

DHM Grid Scalar Editor Program User Manual

Revision History

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1. INTRODUCTION

DHM Grid Scalar Editor (DHMGSE) is a graphical user interface (GUI) program used to transition distributed modeling in calibration/research (HL-RDHM) to operations (DHM). DHMGSE:

1. creates DHM model parameter grids by applying edits (multipliers or constants) to the apriori parameter grids
2. creates DHM model state grids by merging any new basins (with edits) to the existing set of operational state grids
3. creates monthly PET grids by multiplying the apriori monthly pet grids and apriori monthly pet adjustment grids (with edits)
4. saves the grids in #'s 1 – 3 into the directory structure needed to run DHM
5. ensures a valid Connectivity file is located in the directory needed to run DHM

The list of model parameter and state grids supported by DHMGSE reflects the current AWIPS version of DHM (as of OB8.2 SAC-SMA and Kinematic Routing). Lastly, using DHMGSE is a required step before using DHM in AWIPS. *In cases where no edits to apriori grids are needed, the user should specify a multiplier edit with value of '1'.

1.1. How to use the DHMGSE

DHMGSE is used to apply scalar edits determined during calibration to existing parameter, state, and pet grids. Because DHMGSE applies edits to the current basin and all upstream basins, the recommended approach is to apply edits by starting from the most downstream basin and continuing up towards the headwater basins. In some cases scalars will only be defined for a downstream basin, in other cases the individual headwaters may have been calibrated and have their own scalars.

For example, in the following scenario there are 2 basins to be modeled using DHM. BasinB is a nested basin (a sub-basin to BasinA). In Figure A, a value of 1 is only defined for the downstream basin (BasinB). In this case, the user would only process BasinB using DHMGSE. In Figure B, a constant scalar of 1 is defined for BasinB and scalar of '2' is defined for basin A, so the user would first process BasinB and then BasinA using DHMGSE.

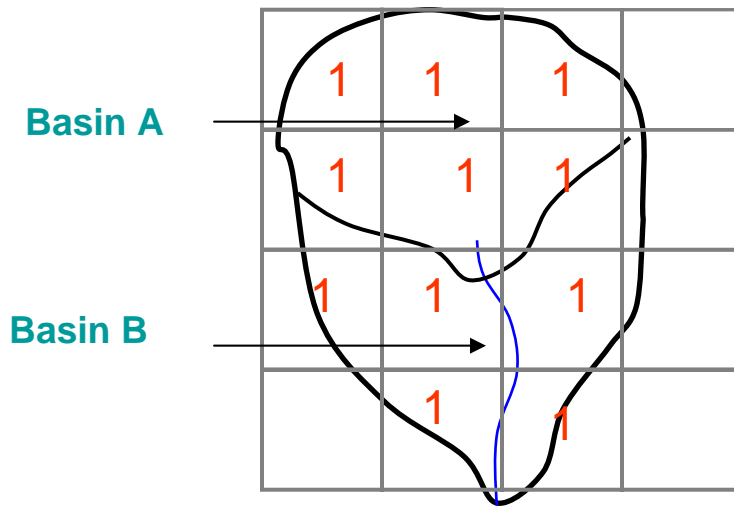


Figure A: Scalars only defined for basin B

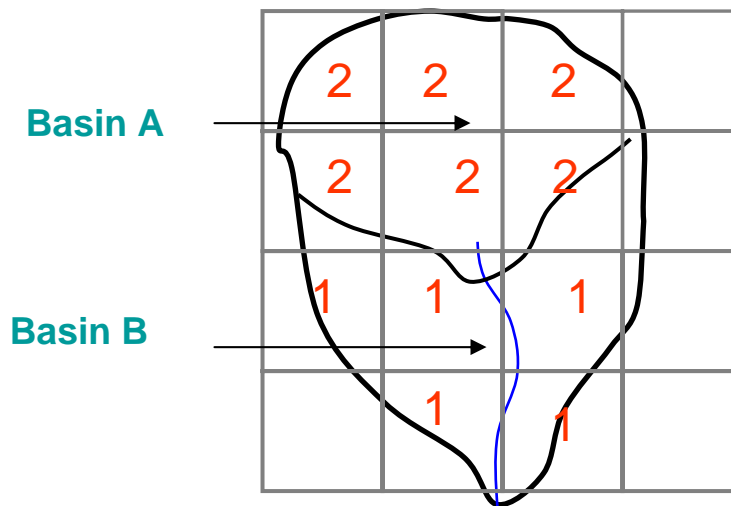


Figure B: Scalars defined for both Basins

2. SYSTEM LEVEL FEATURES

2.1. Apps_Defaults_tokens

DHMGSE uses the following Apps_defaults tokens:

Token Name	Description	Default Value
rdhm_input_data_dir	Root directory for grids and connectivity file used by RDHM	?
dhm_data_dir	Root directory used by AWIPS version of DHM to locate grids and connectivity file	\$(ofs_files)/\$(ofs_level)/dhmdata
geo_data	Directory used to read (along with ifp_rfc) the file with RFC bounding HRAP coordinates	\$(apps_dir)/geo_data
ifp_rfc	RFC name	

2.2. Scripts

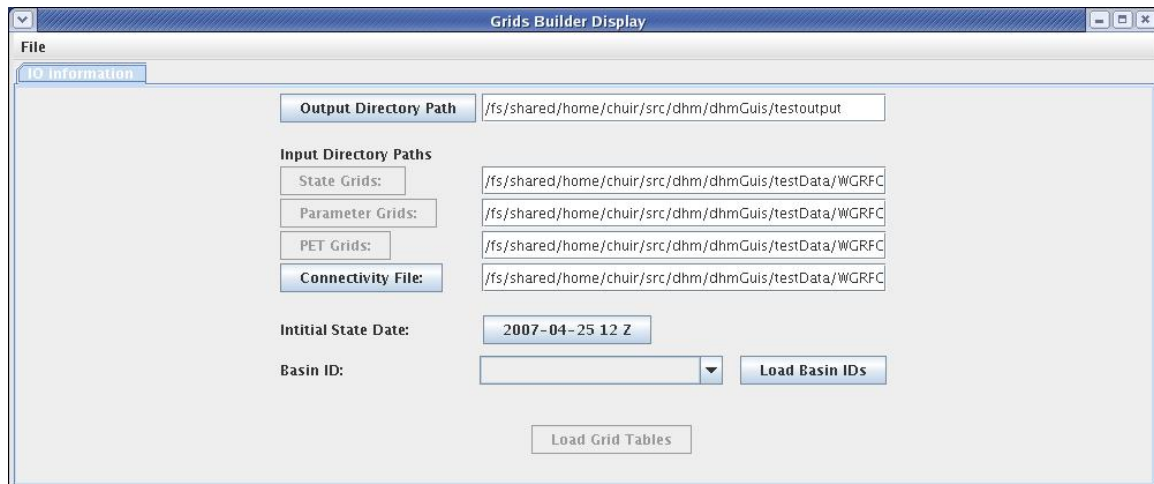
The DHMGSE GUI is started by running the script “run_dhm_grid_editor” located in the directory pointed to by the token ofs_scripts.

e.g. go ofs_scripts; run_dhm_grid_editor **

** If the directory pointed to by the token ofs_scripts is already part of the \$PATH, the run_dhm_grid_editor script can be started from any directory.

3. GETTING STARTED

After executing the script, the main “Grid Builder Display” shown below appears.



3.1. File Selection Menu:

Select RDHM Input File: Selects an existing RDHM input file. In most cases DHM users will have already defined basin-wide edits to apply to model parameter, state, and pet grids. This option allows the user to import those multipliers into DHMGSE.



Exit: Exits DHMGSE

3.2. Input and Output Directories Selection:

DHMGSE uses four input directories and one output directory. The input directories will contain the original (un-modified) grids used in calibration mode. The output directory will contain the grids after applying edits.

3.2.1. State Grids:

This button is used to select an input directory path for State Grid files. If creating State grids using the ‘multiplier’ option, this directory should contain state grids for the date specified by the “Initial State Date” button (e.g. sac_uztwc.mmddyyyyhhz).

3.2.2. Parameter Grids:

This button is used to select an input directory path for Parameter Grid files. If creating Parameter grids using the ‘multiplier’ option, this directory should contain the unmodified parameter grids (e.g. sac_LZTWM).

3.2.3. Pet Grids:

This button is used to select an input directory path for Pet Grid files. This directory should contain the apriori monthly pet and monthly pet adjustment grids (e.g. pe_JAN, peadj_JAN).

Figure 1 is an example of the dialog box used to select Input the directories (by default the directory is set to \$rdhm_input_data_dir). Selecting any of the Input directory buttons brings up the following dialog box. In this dialog:

OK: Selects the current directory.

Cancel: Exits the “Select a Path” dialog and closes the window.

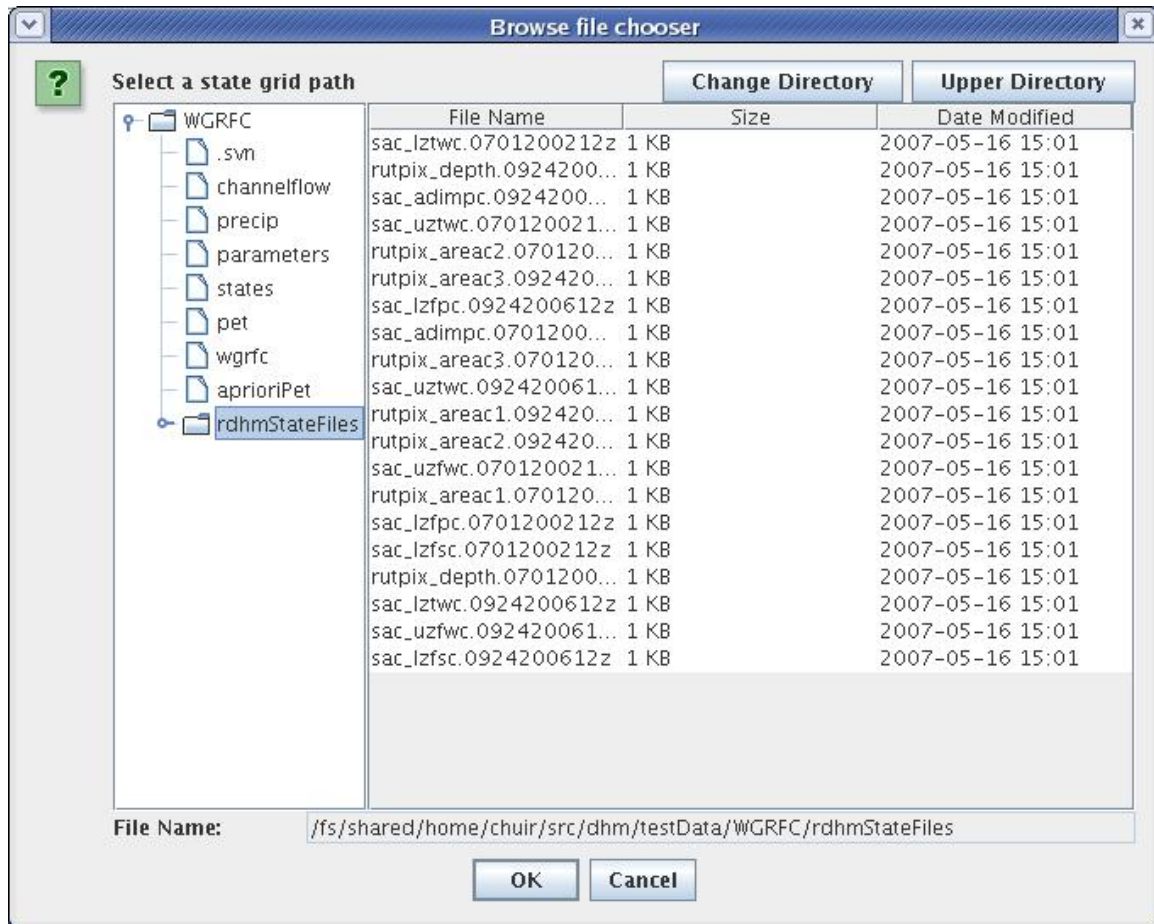


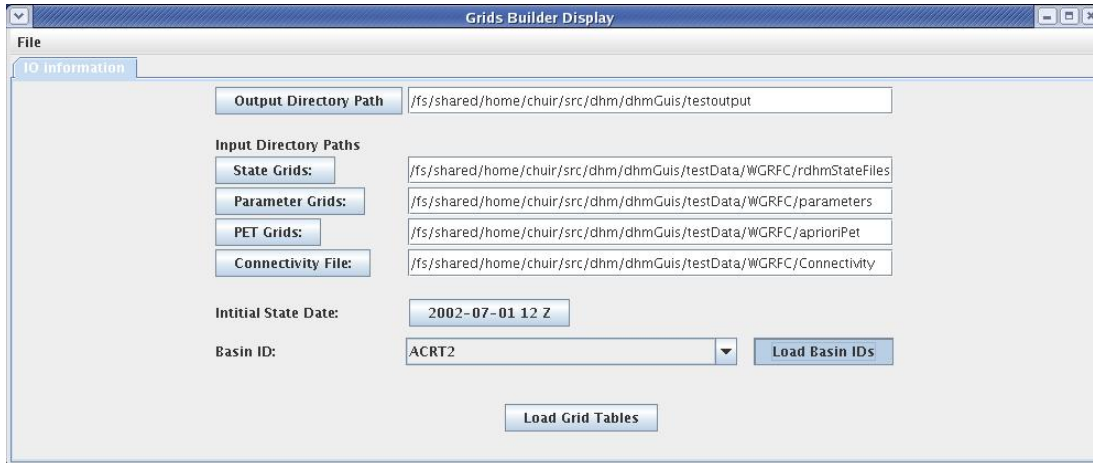
Figure 1

3.2.4. Output Directory Path:

This button allows users to select the directory where to write the output grids (by default the directory is set to \$dhm_data_dir).

3.2.5. Connectivity File:

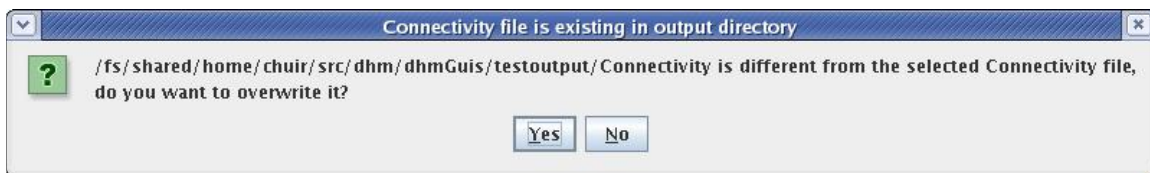
This button allows users to select the directory with an existing connectivity file, or if a file is selected the existing connectivity file. In cases where only the path is selected, a file named “Connectivity” must exist in the directory.



3.3. Existing Connectivity File in Output Directory

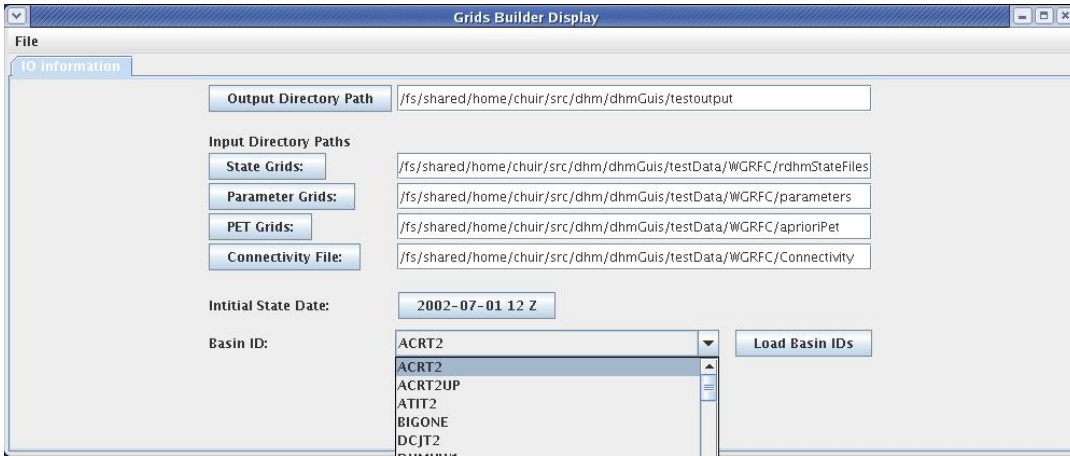
A file named “Connectivity” in the directory referenced by the token \$dhm_data_dir is required to run DHM. To ensure a Connectivity file exists, DHMGSE checks to see if a file named “Connectivity” exists in \$dhm_data_dir.

- If no file exists, the selected Connectivity file is copied to \$dhm_data_dir.
- If a Connectivity file already exists in \$dhm_data_dir, DHMGSE compares the contents of the Connectivity file in \$dhm_data_dir with user selected Connectivity file. If the contents of two files are different, then a dialog will popup to confirm whether the file in \$dhm_data_dir should be updated.

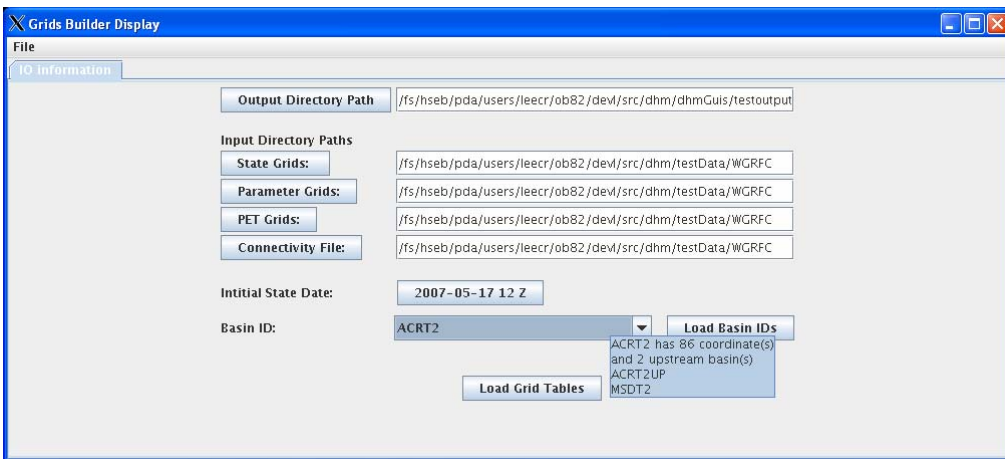


3.4. Basin ID Selection:

The list of basin ids in the scrollable button is populated after selecting “Load Basin IDs”. This list will reflect the basins identified in the Connectivity file. This scrollable button allows user to select a (one) basin ID for grid editing.



In addition to displaying the basins in the Connectivity file there is a tool-tip that will display how many pixels the basin is composed of (local area) and which basins, if any, are immediately upstream. This information shown in the display below is shown by placing the cursor over the selected basin.



3.5. State Date Time Selection:

3.5.1. Initial State Date: This button allows users to select the year, month and day, using the dialog in Figure 2, for the state files.

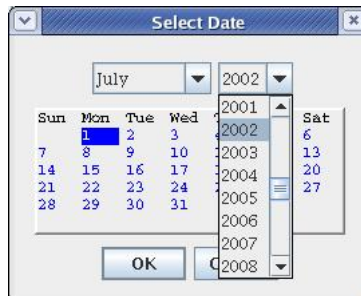


Figure 2: Date Selection Dialog Display

3.6. Load Grid Tables:

This button brings up the display shown in Figure 3. The display has three panes for editing Sac, Kinematic, and Pet grids using an operation and value.

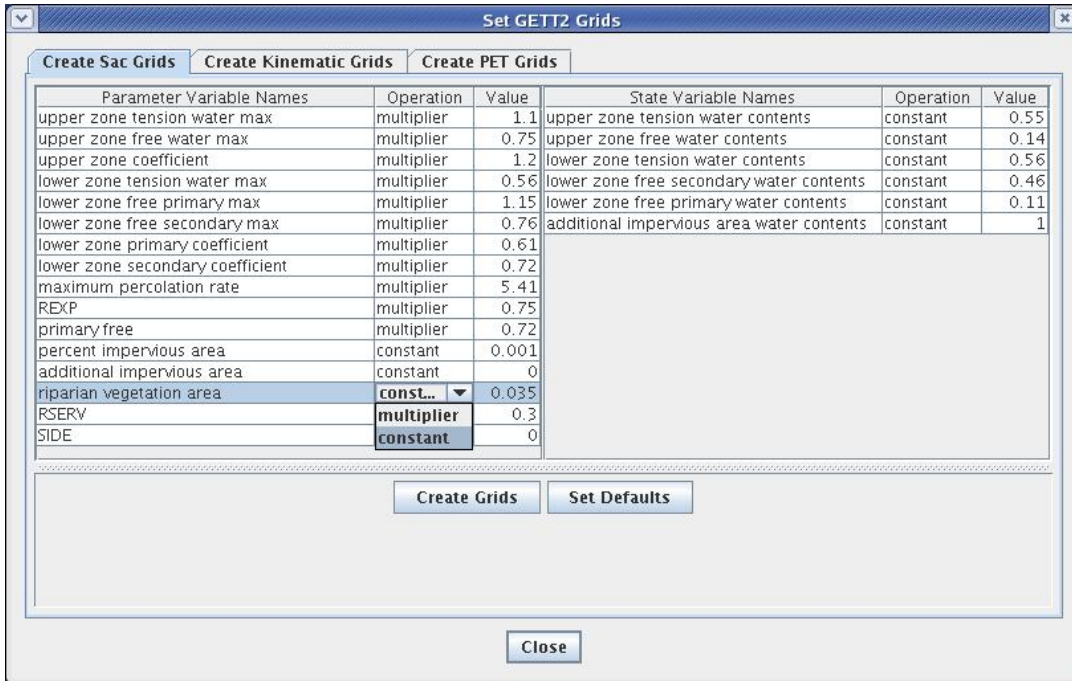


Figure 3 : Load Grid Tables Display

3.7. Create Sac Grids

This pane allows users to edit 16 SAC parameter and 6 SAC state grids for the SAC-SMA model. The default operation and value are multiplier and 1 respectively, which corresponds to no changes to the RDHM grids.

3.7.1. Sac States:

SAC states can be edit using multiplier, constant, or percent as the operation.

- Constant uses the given value for each grid cell in the basin
- Multiplier uses the grid in the Input State Grids directory with the same name and applies a constant multiplier with the given value to each grid cell in the basin.
- Percent uses the corresponding maximum parameter value to create a state grid where each grid cell in the basin is the given percentage of the maximum
 - UZTWC uses UZFWM
 - UZFWC uses UZTWM
 - LZTWC uses LZTWM
 - LZFPC uses LZFPM
 - LZFSC uses LZFSM
 - ADIMC uses (UZTWM + LZTWM)

In each case, the edits for the current basin are merged to existing grids in \$dhm_data_dir or added to new grids if grids do not exist.

3.7.2. Sac Parameters:

SAC parameters can be edit using multiplier and constant as the operation. The effects are the same as Sac State grids.

3.7.3. Create Grids:

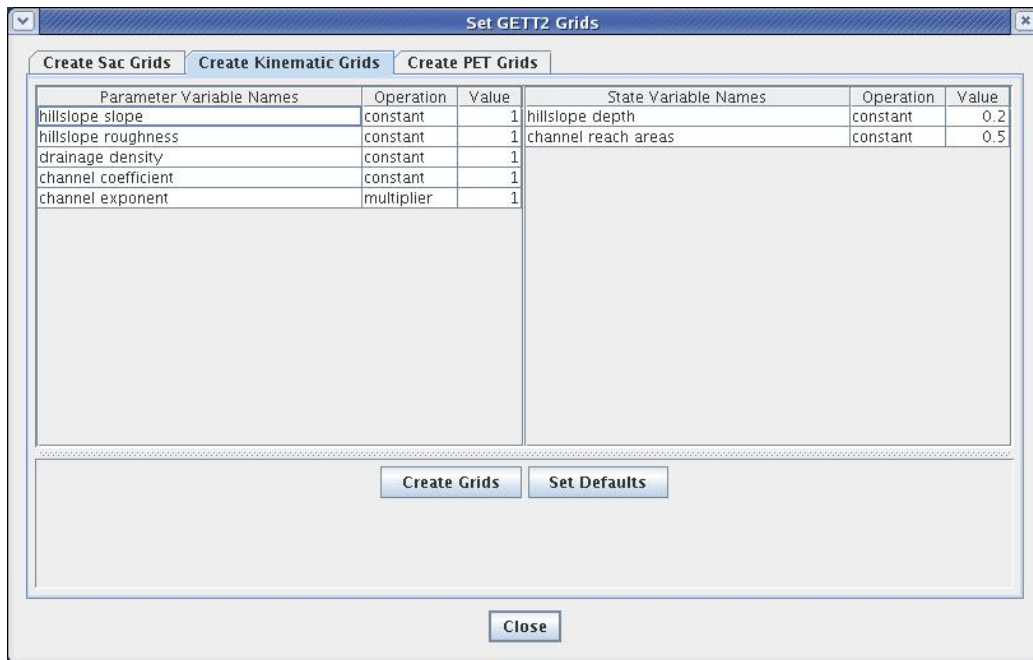
This button creates new SAC-SMA parameter and state grid files in the user selected Output Directory under the subdirectories parameters and states.

3.7.4. Set Defaults:

This button reverts all operations and values to “multiplier” and ‘1’ respectively

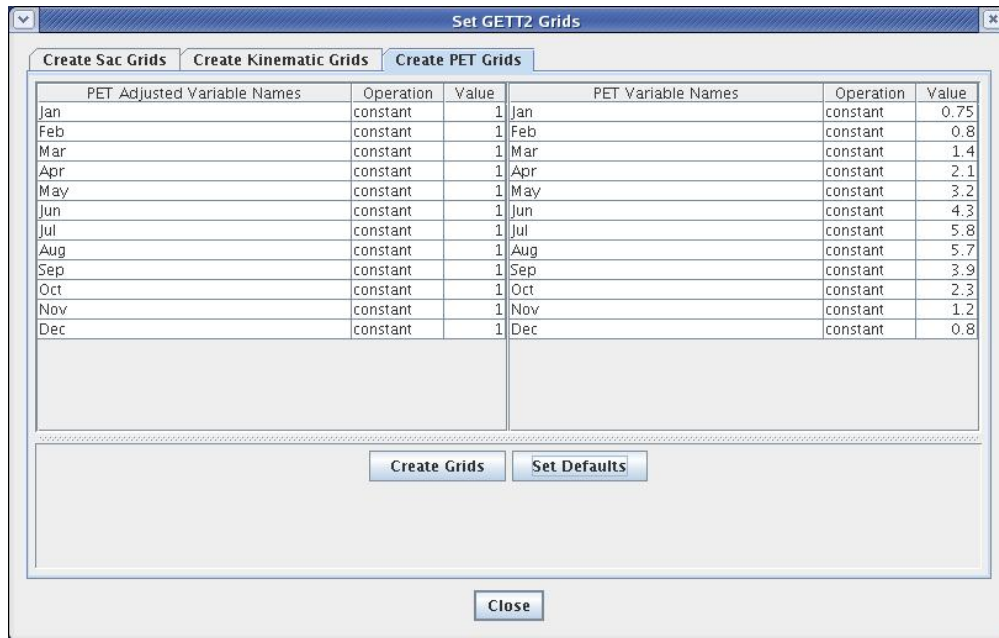
3.8. Create Kinematics Grids:

This pane is similar to the “Create Sac Grids” pane. It allows user to change Kinematic Routing Model grids. Selecting “Create Grids” creates parameter and state grid files in the user selected Output Directory under the subdirectories parameters and states. The edits for the current basin are merged to existing grids in \$dhm_data_dir or added to new grids if grids do not exist.



3.9. Create PET grids:

This pane allows users to modify a priori PET grid values in a similar way as SAC and Kinematics model grids. Valid operations are “multiplier” and “constant”. Selecting “Create Grids” takes the user requested adjustments to create a single monthly PET grid in the output directory under the subdirectory pet (a multiplication of the monthly PET Grid and Adjusted monthly PET Grid at each grid cell). The edits for the current basin are merged to existing grids in \$dhm_data_dir/pet or added to new grids if grids do not exist.



3.10. Close button:

Closes the current DHMGSE pane.