Australian Government
Department of Industry, Science, Energy and Resources

FullCAM: Using Command Line and Plot Digest

Default: 2020 FullCAM option

November 2020

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This document has been developed to assist users of the Full Carbon Accounting Model (FullCAM). FullCAM is the model used to construct Australia's National Greenhouse Gas Accounts for the land sector. FullCAM is also used to estimate abatement for forest methodology determinations (methods) under the Emissions Reduction Fund (ERF).

ERF project proponents are required to use FullCAM in accordance with the requirements set out in method specific FullCAM Guidelines. These requirements are inconsistent with the command line and plot digest functionality. The functionality outlined herein is not required under ERF methods, and cannot be used for reporting purposes under the ERF. The command line and plot digest functionality is provided to facilitate and streamline extraneous simulations within FullCAM.

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Purpose

This document aims to support the use of the command line and plot digest functionality of the default option within the FullCAM 2020 public release, to make processing multiple plot files or model point locations easier. It should be used in conjunction with the FullCAM Help pages. Neither the command line nor plot digest functionality can be used for reporting purposes under the Emissions Reduction Fund (ERF). ERF project proponents are required to use FullCAM in accordance with the requirements set out in method specific FullCAM Guidelines. ERF project proponents should not use this document as a substitute for the applicable ERF method and method guidelines.

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FullCAM Command Line

Running the Command Line

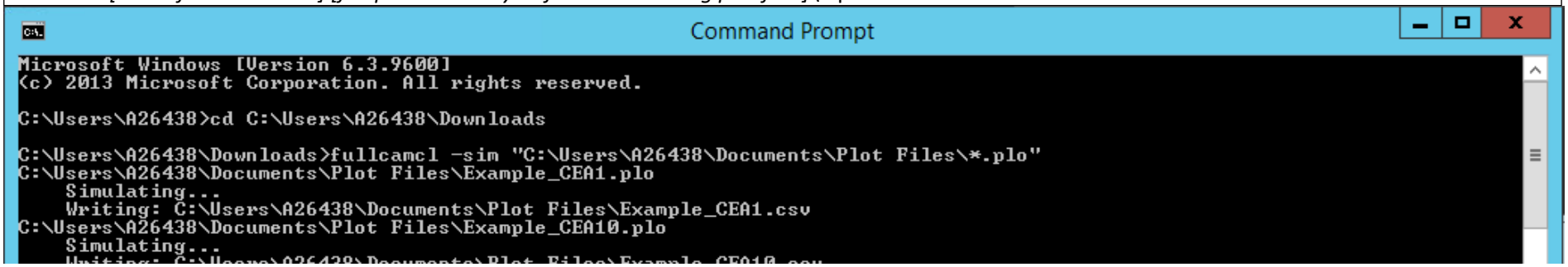
From the windows command prompt, either use the full path to where the FullCAMCL.exe is stored and full path to where the plot files are stored, or change directory to the folder containing FullCAMCL.exe

Option 1:

[full path directory to folder containing FullCAM command line]\FullCAMCL.exe *[insert functions here] [full path directory to folder containing plot files]**.plo

Option 2:

cd *[full path directory to folder containing FullCAM command line]*
fullcamcl *[insert functions here] [full path directory to folder containing plot files]**.plo

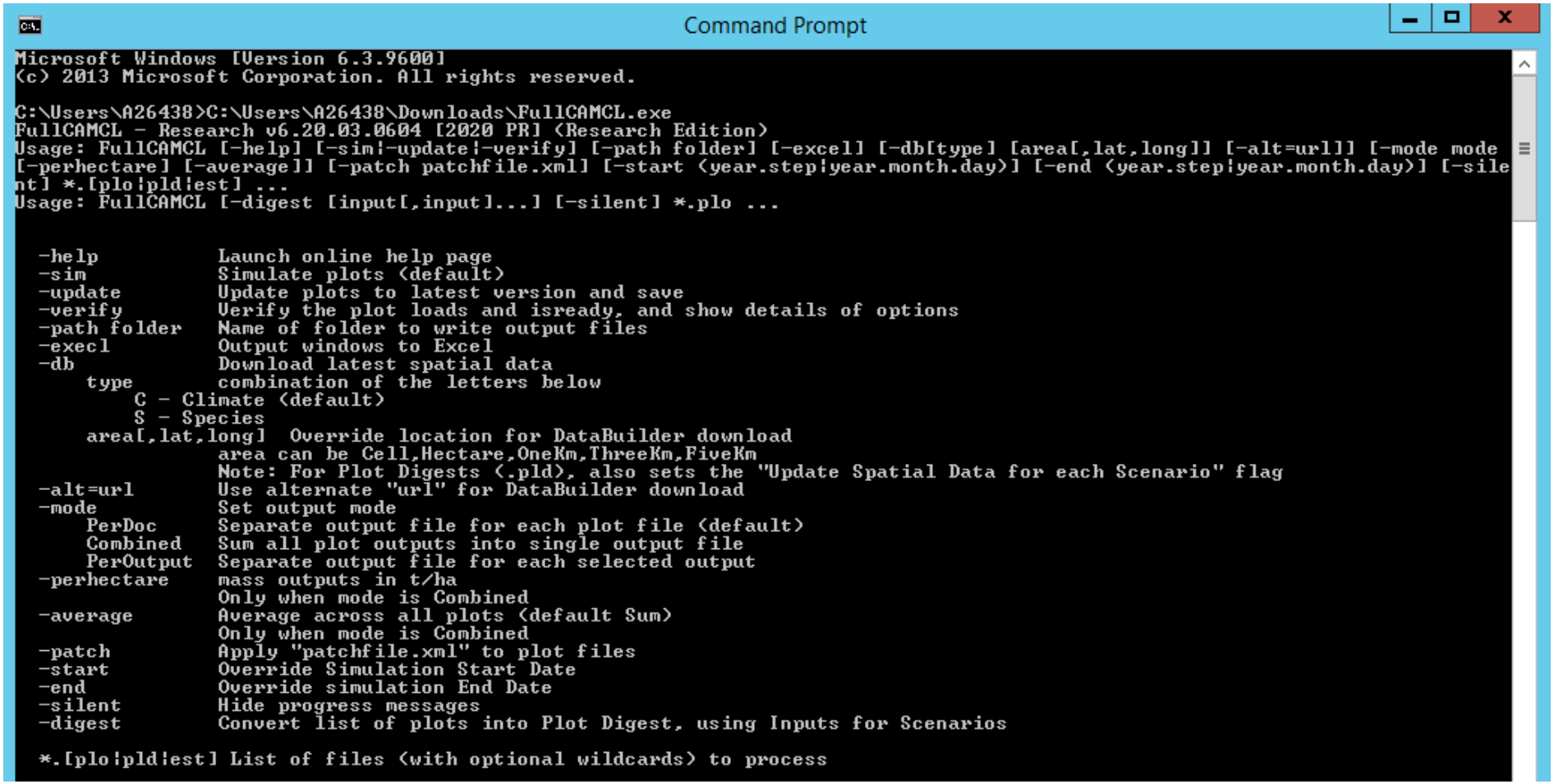


Note: Use “ “ quotation marks around path directories that contain spaces.

Command line functions

The following functions can be applied to individual plot files by directory\filename.extension, or multiple files in the specified folder directory by using the *. option with the file extension.

Note: FullCAM Public Release automatically downloads site specific data from the databuilder, which is a custom built online database. It was built to download data for a few plots at a time. When the command line option is used to extract data for thousands of plots, the software does not populate data values in the plot files correctly. To overcome this problem in this release, we suggest users to limit data downloads to a maximum of 1000 plots at a time. We also recommend users insert one or two second delay between each plot download, in the command line script, which should avoid this known problem.


Command Prompt
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.
C:\Users\A26438>C:\Users\A26438\Downloads\FullCAMCL.exe
FullCAMCL - Research v6.20.03.0604 [2020 PR] (Research Edition)
Usage: FullCAMCL [-help] [-sim|-update|-verify] [-path folder] [-excel] [-db[type] [area[,lat,long]] [-alt=url]] [-mode mode
[-perhectare] [-average]] [-patch patchfile.xml] [-start (year.step|year.month.day)] [-end (year.step|year.month.day)] [-sile
nt] *.[plo|pld|est] ...
Usage: FullCAMCL [-digest [input[,input]...] [-silent] *.plo ...
-help Launch online help page
-sim Simulate plots (default)
-update Update plots to latest version and save
-verify Verify the plot loads and isready, and show details of options
-path folder Name of folder to write output files
-excel Output windows to Excel
-db Download latest spatial data
type combination of the letters below
C - Climate (default)
S - Species
area[,lat,long] Override location for DataBuilder download
area can be Cell,Hectare,OneKm,ThreeKm,FiveKm
Note: For Plot Digests (.pld), also sets the "Update Spatial Data for each Scenario" flag
-alt=url Use alternate "url" for DataBuilder download
-mode Set output mode
PerDoc Separate output file for each plot file (default)
Combined Sum all plot outputs into single output file
PerOutput Separate output file for each selected output
-perhectare mass outputs in t/ha
Only when mode is Combined
-average Average across all plots (default Sum)
Only when mode is Combined
-patch Apply "patchfile.xml" to plot files
-start Override Simulation Start Date
-end Override simulation End Date
-silent Hide progress messages
-digest Convert list of plots into Plot Digest, using Inputs for Scenarios
*.[plo|pld|est] List of files (with optional wildcards) to process

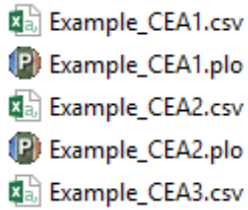
-sim	• If used by itself, plot file will simulate with latest version only and will not update so can still be opened with 2016 option afterwards • Combine with other prompts to simulate outputs including changes eg download latest climate data or changing start date • Will produce .csv file of outputs from plot file(s) in same folder as plot files unless new folder specified with -path folder

One plot file:

```
C:\Users\A26438>C:\Users\A26438\Downloads\FullCAMCL.exe -sim "C:\Users\A26438\Documents\Plot Files\Example_CEA1.plo"
C:\Users\A26438\Documents\Plot Files\Example_CEA1.plo
    Simulating...
    Writing: C:\Users\A26438\Documents\Plot Files\Example_CEA1.csv
```

Multiple plot files:

```
C:\Users\A26438>C:\Users\A26438\Downloads\FullCAMCL.exe -sim "C:\Users\A26438\Documents\Plot Files\*.plo"
C:\Users\A26438\Documents\Plot Files\Example_CEA1.plo
    Simulating...
    Writing: C:\Users\A26438\Documents\Plot Files\Example_CEA1.csv
C:\Users\A26438\Documents\Plot Files\Example_CEA10.plo
    Simulating...
    Writing: C:\Users\A26438\Documents\Plot Files\Example_CEA10.csv
C:\Users\A26438\Documents\Plot Files\Example_CEA11.plo
    Simulating...
    Writing: C:\Users\A26438\Documents\Plot Files\Example_CEA11.csv
C:\Users\A26438\Documents\Plot Files\Example_CEA12.plo
    Simulating...
    Writing: C:\Users\A26438\Documents\Plot Files\Example_CEA12.csv
C:\Users\A26438\Documents\Plot Files\Example_CEA13.plo
    Simulating...
    Writing: C:\Users\A26438\Documents\Plot Files\Example_CEA13.csv
C:\Users\A26438\Documents\Plot Files\Example_CEA14.plo
    Simulating...
    Writing: C:\Users\A26438\Documents\Plot Files\Example_CEA14.csv
C:\Users\A26438\Documents\Plot Files\Example_CEA15.plo
    Simulating...
    Writing: C:\Users\A26438\Documents\Plot Files\Example_CEA15.csv
```



-update	• Plot file will update to version being used and cannot be opened with 2016 option afterwards • If combined with additional prompts or patches, the plot file will be updated/saved with any changes you make in the command line eg downloading spatial data, patching parameters

```
C:\Users\A26438>C:\Users\A26438\Downloads\FullCAMCL.exe -update "C:\Users\A26438\Documents\Plot Files\*.plo"
C:\Users\A26438\Documents\Plot Files\Example_CEA1.plo
    Updating...
C:\Users\A26438\Documents\Plot Files\Example_CEA10.plo
    Updating...
C:\Users\A26438\Documents\Plot Files\Example_CEA11.plo
    Updating...
C:\Users\A26438\Documents\Plot Files\Example_CEA12.plo
```

-dbCS	• Download latest spatial data
	  ○ C for Climate data (up to 2018)
	  ○ S for Species parameters
	• Override location for databuilder download

```
C:\Users\A26438>C:\Users\A26438\Downloads\FullCAMCL.exe -update -dbCS -sim "C:\Users\A26438\Documents\Plot Files\*.plo"
C:\Users\A26438\Documents\Plot Files\Example_CEA1.plo
    Downloading...
    Updating...
    Simulating...
    Writing: C:\Users\A26438\Documents\Plot Files\Example_CEA1.csv
C:\Users\A26438\Documents\Plot Files\Example_CEA10.plo
    Downloading...
    Updating...
    Simulating...
    Writing: C:\Users\A26438\Documents\Plot Files\Example_CEA10.csv
C:\Users\A26438\Documents\Plot Files\Example_CEA11.plo
    Downloading...
    Updating...
    Simulating...
    Writing: C:\Users\A26438\Documents\Plot Files\Example_CEA11.csv
C:\Users\A26438\Documents\Plot Files\Example_CEA12.plo
```

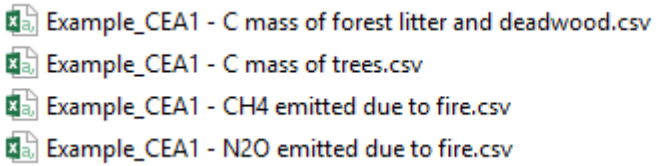
-mode Combined	• Sum all outputs together and produce one .csv
	  ○ perhectare take total sum and divide by total hectares
	  ○ average results across number of plots instead of sum
	• For plots that have no site area ie output as t/ha already, these two prompts will do the same thing
	• .csv file will have name of first plot file in list followed by ‘ – Output 1’

```
C:\Users\A26438>C:\Users\A26438\Downloads\FullCAMCL.exe -sim -mode Combined "C:\Users\A26438\Documents\Plot Files\*.plo"
C:\Users\A26438\Documents\Plot Files\Example_CEA1.plo
    Simulating...
    Combining...
C:\Users\A26438\Documents\Plot Files\Example_CEA10.plo
    Simulating...
    Combining...
C:\Users\A26438\Documents\Plot Files\Example_CEA11.plo
    Simulating...
    Combining...
C:\Users\A26438\Documents\Plot Files\Example_CEA12.plo
    Simulating...
    Combining...
C:\Users\A26438\Documents\Plot Files\Example_CEA9.plo
    Simulating...
    Combining...
    Writing: C:\Users\A26438\Documents\Plot Files\Example_CEA1 - Output 1.csv
```

```
C:\Users\A26438>C:\Users\A26438\Downloads\FullCAMCL.exe -sim -mode Combined -perhectare "C:\Users\A26438\Documents\Plot Files
\*.plo"
C:\Users\A26438\Documents\Plot Files\Example_CEA1.plo
    Simulating...
    Combining...
C:\Users\A26438\Documents\Plot Files\Example_CEA10.plo
    Simulating...
    Combining...
C:\Users\A26438\Documents\Plot Files\Example_CEA9.plo
    Simulating...
    Combining...
    Writing: C:\Users\A26438\Documents\Plot Files\Example_CEA1 - Output 1.csv
```

-mode PerOutput	• Outputs each plot file to a column in a .csv file for each output (eg C mass of trees) • .csv files will have name of first plot file in list followed by the outputs eg ' – C mass of trees'

```
C:\Users\A26438>C:\Users\A26438\Downloads\FullCAMCL.exe -sim -mode PerOutput "C:\Users\A26438\Documents\Plot Files\*.plo"
C:\Users\A26438\Documents\Plot Files\Example_CEA1.plo
    Simulating...
    Combining...
C:\Users\A26438\Documents\Plot Files\Example_CEA10.plo
    Simulating...
    Combining...
C:\Users\A26438\Documents\Plot Files\Example_CEA11.plo
    Combining...
C:\Users\A26438\Documents\Plot Files\Example_CEA9.plo
    Simulating...
    Combining...
Writing Results: C:\Users\A26438\Documents\Plot Files\
```



-patch	• Use an .xml file in the correct format (see FullCAM help or the section below) to patch in values or changes to all plot files • Must use full path to patch file

```
C:\Users\A26438>C:\Users\A26438\Downloads\FullCAMCL.exe -sim -patch "C:\Users\A26438\Documents\Plot Files\Patch.xml" "C:\Users\A26438\Documents\Plot Files\*.plo"
C:\Users\A26438\Documents\Plot Files\Example_CEA1.plo
    Simulating...
    Writing: C:\Users\A26438\Documents\Plot Files\Example_CEA1.csv
C:\Users\A26438\Documents\Plot Files\Example_CEA10.plo
    Simulating...
    Writing: C:\Users\A26438\Documents\Plot Files\Example_CEA10.csv
```

-start -end	• Overwrite simulation start or end date • Format YYYY.MM.DD

```
C:\Users\A26438>C:\Users\A26438\Downloads\FullCAMCL.exe -sim -end 2120.12.31 "C:\Users\A26438\Documents\Plot Files\*.plo"
C:\Users\A26438\Documents\Plot Files\Example_CEA1.plo
    Simulating...
    Writing: C:\Users\A26438\Documents\Plot Files\Example_CEA1.csv
C:\Users\A26438\Documents\Plot Files\Example_CEA10.plo
    Simulating...
    Writing: C:\Users\A26438\Documents\Plot Files\Example_CEA10.csv
```

26	2120	10	31	2120.833	32.13462	14.02479	0	0
27	2120	11	30	2120.915	32.13867	14.00154	0	0
28	2120	12	31	2121	32.14285	13.95496	0	0
29								

-digest	• Create plot digest from list of plot files using inputs as scenarios • Inputs have to use “Programming name” of variable (from Explorer tab of FullCAM user interface) ○ Eg: latBL,lonBL • Resulting plot digest file will have same name as first plot file in list but with .pld extension

```
C:\Users\A26438>C:\Users\A26438\Downloads\FullCAMCL.exe -digest latBL,lonBL "C:\Users\A26438\Documents\Plot Files\*.plo"
Creating plot digest with Inputs:
latBL: (Latitude of plot)
lonBL: (Longitude of plot)
C:\Users\A26438\Documents\Plot Files\Example_CEA1.plo
C:\Users\A26438\Documents\Plot Files\Example_CEA10.plo
C:\Users\A26438\Documents\Plot Files\Example_CEA11.plo
C:\Users\A26438\Documents\Plot Files\Example_CEA12.plo
C:\Users\A26438\Documents\Plot Files\Example_CEA13.plo
C:\Users\A26438\Documents\Plot Files\Example_CEA14.plo
C:\Users\A26438\Documents\Plot Files\Example_CEA15.plo
C:\Users\A26438\Documents\Plot Files\Example_CEA16.plo
C:\Users\A26438\Documents\Plot Files\Example_CEA17.plo
C:\Users\A26438\Documents\Plot Files\Example_CEA2.plo
C:\Users\A26438\Documents\Plot Files\Example_CEA3.plo
C:\Users\A26438\Documents\Plot Files\Example_CEA4.plo
C:\Users\A26438\Documents\Plot Files\Example_CEA5.plo
C:\Users\A26438\Documents\Plot Files\Example_CEA6.plo
C:\Users\A26438\Documents\Plot Files\Example_CEA7.plo
C:\Users\A26438\Documents\Plot Files\Example_CEA8.plo
C:\Users\A26438\Documents\Plot Files\Example_CEA9.plo
```

Example_CEA1.pld
Example_CEA1.plo

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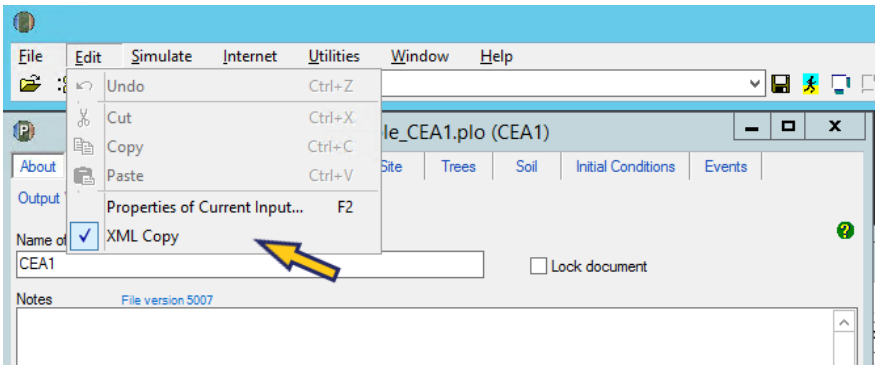
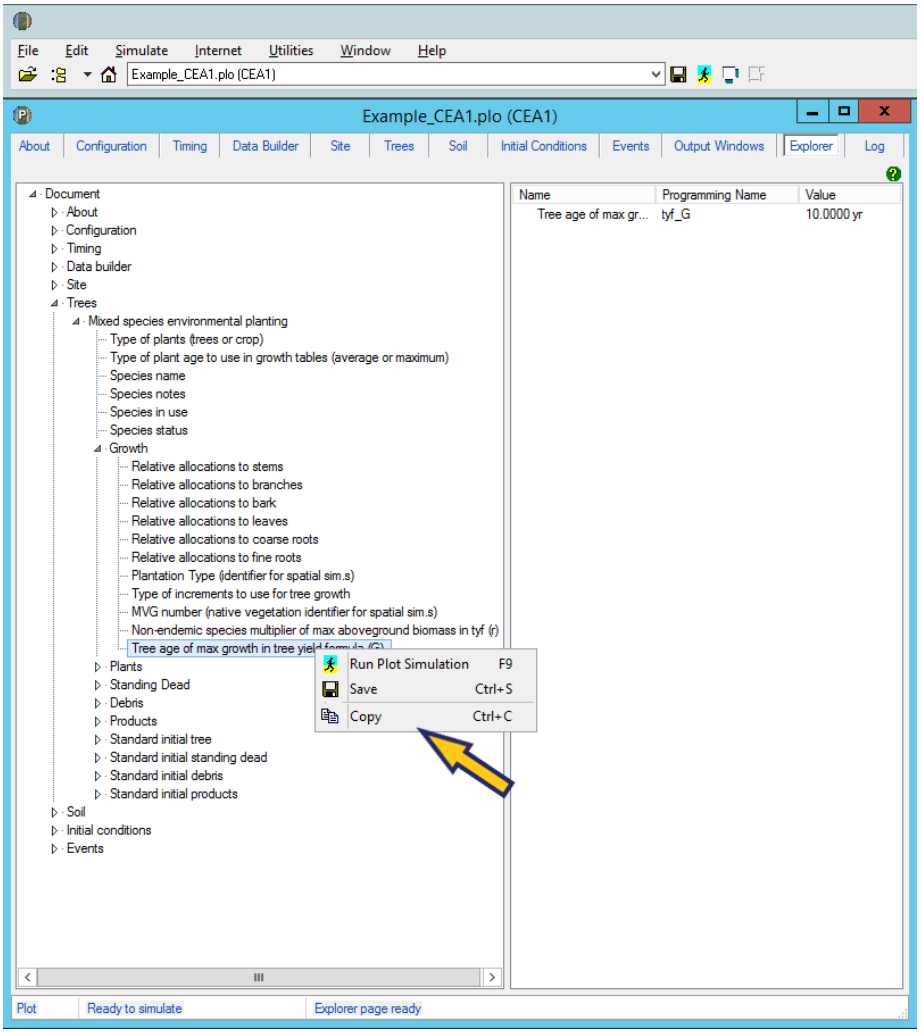
Creating a patch file

Using the FullCAM user interface, variables can be copied to a notepad application and when saved as an .xml file with the correct formatting can be used to patch changes into plot files using the command line.

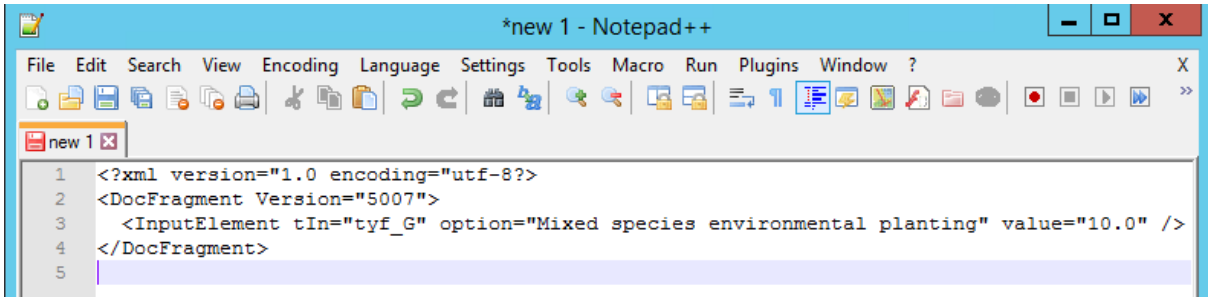
In FullCAM, ensure Edit > XML Copy is ticked.



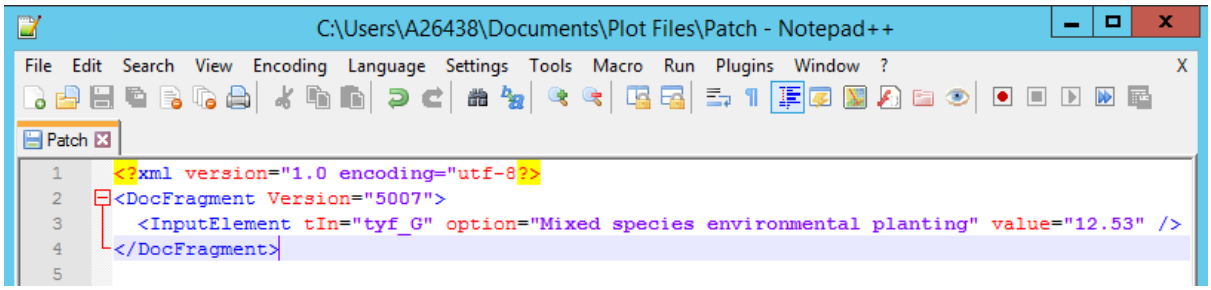
From the explorer tab, right click on an element in the tree in the left-hand side to copy.



Paste variable into text editor.



Edit variable as required and save file as eXtensible Markup Language file (*.xml) following formatting rules in FullCAM Help.

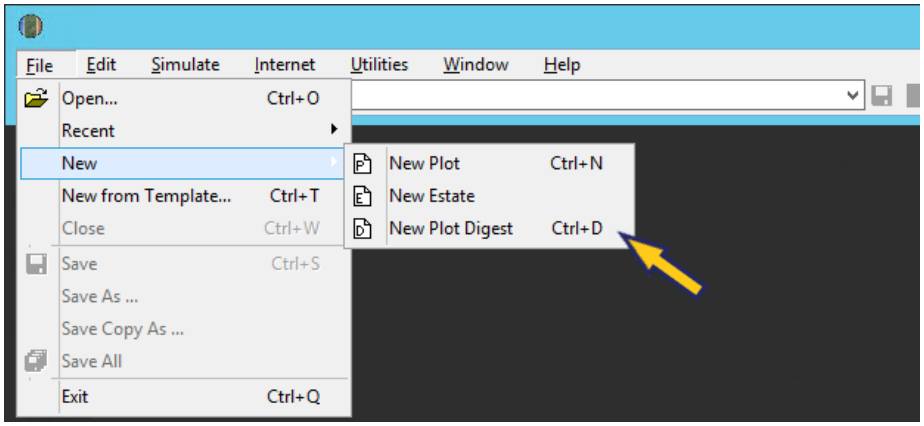


For multiple elements remove header/footer that gets pasted in between variables (only one needed per patch file).

Run FullCAMCL with –patch function as explained above.

Plot Digest

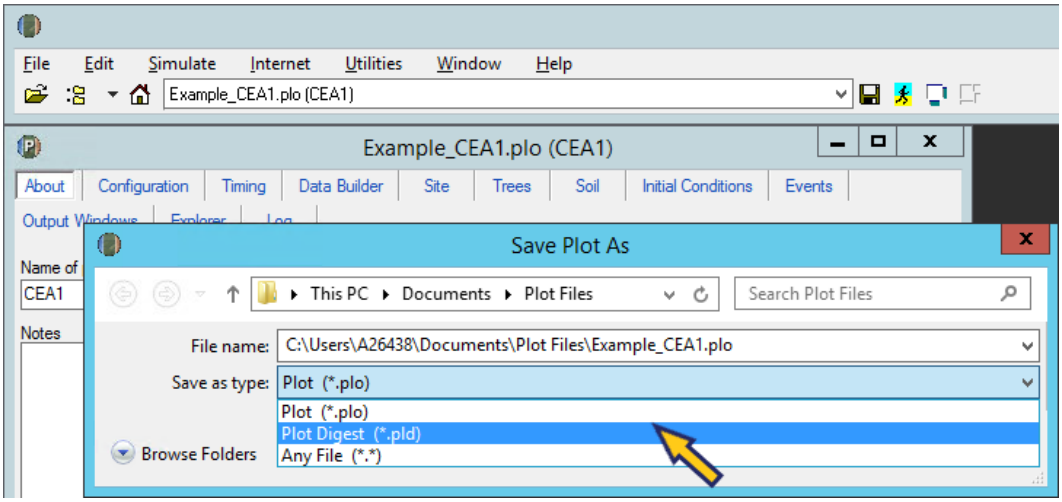
A plot digest can be created and set up from the File > New menu in the same way as a plot file.



Alternatively, an existing plot file can be saved as a plot digest from the File > Save As … menu and selecting .pld as file extension type.

Note: FullCAM Public Release automatically downloads site specific data from the databuilder, which is a custom built online database. It was built to download data for a few plots at a time. When the plot digest option is used to extract data for thousands of plots, the software does not populate data values in the plot files correctly. To overcome this problem in this release, we suggest users to limit data downloads to a maximum of 1000 plots at a time. We also recommend users insert one or two

second delay between each plot download, in the command line script, which should avoid this known problem.

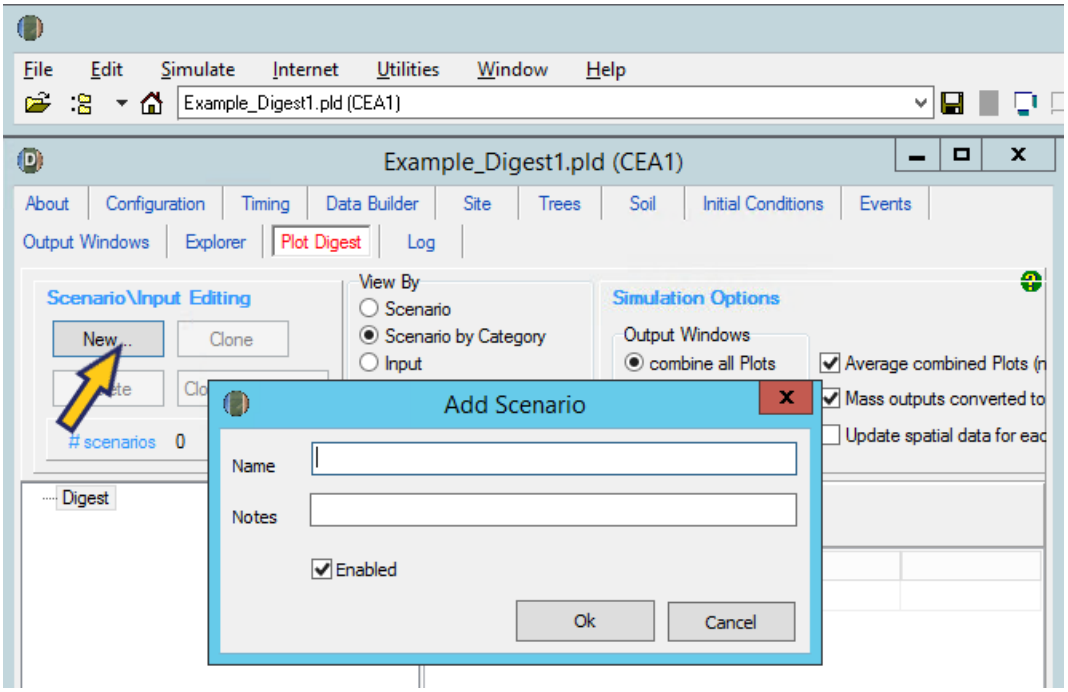


In a plot digest, scenarios work effectively as a list of plot files inside the plot digest to which input elements can be added in order to be changed across scenarios. However, the underlying file is still a single plot digest and individual plot files will not be created for each scenario.

Scenarios can be cloned from existing plot files, or data can be copied from a list in excel (for example a list of latitude and longitudes).

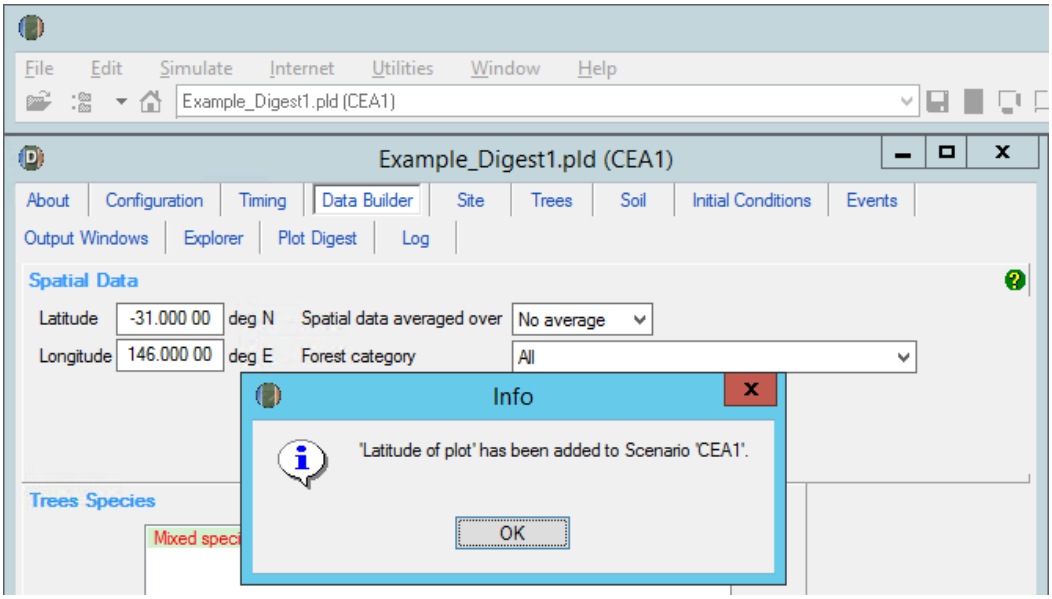
Creating scenarios from existing plot files

After creating a plot digest by either of the methods listed above, navigate to the Plot Digest tab. Create a new scenario from the Scenario/Input Editing section.

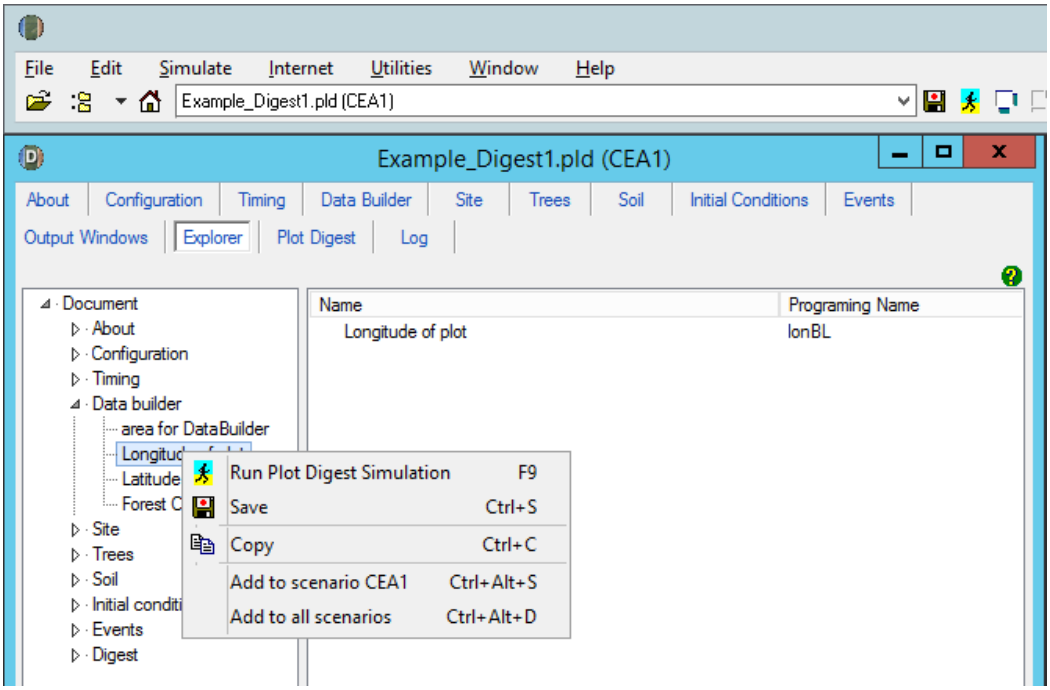


There are two ways to add an input element to the scenario.

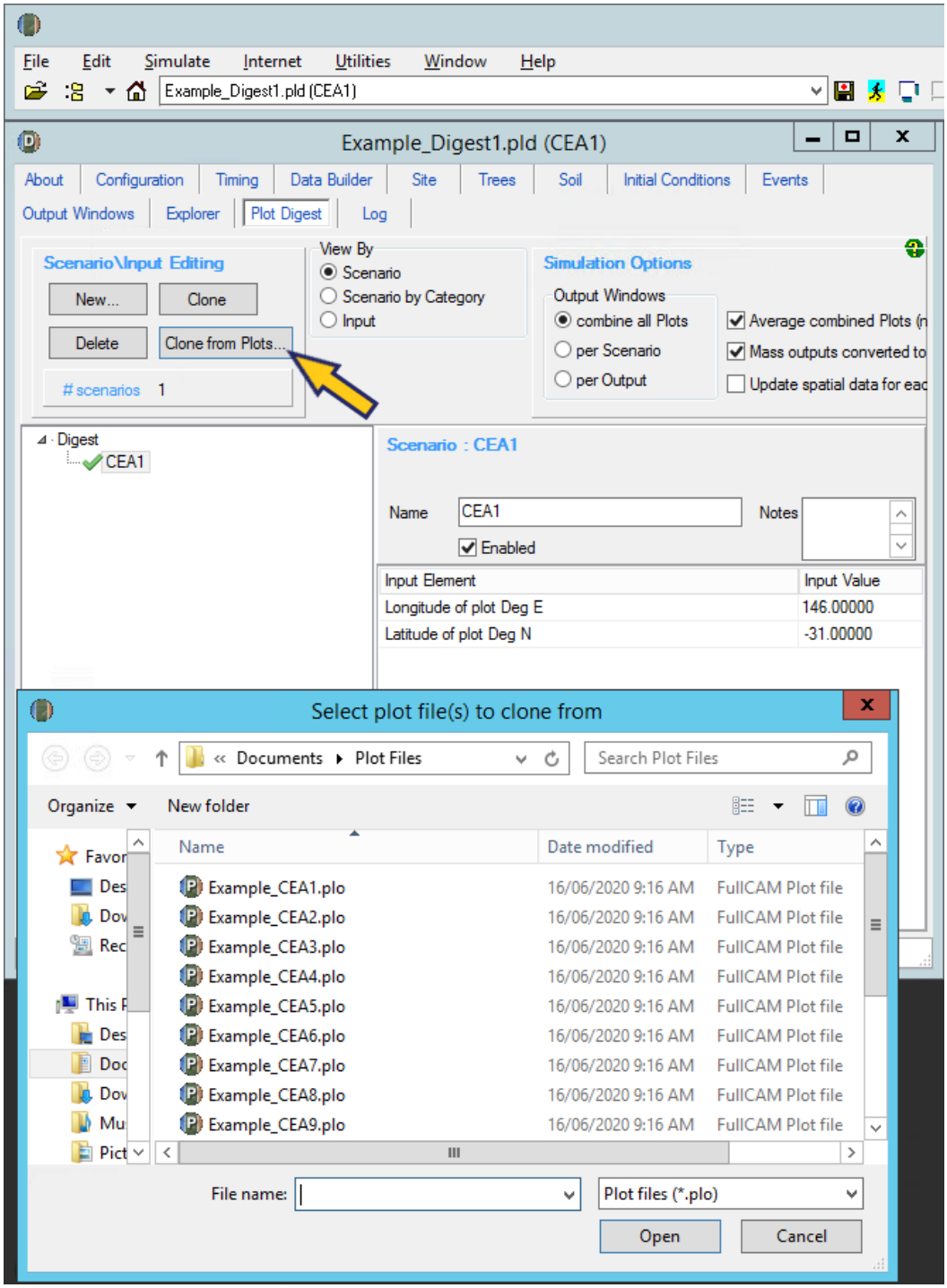
Navigate to the tab that contains the required element (in this example latitude or longitude). Click inside the element text box, and use the shortcut CTRL + ALT + S to add it to the current scenario. If you have created more scenarios and want to add an element to all scenarios, use CTRL + ALT + D.



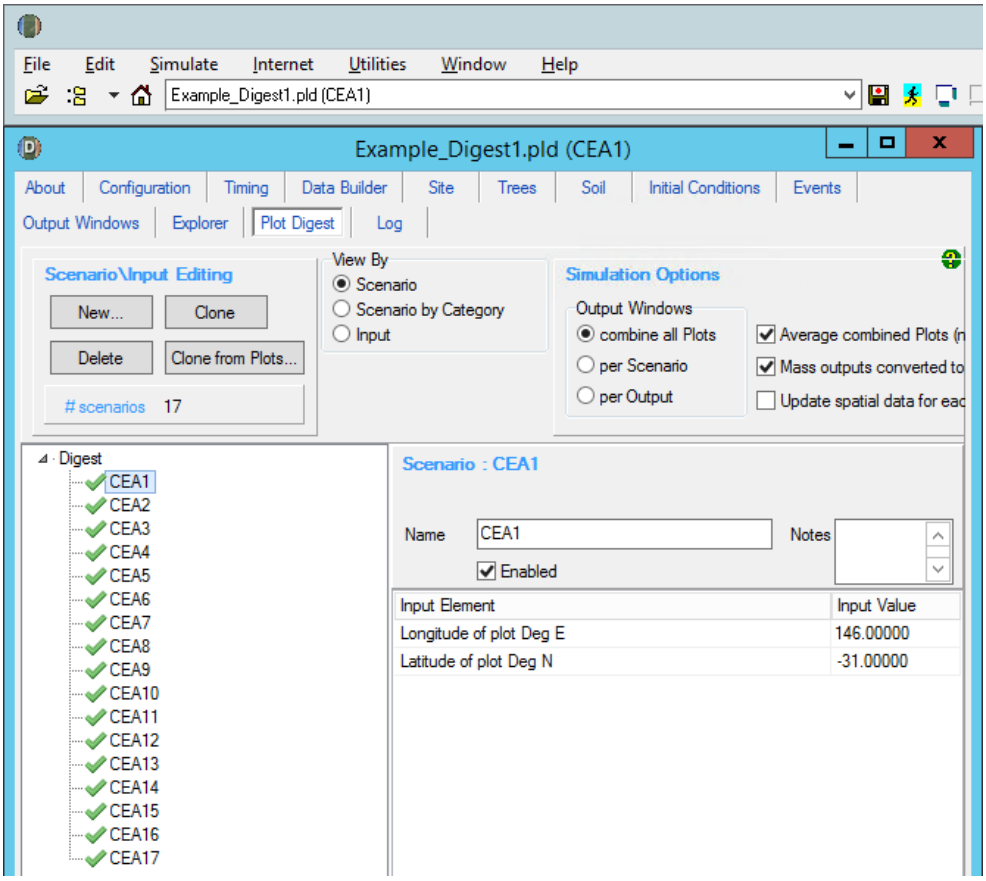
Or, navigate to the explorer tab to add an input element from the tree on the left-hand side (make sure Edit > XML Copy is **unticked** first).



Once one scenario has been created, the input elements added to it can be cloned from existing plot files to create the rest of the scenarios representing those plot files inside the plot digest. From the Scenario\Input Editing section choose Clone from Plots… and select the rest of the plot files of interest. In this example, their latitudes and longitudes will be used to create their scenarios.

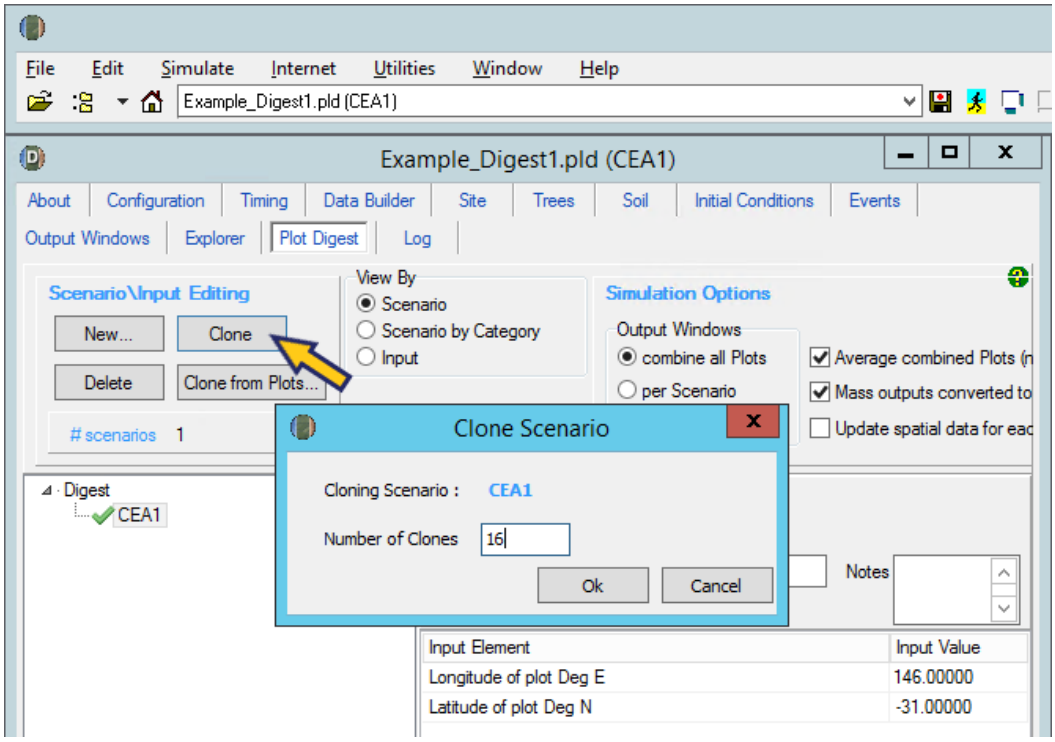


View by Scenario to see each scenarios input element, or by Input to see the latitudes or longitudes for each scenario as a list.

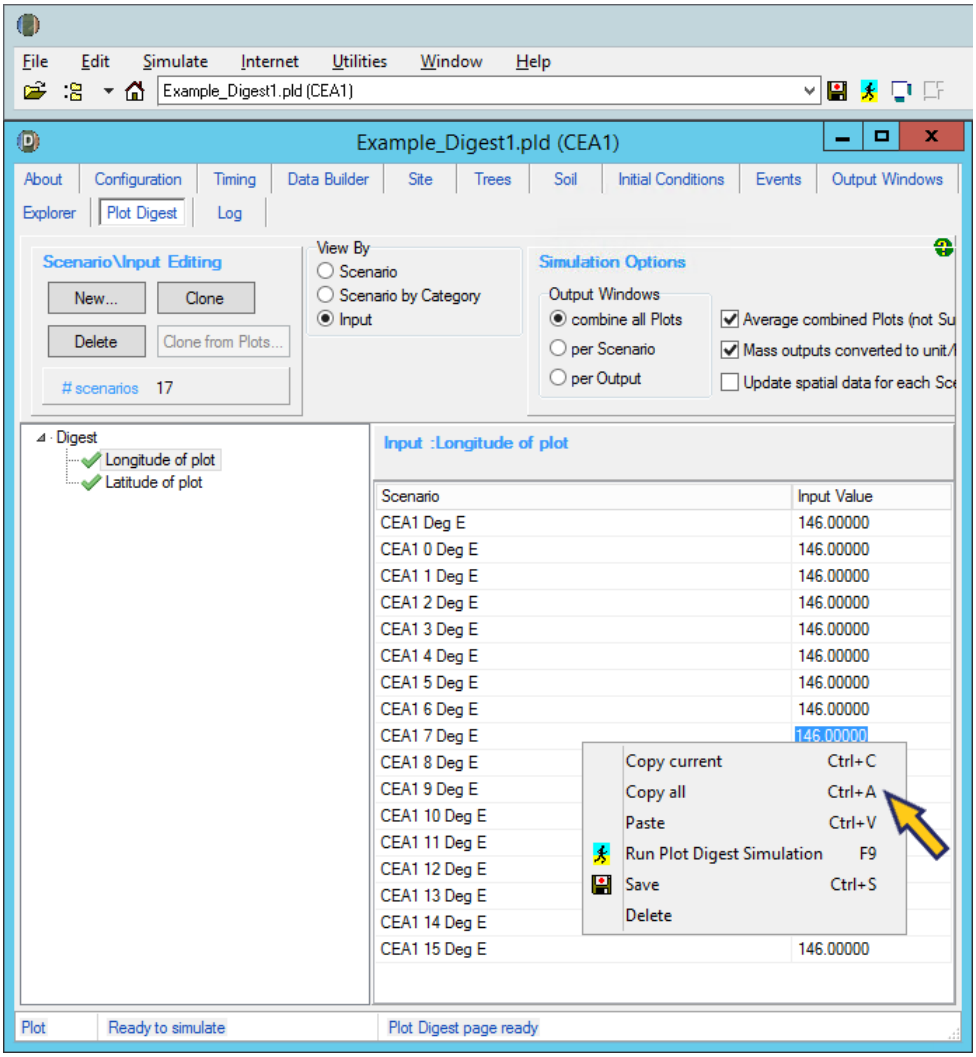


Creating scenarios from a list of inputs

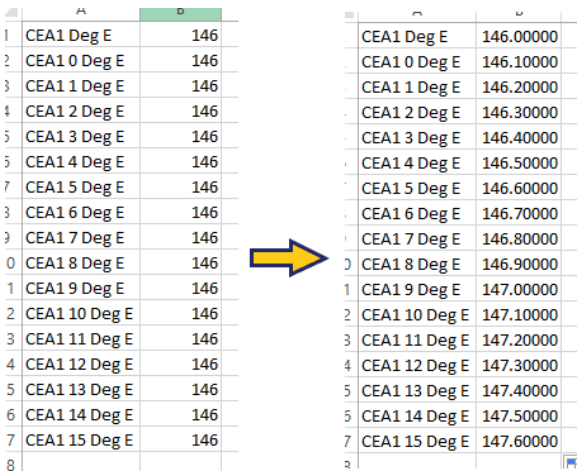
To instead copy input elements from a list in an Excel or .csv file, first create the scenario as explained above. Instead of selecting Clone from Plots… in the Scenario\Input Editing section, choose Clone and put the number of additional expected scenarios, in this case 16. This method will not use the existing names of plot files but will give default names to the new scenarios.



View By Input to see the list of latitudes or longitudes which have been cloned from the first scenario. Right click in the list and select 'Copy All' or use shortcut CTRL + A.



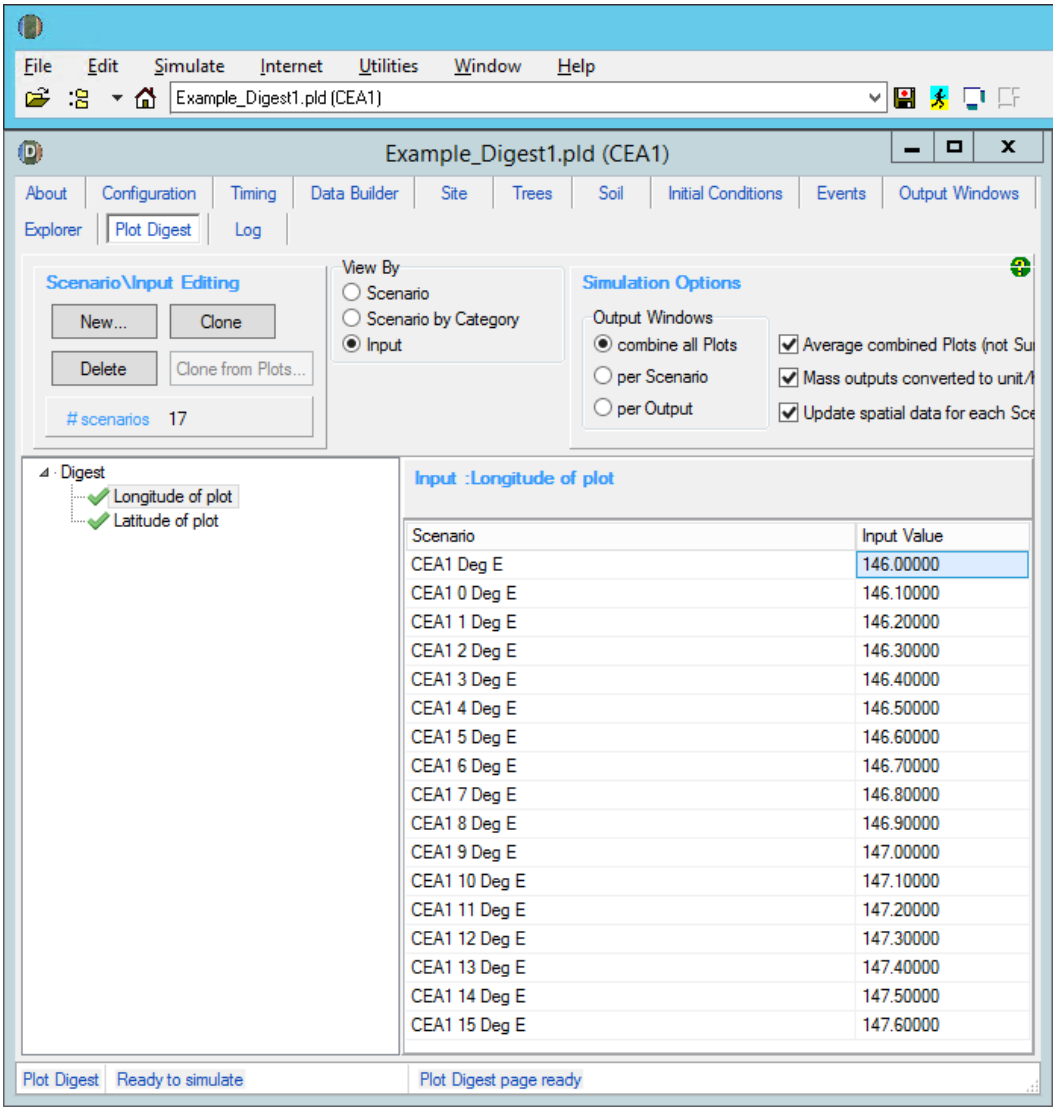
Paste into an excel sheet. Paste new values over the top of copied values, ensuring not to change the Scenario names.



CEA1 Deg E	146
CEA1 0 Deg E	146
CEA1 1 Deg E	146
CEA1 2 Deg E	146
CEA1 3 Deg E	146
CEA1 4 Deg E	146
CEA1 5 Deg E	146
CEA1 6 Deg E	146
CEA1 7 Deg E	146
CEA1 8 Deg E	146
CEA1 9 Deg E	146
CEA1 10 Deg E	146
CEA1 11 Deg E	146
CEA1 12 Deg E	146
CEA1 13 Deg E	146
CEA1 14 Deg E	146
CEA1 15 Deg E	146

CEA1 Deg E	146.00000
CEA1 0 Deg E	146.10000
CEA1 1 Deg E	146.20000
CEA1 2 Deg E	146.30000
CEA1 3 Deg E	146.40000
CEA1 4 Deg E	146.50000
CEA1 5 Deg E	146.60000
CEA1 6 Deg E	146.70000
CEA1 7 Deg E	146.80000
CEA1 8 Deg E	146.90000
CEA1 9 Deg E	147.00000
CEA1 10 Deg E	147.10000
CEA1 11 Deg E	147.20000
CEA1 12 Deg E	147.30000
CEA1 13 Deg E	147.40000
CEA1 14 Deg E	147.50000
CEA1 15 Deg E	147.60000

Select all values including the scenario names (so two columns), copy and paste back into the input list in FullCAM either by right clicking and selecting 'Paste' or by using the shortcut CTRL + V. Repeat for other input elements.



The plot digest can now be simulated. For example the plots can be simulated per Scenario (akin to simulating a list of plot files to individual .csv outputs, but there will be a FullCAM window per scenario), per Output (a FullCAM window per Output eg C mass of Trees with each scenario as a line on the graph), or combine all Plots (Sum by default, or Average when selected).

The 'Update spatial data for each Scenario' option should be ticked when using location as an input element in scenarios, otherwise the spatial data will only download at the location indicated in the Data Builder tab.

To simulate a plot digest with the command line, the option -excel must be used. This will open a .csv file with a tab for each scenario.