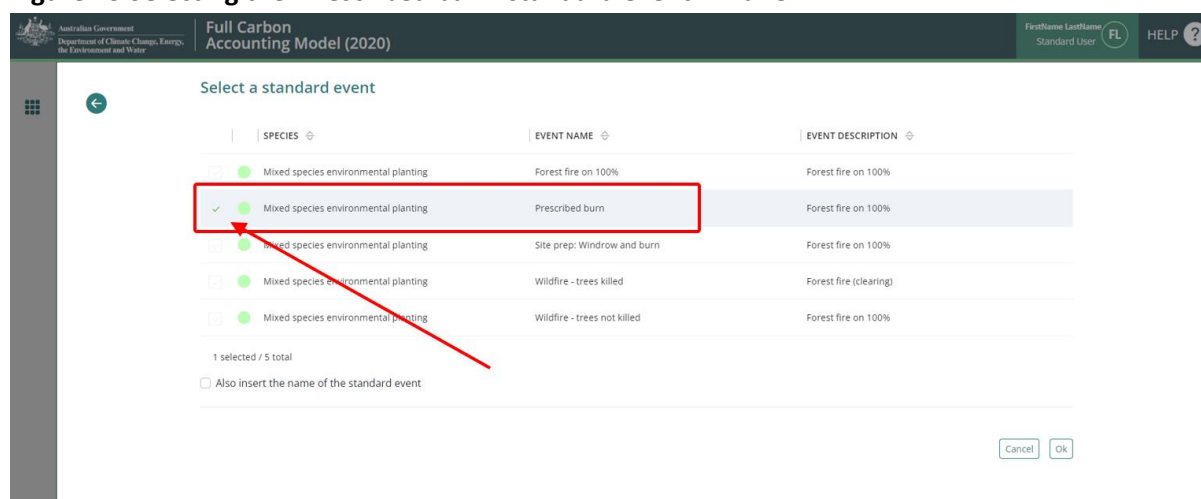
Cancel Ok

- Click **Ok** at the bottom right. This will close the pop-up window.
- In the Affected portion section, in the **Percentage of forest affected by fire** field, enter the percentage of the CEA that was *affected* by fire. You must report on how the estimate was derived in your project offset report.
- Click the **Generate name automatically** button in the top left of the window.
- Insert the calendar date for the Event in the **Event date** field. The accepted format is DD/MM/YYYY.
- Click the green **Save and close** button in the top right of the window. This will close it, add the Event to the list, and create a Regime for it.

2.5.2.4 Adding a Prescribed Fire Event

- Select the **Forest fire** Event Type.
- Click the **Insert standard values** button. This will open a pop-up window.
- In the checkbox on the left, select the event named **Prescribed burn**.

Figure 13 Selecting the ‘Prescribed burn’ standard event in FullCAM



- Click **Ok** at the bottom right. This will close the pop-up window.
- In the Affected portion section, in the **Percentage of forest affected by fire** field, enter the percentage of the CEA that was *affected* by fire. You must report on how the estimate was derived in your project offset report.
- Click the **Generate name automatically** button in the top left of the window.
- Insert the calendar date for the Event in the **Event date** field. The accepted format is DD/MM/YYYY.
- Click the green **Save and close** button in the top right of the window. This will close it, add the Event to the list, and create a Regime for it.

2.5.3 After adding all Events

Once all Events are added, navigate to the Output Windows tab.

2.6 Outputs and running a simulation

2.6.1 Ensuring correct outputs selected

The **New from template** option used to create plot files will by default select the correct output types for the applicable scenario. The below steps can be followed to ensure the output types are correct, and to rectify any issues with those selected.

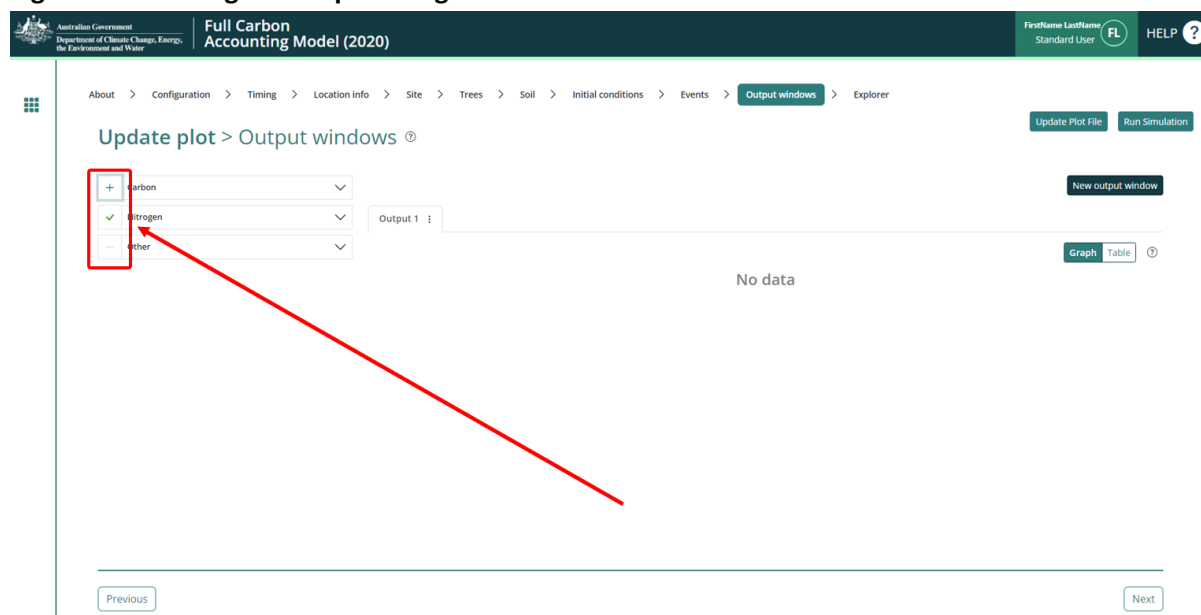
Selected outputs have a tick next to their name.

Categories and subcategories with *all* outputs selected will have a tick symbol.

Expanded categories, or those with *some* outputs selected will have a ‘-’ symbol.

Categories with *no* outputs selected will have a ‘+’ symbol.

Figure 14 Selecting the output categories in FullCAM



From the templates used to create plot files, the following outputs will be selected, consistent with the Determination requirements:

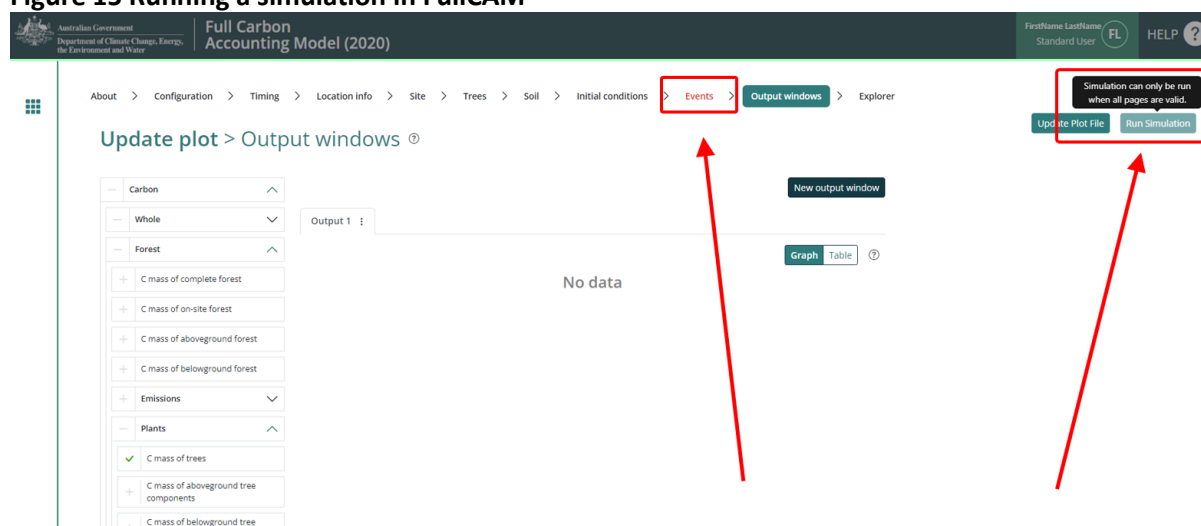
- the tree carbon pool: Carbon / Forest / Plants / **C mass of trees**
- the emission: Carbon / Whole / Emissions / **CH₄ emitted due to fire**
- the emission: Nitrogen / Whole / Emissions / **N₂O emitted due to fire**
- the debris pool: Other / Carbon Projects / **C mass of forest debris**

Note: only the four pools listed above must be selected.

2.6.2 Running simulations

To run the simulation, click the **Run Simulation** button, in the top right of the screen. This will generate the selected outputs in a graph. It will also initialise a download of the result in CSV format. This button will appear faded out and will not be available if the Events queue contains invalid Events, which will appear in red, and the tab will have a red title.

Figure 15 Running a simulation in FullCAM

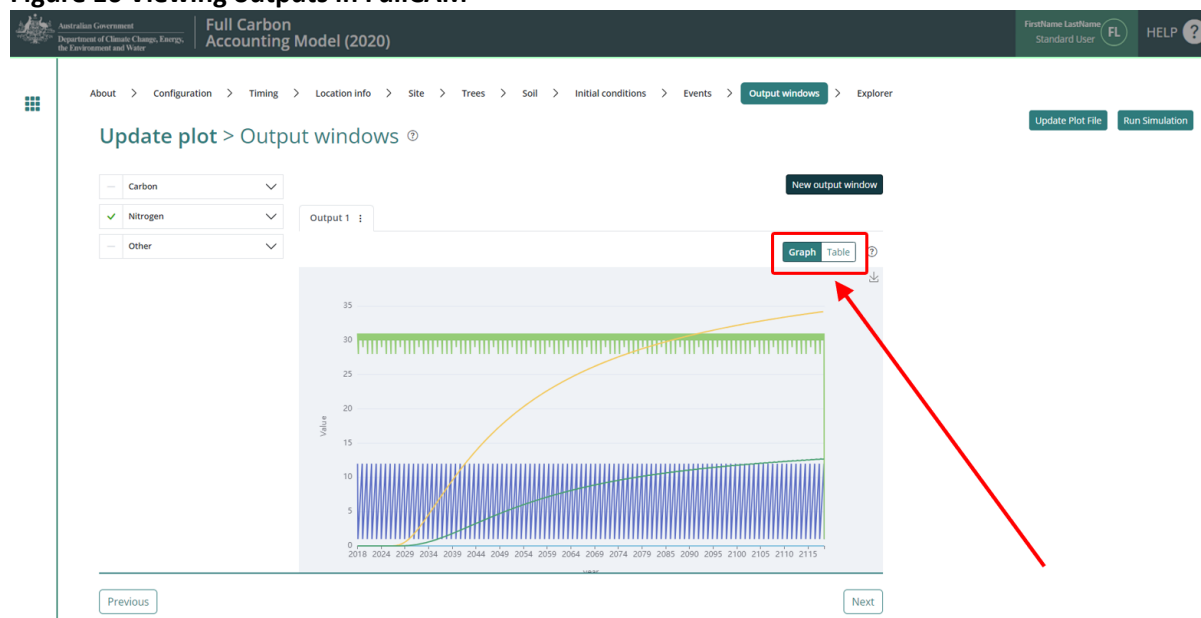


Note that if reopening a plot file, users must first navigate to the Location info tab and click **Query FullCAM spatial data** before running the simulation to ensure the latest spatial data is used for the simulation.

2.6.3 Viewing outputs

Outputs can be viewed as a graph or a table by clicking on the corresponding icons at the top right of the Output window.

Figure 16 Viewing outputs in FullCAM



2.6.4 Accessing outputs as a spreadsheet

Running a simulation will automatically download the CSV file with the graph's data. A pop-up near your **Downloads** button on your browser may request permission to download.

3. FullCAM simulation outputs and offsets reporting

Project proponents must calculate the project net abatement by completing the equations in Part 4 the Determination. Division 2 of Part 4 of the Determination make clear that these outputs must be generated in accordance with the requirements in both the Determination and this document.

Note that for some of the equations the average or sum of the FullCAM output over the simulation period will be required, whereas for others the value of the FullCAM output at the end of the simulation period will be used. Refer to the equations within the Determination to determine which value to use. Averages and sums can be calculated using the average and functions within your spreadsheet software.

Note also that the FullCAM outputs referred to in masses of carbon, methane or nitrous oxide per hectare are converted to tonnes of CO₂-e in the Equations in Part 4 of the Determination. Biomass from the shrub component of a planting is incorporated in the FullCAM calibrations.

Table 5 Outputs generated by FullCAM and the corresponding Determination equations

FullCAM Output	Units	Description	Form	Parameter and Equation
Initial C mass of trees	tonnes C per hectare	Initial carbon stock in above-ground and below ground tree biomass	Time series - monthly (cumulative)	C_{Dti} Equation 9
Initial C mass of forest debris	tonnes C per hectare	Initial carbon stock in debris	Time series - monthly (cumulative)	C_{Ddi} Equation 9
C mass of trees	tonnes C per hectare	Carbon stock in above-ground and below ground tree biomass	Time series - monthly (cumulative)	C_{ti} Equation 10
C mass of forest debris	tonnes C per hectare	Carbon stock in debris	Time series - monthly (cumulative)	C_{di} Equation 10

CH ₄ emitted due to fire	tonnes CH ₄ per hectare	Mass of CH ₄ emitted to the atmosphere due to fire	Time series monthly (non-cumulative)	E_{CH_4i} Equation 11
N ₂ O emitted due to fire	kg N ₂ O per hectare	Mass of N ₂ O emitted to the atmosphere due to fire	Time series – monthly (non-cumulative)	$E_{N_2O_i}$ Equation 12

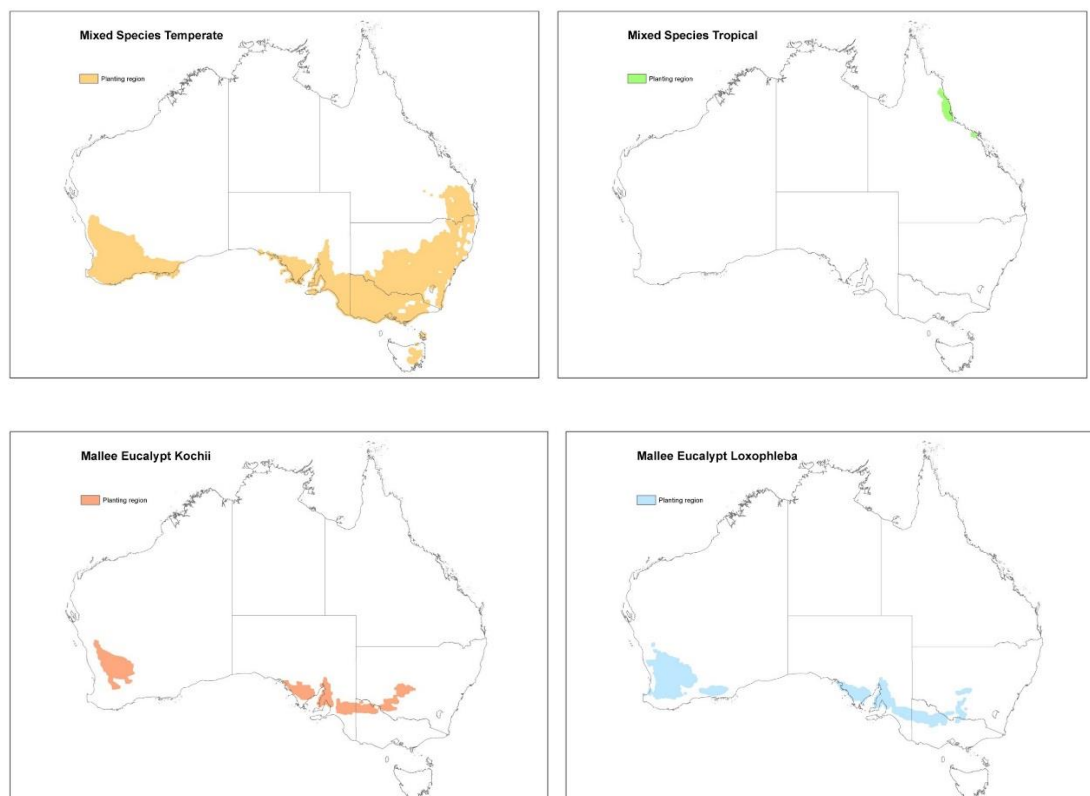
Appendix 1: Generic and specific calibrations

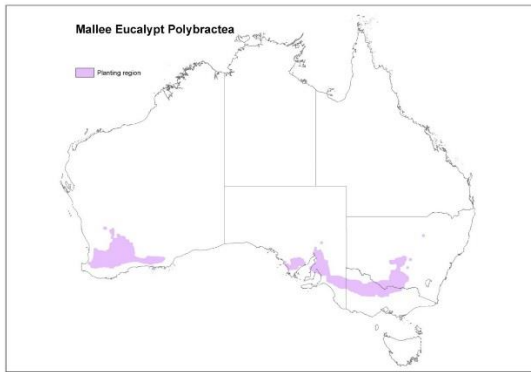
Under the *Carbon Credits (Carbon Farming Initiative) (Reforestation by Environmental or Mallee Plantings—FullCAM) Methodology Determination 2014*, and within FullCAM 2016, there were two classes of species calibrations available: ‘specific’ and ‘generic’.

Within the 2016 version of FullCAM, the two classes of calibrations produced different abatement estimates, and have different spatial and temporal applicability, and events permitted for modelling. The 2020 version FullCAM removed the distinctions between generic and specific species calibrations. The vegetation growth calibrations of the specific calibrations in the 2020 version of FullCAM are the same as the vegetation growth calibrations of the generic calibrations in the 2015 version of FullCAM.

The ability to select a specific calibration within FullCAM 2020 was retained to ensure operational consistency with the earlier method. The specific species calibrations remain selectable within the 2020 version of FullCAM (**ERF Method-EMP specific calibrations** dropdown under forest category within the Location info tab) where available spatially (see Figure 15).

Figure 17 Geographic areas that restrict where each ‘specific calibration’ is available as an option





Where correctly configured, the specific calibrations in FullCAM 2020 produce the same abatement estimates as the corresponding generic calibrations: ‘Mixed species environmental planting’ for the mixed species specifics or ‘Mallee eucalypt species’ for the mallee species specifics. It is the sub-settings within the planting event that capture variations in growth rates due to stocking densities or planting configurations. Table 6 compares the FullCAM 2020 calibrations to those of the 2016 version.

Table 6 FullCAM calibrations in the 2020 and 2016 versions

2020 FullCAM option: calibrations	2020 FullCAM option: Plant Events	Comparative view - 2016 FullCAM option: Plant Events
Belt High (Belt plantings of high density – more than 1500 stems per hectare (sph))	Mixed species environmental planting: Belt plantings >1500 sph	Mixed species temperate, Geometry narrow, Stocking >1,500, Prop tree <0.75 or Prop tree >=0.75
		Mixed species temperate, Geometry wide, Stocking >1,500, Prop tree >=0.75 or Prop tree <0.75
	Mallee eucalypt species: Belt plantings >1500 sph	Mallee eucalypt kochii, Geometry narrow, Stocking >2,300
		Mallee eucalypt loxophleba lissophloia, Geometry narrow, Stocking >2,300
Belt Low (Belt plantings of low density – between 200 and 1500 sph)	Mixed species environmental planting: Belt plantings <1500 sph	Mixed species temperate, Geometry narrow, Stocking <1,500, Prop tree >=0.75 or Prop tree <0.75
		Mixed species temperate, Geometry wide, Stocking <1,500, Prop tree >=0.75 or Prop tree <0.75
Block ES (Block of planting on land used to deliver environmental services – more than 200 sph)	Mixed species environmental plantings: on land managed for environmental services	Mixed species temperate, Geometry block, Stocking 500 - 1,500, Prop tree >=0.75 or Prop tree <0.75
		Mixed species temperate, Geometry block, Stocking <500, Prop tree >=0.75 or , Prop tree <0.75
		Mixed species temperate, Geometry block, Stocking >1,500
		Mixed species tropical, Geometry block
		Mixed species environmental planting (1970-present All Plantation low: Non-commercial planting; No prunes)
		Mixed species environmental planting (1970-present All Plantation high: Non-commercial planting; No prunes)

		Mixed species environmental planting (1970-present All Plantation medium: Non-commercial planting; No prunes)
	Mallee eucalypt species: on land managed for environmental services. Block_ES	Mallee eucalypt polybractea, Geometry block
		Mallee eucalypt loxophleba lissophloia, Geometry block
		Mallee eucalypt kochii, Geometry block
Belt high or Belt Low (based on the stand density – above 200 sph)	Mallee eucalypt species: Belt plantings >1500 sph or Mallee eucalypt species: Belt plantings <1500 sph	Mallee eucalypt kochii, Geometry wide
		Mallee eucalypt polybractea, Geometry wide
		Mallee eucalypt loxophleba lissophloia, Geometry wide
		Mallee eucalypt kochii, Geometry narrow, Stocking <2,300 (as 1500 split)
		Mallee eucalypt loxophleba lissophloia, Geometry narrow, Stocking <2,300 (as 1500 split)