FullCAM 2024 Public Release

Consultation Paper

Acknowledgement of Country

Our department recognises the First Peoples of this nation and their ongoing connection to culture and country. We acknowledge Aboriginal and Torres Strait Islander Peoples as the Traditional Owners, Custodians and Lore Keepers of the world's oldest living culture and pay respects to their Elders past, and present.

Introduction

The Full Carbon Accounting Model (FullCAM) is a process-based ecosystem model that calculates greenhouse gas emissions and removals in forested and agricultural land systems. The Department uses FullCAM to calculate emissions and removals from the Land Use, Land Use Change and Forestry (LULUCF) sector as part of the National Greenhouse Accounts, to meet Australia's reporting obligations under the *Climate Change Act 2022*, the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement. The Department also publishes versions of FullCAM ('Public Release Versions' or 'PR') to support research and a range of Government programs.

FullCAM (both the 2016 PR version and 2020 PR version) is used to support abatement estimates for some vegetation methods under the Australian Carbon Credit Unit (ACCU) scheme, including:

- *Carbon Credits (Carbon Farming Initiative—Plantation Forestry) Methodology Determination 2017*
- *Carbon Credits (Carbon Farming Initiative—Plantation Forestry) Methodology Determination 2022*
- *Carbon Credits (Carbon Farming Initiative) (Measurement Based Methods for New Farm Forestry Plantations) Methodology Determination 2014*
- *Carbon Credits (Carbon Farming Imitative) (Human Induced Regeneration of a Permanent Even Aged Native Forest—1.1) Methodology Determination 2013*
- *Carbon Credits (Carbon Farming Initiative) (Native Forest from Managed Regrowth) Methodology Determination 2013*
- *Carbon Credits (Carbon Farming Imitative) (Reforestation by Environmental or Mallee Plantings – FullCAM) Methodology Determination 2014*
- *Carbon Credits (Carbon Farming Initiative—Avoided Clearing of Native Regrowth) Methodology Determination 2015*

In late 2022 and mid-2023 the Department also conducted a targeted consultation on a beta version of a new 2024 PR version, which included updates to the modelling of plantation and mallee species. The Department is now conducting a full consultation on the 2024 PR version, which includes the new plantation and mallee species calibrations, as well as new climate data and a recalculated forest-productivity index (FPI) for years after 2001. The 2024 PR version will also be hosted on the modernised web platform for FullCAM. We consulted on this new platform in late 2023 and early 2024, with a test version of the 2020 PR.

This paper outlines the nature of the 2024 PR update, including information on what has changed and what has stayed the same, and outcomes of the previous consultation on the 2020 PR version. Consultation questions are also provided at the end of the document as well as expected timing of further releases.

If you have questions about the 2024 FullCAM Public Release version, please contact us at fullcam@dcceew.gov.au. If you have questions about the use of the modernised FullCAM interfaces under the ACCU scheme (including the FullCAM guidelines, when the updated version comes into force under the scheme, and how climate data updates will be handled in future) please contact ACCUmethods@dcceew.gov.au.

Feedback from last consultation

As flagged above, the Department consulted on a modernised version of the 2020 FullCAM PR in late 2023. Feedback received largely comprised minor useability and functionality upgrades. Outcomes from this feedback have been included in the 2024 PR version. We also received feedback on the plot digest functionality, which is discussed in more detail below.

The department also conducted targeted consultation on updated plantation calibrations with industry users. Feedback included identifying bugs and fixes in the beta software that were addressed in subsequent releases, questions about the changes to the calibrations, and their use in ACCU scheme methods.

What's new in the 2024 FullCAM PR Version?

1.1 Plantation and mallee planting calibrations

In 2023 the Department conducted targeted consultation with plantations stakeholders about a range of updates to the way FullCAM models plantation and mallee species. These updates largely consisted of updates to the way the model predicts the growth and debris pool turnover of trees in plantations (including plantation forestry and farm forestry). These refinements are based on a significant body of new and updated research (Paul et al. 2022a; Paul et al. 2022b). Contributors to this research include ACCU Scheme project participants and other commercial plantation growers, who provided data on tree growth and debris turnover rates in their plantations.

For users that tested beta versions of the 2024 PR, please note that the modelled abatement will be different between the beta versions you tested and this version. This is reflective of the updated climate data discussed below.

1.2 New climate data

The site information database has been updated to include climate data and a revised forest-productivity index up to December 2022. This is an update to the 2020 PR version, which only contains climate data to December 2018. The updated layers include the following time-series datasets:

- Rainfall
- Open-pan evaporation
- Temperature
- Topsoil Moisture Deficit (TSMD)
- Forest-productivity index (FPI)

1.3 Revised Forest Productivity Index (FPI) after 2001

The spatial time-series for the Forest Productivity Index (FPI) used in FullCAM's Tree Yield Formula has been changed. This variable affects the rate of tree growth based on seasonal and inter-annual variations in local growing conditions. Previous public release versions of FullCAM have relied on the NOAA/AVHRR satellite, but sensors on this satellite were found to be degraded such that the data in more recent years is no longer accurate. This is why the climate data in the 2020 PR version is fixed at end-2018.

New spatial data has been introduced for FPI using MODIS (Moderate Resolution Imaging Spectroradiometer) time series data beginning from 2001. In practice, this means that users will see different results for all years since 2001 when using the 2024 PR version, however the impact of the difference should be more pronounced in recent years.

1.4 Modernised user interface

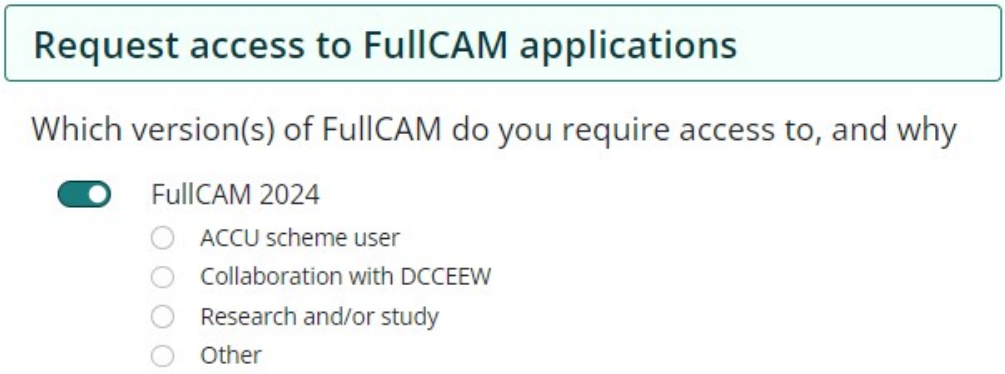
The 2024 PR version is hosted on the modernised FullCAM interface. This new interface has already been consulted on, and includes:

- Increased security and cross-platform inter-operability including on Mac OS and mobile platforms;
- Online storage of plot files, to allow users to save their plots on the web and access them from any device;
- Easier navigation of the user interface;
- An API functionality; and
- More seamless pathways for future updates (including climate and scientific calibration updates).

How to access FullCAM 2024 PR

- Go to https://www.fullcam.gov.au/
- Sign up for an account
- Once you are signed in, click on the user section of the top banner and select 'User profile'

- Under 'Request access to FullCAM applications', select FullCAM 2024, specify and provide details on your reason for access and submit



- You will see a green tick or receive an email notification when access has been granted and FullCAM 2024 will be accessible via the application list on the left hand banner

Plot digest functionality

In the last consultation, we asked a number of questions regarding the plot digest functionality, and legacy errors with this functionality. A range of feedback was received on this functionality, however we expect that much of this feedback will be addressed by the introduction of the application programming interface (API), which was only made available for testing after consultation closed on the last version. As such, we have not yet implemented any changes to the plot digest functionality, however if API testing reveals that there is value in retaining the plot digest functionality, we will work through the additional feedback on plot digest.

Estate functionality

The estate model functionality has also been modernised and included for consultation in this update. This includes the estate model functionality for the 2020 and 2024 public release versions. Existing users of the estate model are encouraged to test the modernised estate model and provide feedback.

Questions for consultation

The consultation questions are outlined on the Department's 'Have Your Say' consultation page and recreated below for completeness. Please utilise the 'Have Your Say' webpage to ensure your feedback is properly considered.

- Does the 2024 PR provide all the necessary functionality to run the plot files and simulations you need to?
- Did you participate in testing of early beta versions of the 2023 PR?
    - If so, do the results from the modernised 2024 PR track with those you were achieving under the 2023 PR beta v2? Noting that there will be differences resulting from the new climate and FPI data.
- Do you currently use the estate functionality in existing FullCAM public release versions?
    - If so, could you please outline your standard workflow with this functionality?
    - Do the modernised estate model functionalities (either the 2020 or 2024 estate models) provide the necessary functionality to run the plots and estates you need to?
- Do the updated ACCU Scheme FullCAM guidelines provide adequate instruction to use the 2024 PR for ACCU scheme project purposes?
- If you have an ACCU Scheme project, how would using the 2024 PR impact your ACCU Scheme project's estimated abatement compared to the current version of FullCAM you use to report?
- FullCAM is refined and updated over time due to, for example, further science, data or measurement improvements. If you were required to use 2024 PR and further updated

versions of FullCAM in future, what conditions could support a reasonable transition to updated versions of FullCAM to ensure ongoing accuracy of abatement estimates, support ongoing integrity of the ACCU Scheme, and provide confidence and certainty to project proponents?

- Please detail any other information or feedback you'd like to provide on the 2024 public release version.

Upcoming FullCAM consultations

In the coming months, there will be consultations on further modernised versions of FullCAM and the Reforestation Modelling Tool.

FullCAM Version	Indicative timing for consultation	Details
2020 Public Release Version	Completed	Consultation completed in late 2023 and early 2024. Results of consultation discussed above.
2024 Public Release Version and 2020 estate functionality	August 2024 – September 2024	Discussed above.
Reforestation Modelling Tool (RMT)	Third quarter 2024	Mainly focussed on the new user interface and ensuring abatement estimates match between the classic and modernised versions.
2016 Public Release Version	Early 2024	Mainly focussed on the new user interface and ensuring abatement estimates match between the classic and modernised versions.

Each of these consultations will be conducted on the Department's consultation hub webpage (the same website that this consultation is hosted on).

Matters relating to FullCAM usage in the ACCU Scheme

At this stage, the 2024 PR version is released for consultation and beta testing purposes only. It will **not** be able to be used for the purposes of submitting offsets reports under the ACCU Scheme and should not be used to make business decisions for potential new projects.

Prior to the release of the updated ACCU Scheme FullCAM guidelines, to instruct participants to use the 2024 PR version, you must continue to use the classic 2020 PR or 2016 PR (as required under your individual method requirements) via the downloadable applications. These will continue to be available on the Department's website[1].

Will you be required to use the 2024 PR version to report under the ACCU Scheme?

When the 2020 PR was finalised, some project proponents were able to continue using the 2016 PR. These were projects registered under the following four methods and with Section 22 declaration applications submitted to the Clean Energy Regulator before 1 September 2020:

- *Carbon Credits (Carbon Farming Imitative) (Human Induced Regeneration of a Permanent Even Aged Native Forest—1.1) Methodology Determination 2013*
- *Carbon Credits (Carbon Farming Initiative) (Native Forest from Managed Regrowth) Methodology Determination 2013*
- *Carbon Credits (Carbon Farming Imitative) (Reforestation by Environmental or Mallee Plantings – FullCAM) Methodology Determination 2014*
- *Carbon Credits (Carbon Farming Initiative—Avoided Clearing of Native Regrowth) Methodology Determination 2015*

The changes made to the 2020 PR did not include updated calibrations for plantation forestry. As such, proponents could only use the 2016 PR for the following three methods:

- *Carbon Credits (Carbon Farming Initiative) (Measurement Based Methods for New Farm Forestry Plantations Methodology Determination 2014*

[1] https://www.dcceew.gov.au/climate-change/publications/full-carbon-accounting-model-fullcam

- *Carbon Credits (Carbon Farming Initiative—Plantation Forestry) Methodology Determination 2022*
- *Carbon Credits (Carbon Farming Initiative—Plantation Forestry) Methodology Determination 2017*

During this consultation, the Department is seeking feedback on the impact of the 2024 PR on projects currently registered under any of the above-mentioned seven methods, regardless of whether you are using the 2016 or 2020 version of FullCAM. To help demonstrate the impacts of using the 2024 PR version of FullCAM compared to earlier versions on your project, please provide the following data with your submission:

- FullCAM plot files for all CEAs and scenarios modelled. For example, for Plantation Forestry projects, this includes the project, long-term project and baseline scenarios where relevant. Plot files should be provided for both 2024 PR and either the 2016 PR or 2020 PR versions of FullCAM to allow comparison. Ensure your plot files are clearly labelled.

- At least one spreadsheet including:
    - The output of your modelling
    - Size of CEA in hectares
    - Project registration date
    - Crediting period commencement date
    - Modelling commencement date
    - [Plantation Forestry 2022 method users only]: If the CEA you are modelling is an ex-plantation (Schedule 4) CEA under the:
        - Date of exceedance and maximum biomass value for the CEA (you can determine these values by following the instructions in section 3.19 of the Draft Updated Plantation Forestry FullCAM Guidelines or section 3.21 of the Plantation Forestry FullCAM Guidelines currently in force)

- You must also provide a means by which to relate the spreadsheet data to the plot files.

All feedback pertaining to FullCAM's usage under the ACCU scheme will be passed on to the relevant team within the Department. For questions about FullCAM's usage within the ACCU scheme, please contact ACCUMethods@dcceew.gov.au.