

# MGM21 Batch Macro (v1\_6) – User’s Guide – December 14, 2021

## Introduction

The MGM Batch Macro workbook allows MGM to run tens, hundreds, or thousands of projections using plot summary information and MGM Stand worksheets (e.g. MGM Stands.xlsx). The MGM Batch Macro also records long-form MGM outputs in a tabular format for data analysis.

## Notes

- The Batch Macro (v1\_6) is designed to work with MGM21. Do not use the Batch Macro (v1\_6) on older or newer versions of MGM without contacting the Developer ([mike.bokalo@ualberta.ca](mailto:mike.bokalo@ualberta.ca)).
- MGM21 and the Batch Macro should be run locally on your computer’s hard drive. Poor performance or unusual behaviour may occur if MGM and the Batch Macro are run on a network drive, including Microsoft OneDrive.
- Multitasking is not recommended when using the Batch Macro. Multitasking may interfere with the Batch Macro or corrupt MGM records.
- If operating your computer through Remote Desktop Connection, do not link the target computer’s Clipboard with the remote computer’s clipboard. Linked Clipboards in a Remote Desktop session are equivalent to multitasking.

## Batch Macro Overview

- The Batch Macro resides in the “MGM Batch Macro Workbook” (Figure 1).
- Upon execution, the Batch Macro accesses the “MGM Workbook” (i.e. MGM - My Working Copy.xlsm) to create and run crop plans.
- After running each crop plan, the Batch Macro records the MGM outputs in the “MGM Batch Macro Workbook”.
- “MGM Stand Worksheets” in the “MGM Stands Workbook” are required to run projections with treelist data (Figure 1).

## Batch Macro Operation

- The Batch Macro creates crop plans with unique start/stop dates, grow schedules, and MGM settings using plot summary information in the “Batch Control List” worksheet (Figure 1).
- Information in the “Batch Control List” worksheet is used to update a “Reference Crop Plan” that is loaded in the “MGM Crop Plans Worksheet”.
- Updated crop plans in the “MGM Crop Plans Worksheet” are submitted to MGM and allowed to complete.
- Long-form MGM outputs in the “MGM Records Worksheet” are extracted into 5 Batch Macro worksheets: “Out Yields”, “Out Trees”, “Out Stand Summaries”, “Submitted Crop Plans”, and the “Error Log”.
- Plot summary information in the “Batch Control List” worksheet (e.g. plot name, plot age, measurement year, site index, CMI, etc.) must correspond with the “MGM Stand Worksheets” in the “MGM Stands Workbook” (e.g. MGM Stands.xlsx) (Figure 1).

## Important Features

- All pre-existing MGM records are deleted at beginning of each batch run. This prevents the Batch Macro from combining data from different batch runs. Important MGM outputs (e.g. “Out Yields” and “Submitted Crop Plans”) should be saved in a separate, renamed file (e.g. .xlsx, .csv, etc.) to prevent accidental deletion.
- A warning message is displayed before deleting any MGM records.
- You can choose to record fewer MGM outputs, depending on your data needs.
  - “Out Yields” only
  - “Out Yields”, “Out Trees”, and “Out Stand Summaries”
- The “Reference Crop Plan” is automatically loaded into the “MGM Crop Plans Worksheet” at the start of the batch run.
- If MGM errors are encountered, these errors are logged in the “Error Log” worksheet.
- The “Submitted Crop Plans” worksheet may be loaded into the “MGM Crop Plans Worksheet” for debugging.
- The “Batch Macro Workbook” is automatically saved on every 10<sup>th</sup> crop plan and at the end of the batch run.

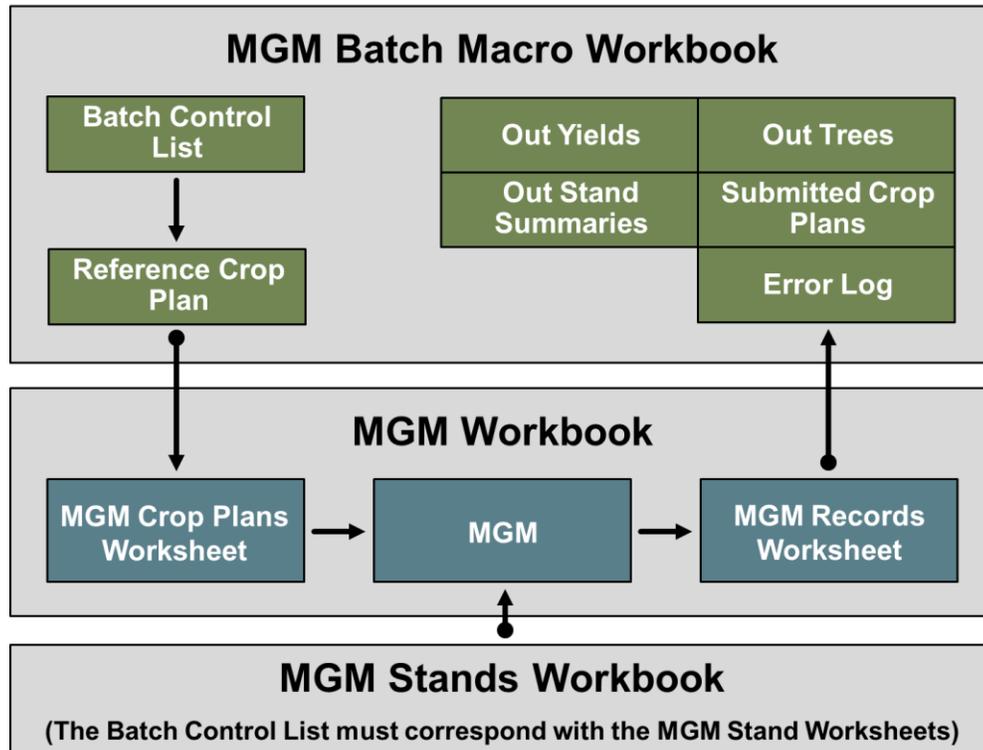


Figure 1. Batch Macro structure. Gray boxes represent Excel Workbooks. Green boxes represent Batch Macro worksheets, and blue boxes represent MGM worksheets. Arrows indicate the flow of input or output data.

## Installation Instructions

*Note: To successfully install the Batch Macro, please follow these instructions sequentially.*

1. Download and install MGM on your computer using the links and installation instructions on the MGM website. Follow the instructions carefully and verify that MGM runs on your system. Please note the “working directory” where you installed MGM (e.g. “C:\Users\YourProfile\Desktop\MGM21”). Your MGM working directory will also be used to install the Batch Macro.
2. Download the compressed file “MGM21\_Batch\_Macro\_v1\_6.zip”. (Note: Steps 2 through 5 assume that you received a copy of the Batch Macro in an email or a download on the MGM website. Please disregard Steps 2 through 5 if you already have a copy of the Batch Macro.)
3. Cut and paste “MGM21\_Batch\_Macro\_v1\_6.zip” from your download directory into your working directory (e.g. “C:\Users\YourProfile\Desktop\MGM21”).
4. Right-click on “MGM21\_Batch\_Macro\_v1\_6.zip”, and select “Properties”. In the new dialog (Figure 2), go to the “General” tab. If visible, check “Unblock” in the lower-right corner. Then, click “OK” (Figure 2). The Batch Macro will not run if “MGM21\_Batch\_Macro\_v1\_6.zip” is “Blocked” by Windows.

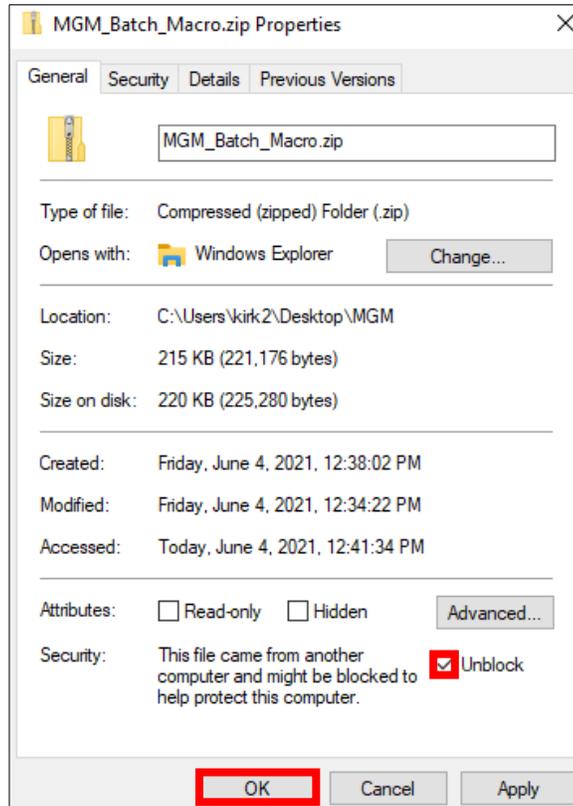


Figure 2. Unblock “MGM21\_Batch\_Macro\_v1\_6.zip”.

5. Extract “MGM21\_Batch\_Macro\_v1\_6.zip”.
6. Cut and paste the extracted files “MGM21\_Batch\_Macro\_v1\_6.xlsm” and “MGM21\_Batch\_Demo\_Stands.xlsx” into your MGM working directory.
7. Open “MGM21 VS39 Rev 6xxx - My Working Copy.xlsm”, and “MGM21\_Batch\_Macro\_v1\_6.xlsm”. If security warning(s) appear, click “Enable Content” under the Excel Ribbon.
8. Make the “MGM21\_Batch\_Macro\_v1\_6.xlsm” workbook active. On your keyboard, enter (Alt + F11) or select the Developer tab and click on the “Visual Basic” button to bring up the “Microsoft Visual Basic for Applications” window (Figure 3). Then, select “Tools” and “References” (Figure 3). A “References-VBAProject” dialog will appear (Figure 4). Check “MGM”, and click “OK” (Figure 4). Save “MGM21\_Batch\_Macro\_v1\_6.xlsm” in the “Microsoft Visual Basic for Applications” window by clicking the “Save” icon (Figure 3) or by clicking “File” and “Save”.

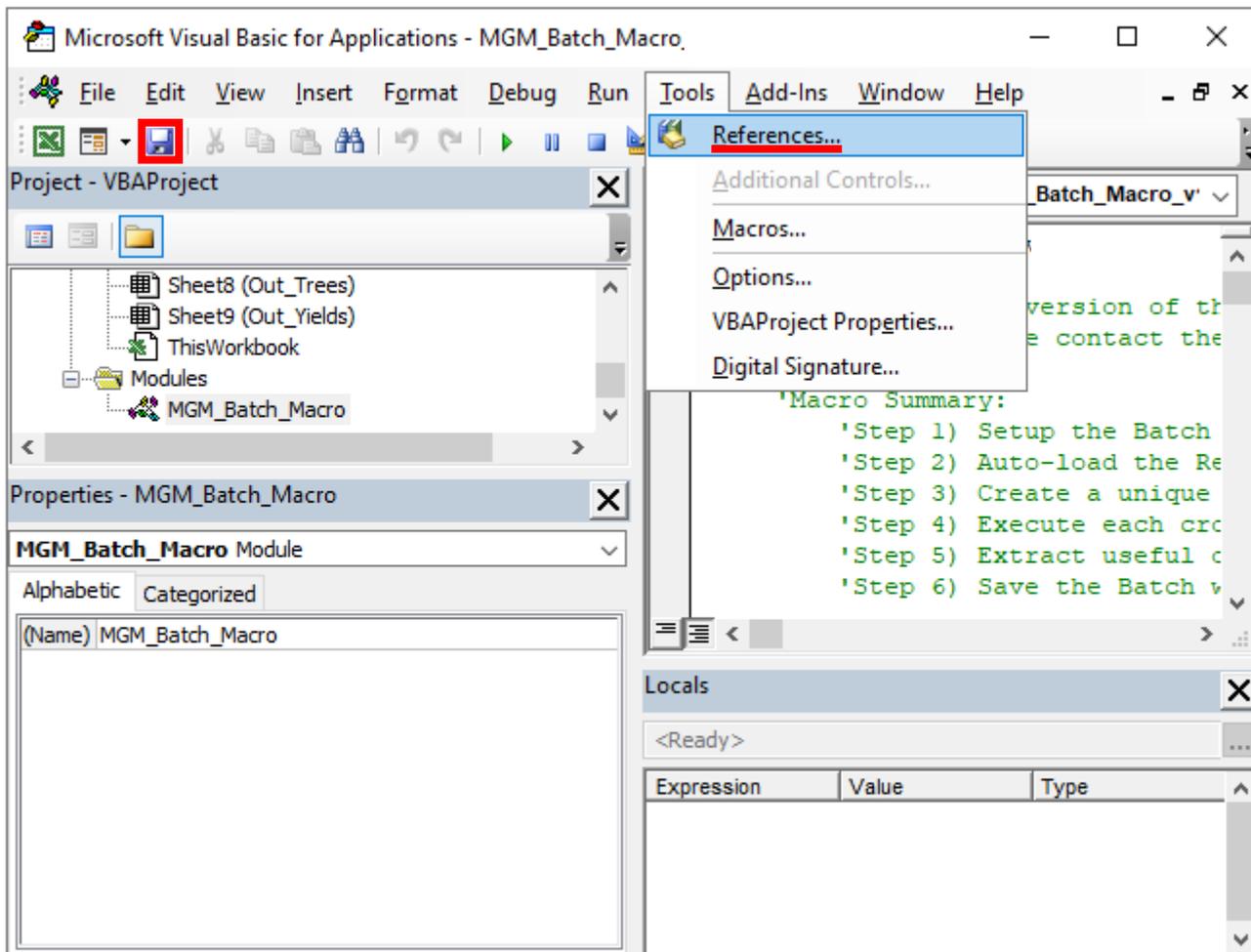


Figure 3. Open the VBA references.

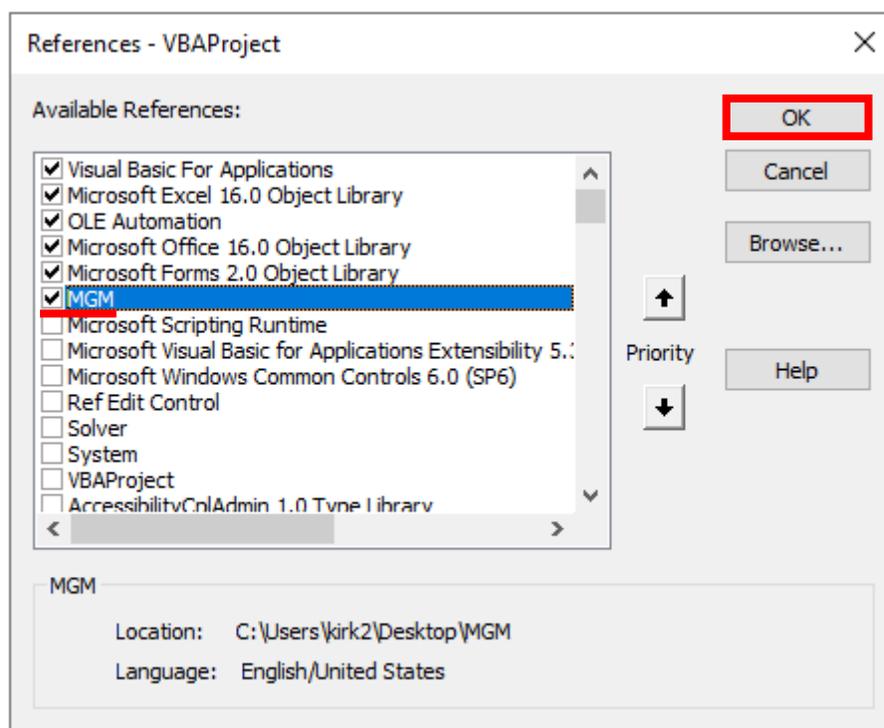


Figure 4. Set the Batch Macro's VBA reference to MGM.

9. Close the “Microsoft Visual Basic for Applications” window (Figure 3), the “MGM21\_Batch\_Macro\_v1\_6.xlsm” workbook, and the “MGM21 VS39 Rev 6xxx - My Working Copy.xlsm” workbook.
10. Reopen “MGM21\_Batch\_Macro\_v1\_6.xlsm”. If the VBA reference is intact, “MGM21 VS39 Rev 6xxx - My Working Copy.xlsm” and “MGM21\_Batch\_Macro\_v1\_6” should appear in the same Excel session. To see the status of your Excel session, select “View” on the Excel Ribbon, and click “Switch Windows” (Figure 5). Both “MGM21 VS39 Rev 6xxx - My Working Copy.xlsm” and “MGM21\_Batch\_Macro\_v1\_6.xlsm” should appear on the list (Figure 5).

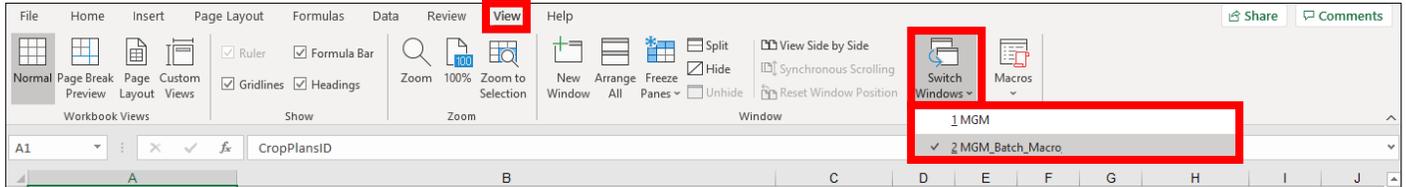


Figure 5. Verify that “MGM21 VS39 Rev 6xxx - My Working Copy” and “MGM21\_Batch\_Macro\_v1\_6” appear in the same Excel session. Note: This image includes generic names for “MGM21 VS39 Rev 6xxx - My Working Copy” (i.e. MGM) and “MGM21\_Batch\_Macro\_v1\_6” (i.e. MGM\_Batch\_Macro).

11. To run the Batch Macro, select “View” on the Excel Ribbon. Then, select “Macros” and “View Macros” (Figure 6).



Figure 6. View Macros.

12. A “Macro” dialog will appear (Figure 7). Under “Macro name”, select “MGM21\_Batch\_Macro\_v1\_6”, and click “Run” (Figure 7).

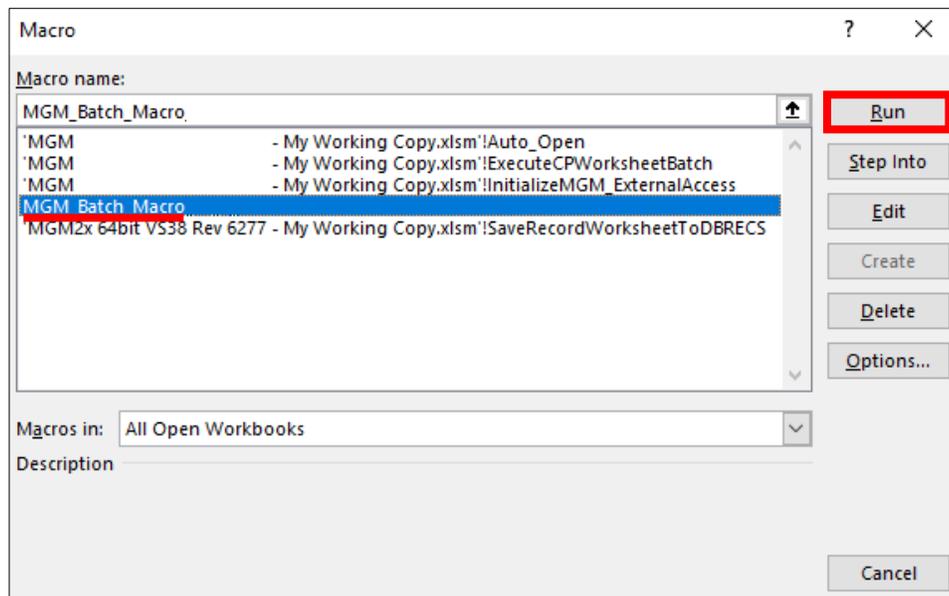


Figure 7. Running the Batch Macro. Note: This image includes generic names for “MGM21 VS39 Rev 6xxx - My Working Copy” (i.e. MGM) and “MGM21\_Batch\_Macro\_v1\_6” (i.e. MGM\_Batch\_Macro).

13. The Batch Macro displays a warning message before deleting all pre-existing MGM records from your last batch run (Figure 8). Click “Yes” to start the Batch Macro and delete all pre-existing MGM records. Otherwise, click “No” to exit the Batch Macro (Figure 8). No MGM records will be deleted if you exit the Batch Macro (Figure 9).

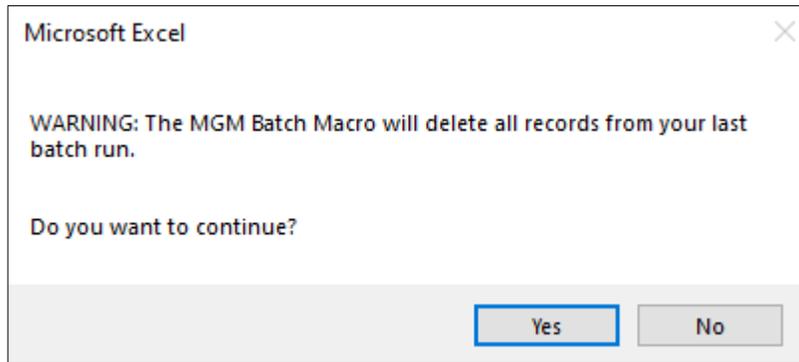


Figure 8. Batch Macro warning message.

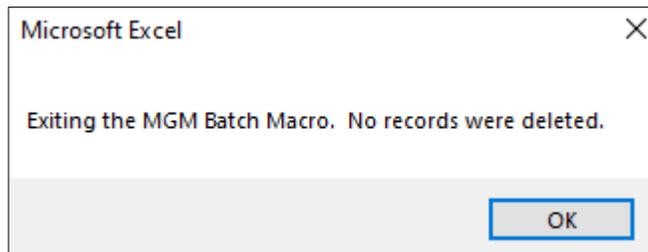


Figure 9. Exiting the Batch Macro.

14. Select the MGM outputs to record. Click “Yes” to record “Out Yields” only, or click “No” to record “Out Yields”, “Out Trees” and “Out Stand Summaries”. After selecting the MGM outputs to record, the Batch Macro should begin.



Figure 10. Select the MGM outputs to record.

15. If the Batch Macro is successful, a "Batch Macro Complete" message will appear (Figure 11). Review the "Submitted Crop Plans", "Out Stand Summaries", "Out Trees", "Out Yields", and "Error Log" worksheets. The Batch Macro start/stop dates and run time will be listed in the "Error Log" worksheet.

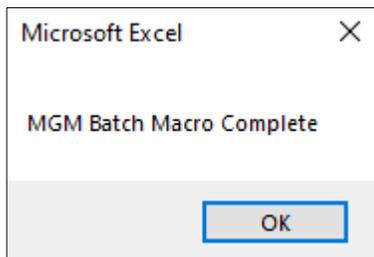


Figure 11. Batch Macro Complete message.

16. If errors are encountered during the batch run, an error message will appear when the Batch Macro completes (Figure 12). MGM error(s) are recorded in the "Error Log" worksheet. Be sure to debug the crop plan(s) and/or MGM stand worksheet(s) that caused the MGM error(s). MGM does not output any data for crop plans with errors!

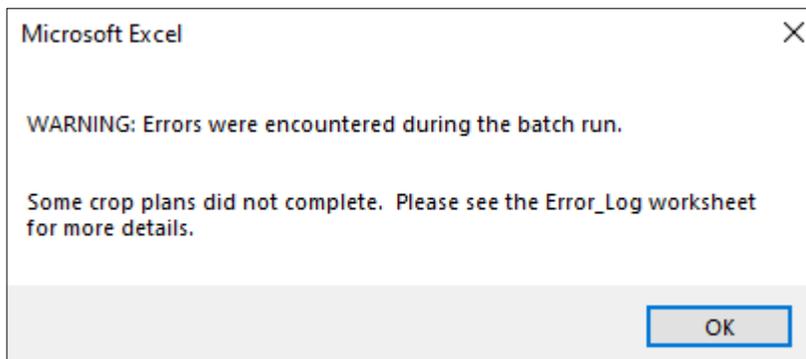


Figure 12. Batch Macro error message.

17. The "MGM21\_Batch\_Macro\_v1\_6.xlsm" workbook is automatically saved at the end of each batch run. However, if you make any changes to the "MGM21\_Batch\_Macro\_v1\_6.xlsm" workbook, save the workbook again by clicking the "Save" icon or clicking "File" and "Save".
18. When exiting the Batch Macro, close the "MGM21\_Batch\_Macro\_v1\_6.xlsm" workbook **first** and the "MGM21 VS39 Rev 6xxx - My Working Copy.xlsm" workbook **second**. Excel will not allow MGM workbook to be closed first. A "This workbook [...] cannot be closed" error will appear if you attempt to close MGM first (Figure 12).

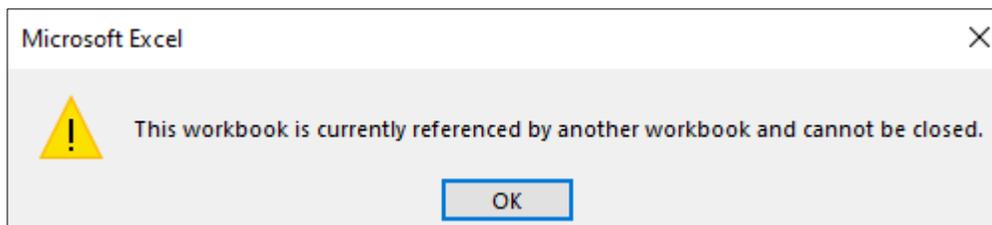


Figure 12. MGM "cannot be closed" error.

19. On some computers, Microsoft OneDrive window(s) may appear after a long batch run. These windows are a pop-up advertisement for OneDrive and do not impact MGM or the Batch Macro. OneDrive windows can be minimized by closing OneDrive before each batch run. To close OneDrive, click on the caret icon on the right side of the taskbar. Then, right-click on the OneDrive cloud icon. A new dialog will appear. Click the “Help & Settings” button, and choose “Close OneDrive”.

## Batch Macro Worksheet Descriptions

1. Batch\_Control\_List – The “Batch Control List” operates the Batch Macro and summarizes your plot information. Each row in the “Batch Control List” represents an individual plot. This plot-level information is used to create a unique crop plan for each row (i.e. plot) in the “Batch Control List”. The “Batch Control List” includes:
  - a. CropPlansID – The general name for your batch run (e.g. PSP\_Runs).
  - b. CropPlanID – The unique name that identifies each plot-level crop plan. CropPlanID is typically a dash or underscore-delimited name that contains the plot, stand, stratum, treatment, and/or utilization information (e.g. Plot-Stand-Stratum-Treatment-Utilization). Thoughtful CropPlanID’s are essential to sort, filter, and analyze MGM outputs from the Batch Macro. Delimited CropPlanID’s can be parsed using Excel’s “Text to Columns” feature, Hadley Wickham’s “stringr” package for R, or the “scan” function in a SAS Data Step.
  - c. Stand\_Initiation\_Year – The stand initiation year of each plot.
  - d. Start\_Year – The start year (year) of each plot.
  - e. Start\_Age – The start age (years) of each plot.
  - f. End\_Year – Then end year (year) of each plot.
  - g. End\_Age – The end age (years) of each plot.
  - h. Region – MGM Region code (Table 1). The Region code must correspond with each “MGM Stand Worksheet”.
  - i. Subregion – MGM Subregion code (Table 1). The Subregion code must correspond with each “MGM Stand Worksheet”. In Alberta and British Columbia, subregion may be defined using the plot location and a GIS layer or a subregion map.
  - j. Stand\_Wbk\_Name – The “MGM Stands Workbook” name (e.g. “MGM Stands.xlsx” or “YourMakeStandsOutput.xlsm”).
  - k. MinDbh – Minimum merchantable DBH (cm).
  - l. TopDib – Merchantable top diameter inside bark (cm).
  - m. StumpHt – Merchantable stump height (m).
  - n. VolumeLoss – Uniform volume reduction (%) for stem decay, waste, and breakage. In most cases, VolumeLoss should be set to “0”.
  - o. Sw\_BH\_SI – White spruce breast height site index (m@50 years breast height age). Currently unused. May be blank. Reserved for site index sensitivity testing.
  - p. P\_BH\_SI – Pine breast height site index (m@50 years breast height age). Currently unused. May be blank. Reserved for site index sensitivity testing.
  - q. Aw\_BH\_SI – Aspen breast height site index (m@50 years breast height age). Currently unused. May be blank. Reserved for site index sensitivity testing.
  - r. Sb\_BH\_SI – Black spruce breast height site index (m@50 years breast height age). Currently unused. May be blank. Reserved for site index sensitivity testing.
  - s. Default\_Sindex – MGM’s default site index assumptions if site index is not provided in a corresponding “MGM Stand Worksheet” (m@50 years breast height age). If site index assumptions are provided in a corresponding “MGM Stand Worksheet”, Default\_Sindex will not be used. Default\_Sindex is a string with space-delimited site indices (WhiteSpruceSI PineSI AspenSI BlackSpruceSI).
  - t. SppUtilStr – Species used in MGM volume estimates. This is a string with 23 space-delimited values (i.e. 0 or 1). To avoid errors, the SppUtilStr should be defined using the MGM Options dialog and pasted into this column with the header “SppUtilStr := ”.
  - u. Reserved1 – Reserved column for developmental MGM settings. Currently unused.
  - v. Reserved2 – Reserved column for developmental MGM settings. Currently unused.
  - w. SourceIndex – The type of input data for MGM. A SourceIndex of 1 indicates that treelist data originates from a “MGM Stand Worksheet”. A SourceIndex of 2 indicates that treelist data originates from MGM’s Tree List Generator.
  - x. CMI – Climate Moisture Index (CMI) for the 30-year period between 1981-2010. This CMI value must

correspond with each “MGM Stand Worksheet”. **CMI should be calculated using the MGM CMI Solver and ClimateNA Version 6.11 data. Other versions of ClimateNA may not be used to calculate CMI.** Please see the “MGM CMI Solver” section on the [MGM Download](#) page to get the MGM CMI Solver, ClimateNA Version 6.11, and instructions to calculate CMI.

- y. Stand\_ID1 – The name of the desired “MGM Stand Worksheet”.
  - z. Stand\_ID1\_WT – The relative weight of each plot. Stand\_ID\_WT is always "1", except for multistrata projections.
  - aa. Stand\_ID1\_TreeSource – The name of the desired “MGM Stand Worksheet”. Stand\_ID\_TreeSource and Stand\_ID usually have the same name.
  - bb. StandParsListSILV1 – String to initialize MGM’s Tree List Generator. StandParsListSILV1 must match the StandParsListSILV format created by MGM’s Tree List Generator dialog (e.g. StandParsListSILV := [AW\_NaturalAllTrees 1A 21.7 None None Aw 7281 12 4.3 1.7 7.7 2.9 1.7]) for an aspen cohort).
  - cc. StandParsListSILV2 – Reserved column for a second Tree List Generator Event. Currently unused.
  - dd. Grow\_Schedule1 – Grow\_Schedule1 defines the length of each MGM projection and MGM’s conifer/deciduous yield intervals (e.g. 1-year, 5-year, or 10-year yields). Grow\_Schedule1 is a string with space-delimited growth intervals (e.g. “1 1 1 1” = 5-year projection with 1-year intervals; “5 5 5 5” = 25-year projection with 5-year output intervals; “10 10 10 10” = 50-year projection with 10-year intervals).
  - ee. Grow\_Schedule2 – Reserved column for a second Grow Event. Currently unused.
  - ff. UserEvent1, UserEvent2, UserEvent3, and UserEvent4 – Reserved columns for user-defined crop plan Events (e.g. thinning).
2. Reference\_Crop\_Plan – The “Reference Crop Plan” worksheet contains the "Reference Crop Plan". The “Reference Crop Plan” is the specific crop plan updated by the Batch Macro.
  3. Submitted\_Crop\_Plans – The “Submitted Crop Plans” worksheet contains a list of all the crop plans submitted to MGM. The “Submitted Crop Plans” worksheet may be opened in the “MGM Crop Plans Worksheet” to debug individual crop plans outside the Batch Macro.
  4. Out\_Stand\_Summaries – The “Out Stand Summaries” worksheet contains the "stand summaries" for all the crop plans submitted to MGM. “Output Stand Summaries” are created by including one or more Record Event(s) in the “Reference Crop Plan”.
  5. Out\_Trees – The “Out Trees” worksheet contains output treelists for all the crop plans that were submitted to MGM. Output treelists are created by including one or more Record Event(s) in the “Reference Crop Plan”.
  6. Out\_Yields – The “Out Yields” worksheet contains the conifer/deciduous yields for all the crop plans submitted to MGM. The number of conifer/deciduous yields depends on the Grow\_Schedule length and Grow\_Schedule interval(s).
  7. Error\_Log – The “Error Log” worksheet contains a record of any MGM errors that were encountered during the batch run. The “Error Log” worksheet also indicates the Batch Macro start/stop dates and the run time (e.g. Start: 06/17/2020 @ 10:47:21; Stop: 06/17/2020 @ 10:48:11; Run Time: 00:00:50 (mm/dd/yyyy; hh:mm:ss)).

Table 1. MGM Region and Subregion codes. Regions: AB = Alberta, BC = British Columbia, SK = Saskatchewan, and MB = Manitoba.

Region	Region Code	Subregion	Subregion Code
AB	1	Central Mixedwood	1
		Dry Mixedwood	2
		Northern Mixedwood	3
		Boreal Subarctic	4
		Peace-Athabasca Delta	5
		Boreal Highlands (Lower & Upper)	6
		Alpine	7
		Sub-Alpine	8
		Montane	9
		Upper Foothills	10
		Lower Foothills	11
		Athabasca Plain	12
		Kazan Upland	13
		Foothills Parkland	14
		Peace River Parkland	15
		Central Parkland	16
BC	2	Boreal White and Black Spruce	1
		Sub-Boreal Spruce	2
SK	3	Province-wide	1
MB	4	Province-wide	1

## Using the Batch Macro with a Simple Crop Plan and Treelist Data

To run the Batch Macro with a simple crop plan (i.e. Crop Plan Event, Options Event, Establish Event, Record Event, Grow Event, and End Event) and treelist data:

1. Create a “MGM Stands Workbook” that contains your data (e.g. My\_Agency\_MGM\_Stands.xlsx or My\_Agency\_MGM\_Stands.xlsm).
  - a. This “MGM Stands Workbook” may be created manually or with the “MGM Make Stands” workbook. Please see the “MGM Make Stands” section on the [MGM Download](#) page to get the “MGM Make Stands” workbook.
  - b. Every plot in your dataset must have a unique “MGM Stand Worksheet” in the “MGM Stands Workbook”.
2. Create a new “Batch Control List” that is tailored to your data.
  - a. This “Batch Control List” can be created manually or with plot summary information in Excel, R, SAS, etc.
  - b. Every plot in your dataset must have a unique row in the “Batch Control List” and a corresponding “MGM Stand Worksheet” in the “MGM Stands Workbook”.
  - c. Use the column order and formatting from the “Batch Control List” that is included with the Batch Macro.
  - d. Create CropPlanID’s that allow you to sort, filter, and analyze the MGM outputs. CropPlanID’s with a dash-delimited or underscore-delimited name are recommended (e.g. Plot-Stand-Stratum-Treatment-Utilization).
  - e. Select the desired MGM settings for each plot.
  - f. Information in the “StandsWbkName”, “Stand ID1”, and “Stand ID1 TreeSource” columns cannot be misspelled.
  - g. Numeric columns in the “Batch Control List” may not contain nonnumeric characters.
  - h. Creating the “Batch Control List” with plot summary information in an R or SAS program is recommended to ensure correspondence with the “MGM Stand Worksheets” in the “MGM Stands Workbook”.
3. Copy your new “Batch Control List” into the “Batch Control List” worksheet in the “Batch Macro Workbook”. Ensure that the columns in the new “Batch Control List” match the columns in the “Batch Control List” worksheet.
4. Save the “Batch Macro Workbook”.
5. Run the Batch Macro. The Batch Macro should run successfully.

## Using the Batch Macro with Complex Crop Plans

MGM crop plans can be of any length or complexity, depending on your specific modelling and data needs. This flexibility makes MGM a powerful tool to explore nuanced forest management scenarios. Given the large number of potential crop plans, the Batch Macro must be customized to run complex MGM crop plans with thinning events, regen events, or multiple establish events. MSLight / multistrata projections also require complex crop plans with special data requirements.

Customizing the Batch Macro requires familiarity with MGM crop plans, the MGM Graphical User Interface (GUI), and VBA programming. For users that are unfamiliar with MGM, MGM crop plans, or VBA programming, a consultation with the Developer is recommended before attempting to customize the Batch Macro.

To customize the Batch Macro:

1. Create a "MGM Stands Workbook" that contains your data (e.g. My\_Agency\_MGM\_Stands.xlsx or My\_Agency\_MGM\_Stands.xlsm).
  - a. This "MGM Stands Workbook" may be created manually or with the "MGM Make Stands" workbook. Please see the "MGM Make Stands" section on the [MGM Download](#) page to get the "MGM Make Stands" workbook.
  - b. When using treelist data, every plot in your dataset must have a unique "MGM Stand Worksheet" in the "MGM Stands Workbook".
2. Create a new "Reference Crop Plan" for one of your plots (or multistrata plot clusters) using the GUI in the "MGM Crop Plans Worksheet".
  - a. The Crop Plan Event must occupy Row 5 of the "MGM Crop Plans Worksheet", and the Options Event must occupy Row 6 of the "MGM Crop Plans Worksheet".
  - b. When using treelist data, this crop plan should reference the "MGM Stand Worksheets" in your "MGM Stands Workbook".
  - c. Adjust the crop plan Grow Schedule and Record Event(s) to output the desired yields, stand summaries, and/or tree data in the "MGM Records Worksheet".
  - d. Ensure that the new "Reference Crop Plan" runs successfully.
  - e. Save the new "Reference Crop Plan" to the "MGM Crop Plans Workbook".
3. Copy the new "Reference Crop Plan" into the Batch Macro's "Reference Crop Plan" worksheet.
  - a. Activate the "MGM Crop Plans Worksheet" that contains your new "Reference Crop Plan".
  - b. Copy the entire "MGM Crop Plans Worksheet". [On your keyboard, enter (Ctrl+A) once to highlight the new Reference Crop Plan. Enter (Ctrl+A) again to highlight the entire "MGM Crop Plans Worksheet". Then, enter (Ctrl+C) to copy the entire "MGM Crop Plans Worksheet".]
  - c. Activate the "Reference Crop Plan" worksheet in the "Batch Macro Workbook".
  - d. Select cell "A1", and enter (Ctrl+V) to paste the new "Reference Crop Plan" into the "Reference Crop Plan" worksheet.
  - e. Save the "Batch Macro Workbook".
4. Review the Batch Macro's code in the "Microsoft Visual Basic for Applications" window (Keyboard: Alt+F11 or select the Developer tab and click on the "Visual Basic" button). Each step in the Batch Macro is annotated for reference.
5. Modify the Batch Macro's code so that it updates the desired cell(s) in your complex "Reference\_Crop\_Plan". In some cases, it may be necessary to add new columns in the "Batch Control List" worksheet and create new variables in the Batch Macro's code. (The "UserEvent" columns in the "Batch Control List" worksheet are reserved for this purpose.)
6. Once you have modified the Batch Macro, "Step Into" (F8) the code and verify that the desired cell(s) in the new "Reference Crop Plan" are updated.
7. Save the "Batch Macro Workbook".
8. Create a new "Batch Control List" that is tailored to your data.
  - a. This "Batch Control List" can be created manually or with plot summary information in Excel, R, SAS, etc.
  - b. Every plot (or multistrata plot cluster) in your dataset must have a unique row in the "Batch Control List" and corresponding "MGM Stand Worksheets" in the "MGM Stands Workbook".
  - c. Use the column order and formatting from your updated "Batch Control List".
  - d. Create CropPlanID's that allow you to sort, filter, and analyze the MGM outputs. CropPlanID's with a dash-delimited or underscore-delimited name are recommended (e.g. Plot-Stand-Stratum-Treatment-Utilization).
  - e. Select the desired MGM settings for each plot (or multistrata plot cluster).
  - f. Information in the "StandsWbkName", "Stand ID1", and "Stand ID1 TreeSource" columns cannot be misspelled.

- g. Numeric columns in the "Batch Control List" may not contain nonnumeric characters.
- h. Creating the "Batch Control List" with plot summary information in an R or SAS program is recommended to ensure correspondence with the "MGM Stand Worksheets" in the "MGM Stands Workbook".
9. Copy your new "Batch Control List" into the "Batch Control List" worksheet in the "Batch Macro Workbook". Ensure that the columns in the new "Batch Control List" match the columns in the "Batch Control List" worksheet.
10. Save the "Batch Macro Workbook".
11. Run the Batch Macro. The Batch Macro should run successfully.

## Reviewing the Batch Macro

- The Batch Macro can be reviewed using Excel's "Microsoft Visual Basic for Applications" window. [To view the "Microsoft Visual Basic for Applications" window, open the Batch Macro. Then, on your keyboard, enter (Alt+F11) or select the Developer tab and click on the "Visual Basic" button.] Crop plan development and record extraction can be tracked by "Stepping Into" the batch macro (F8) and/or inserting "Toggle Breakpoints" (F9) into the batch macro's code. The progress of the batch macro can also be observed in the "Locals Window". (To view the "Locals Window", open the "Microsoft Visual Basic for Applications" window, and go to: "View" and "Locals Window".)
- If you have multiple screens, maximize the "Microsoft Visual Basic for Applications" window on your primary screen and the "Batch Macro Workbook" on your secondary screen. Then, it is possible to "Step Into" the code (F8) on your primary screen and watch the batch macro function on your secondary screen.
- When "Stepping Into" the code (F8), crop plan updates are highlighted in yellow, allowing you to verify crop plan development. Ignore any "Can't execute code in break mode" errors by clicking "OK". MGM only produces these errors when "Stepping Into" the code.