Step 1 of the Automatic Run tool is *Prepare Input Data*, which automatically downloads and prepares all the necessary data to run the Water Balance Tool. Changes to the host servers since the code was completed have affected this ability. The following are "manual" workarounds to accomplish the Step 1 tasks.

Digital Elevation Model

Step 1 will still download a 1/3 arc-second DEM (*.img format), but not process it.

- Following **Appendix D** of the *User Manual* will allow the user to access a (1/9 arc-second) DEM from The National Map (https://apps.nationalmap.gov/downloader/#/).
- Then follow these steps in **Appendix B**, for *Step 1 – DEM*:
  - Extract DEM and Reproject to Project Area shapefile's coordinate system
    - Water Balance Tool: Misc - Extract and Project Raster by Mask
    - Final processed DEM named "dem_ex.tif."
  - Create a constant grid ("grid.tif") to use in subsequent steps (Multiply DEM by 0, add 1, convert to integer)
    - Spatial Analyst Tools – Map Algebra – Raster Calculator: Int(DEM * 0 + 1)

Soil AWC

- Follow the guidelines in **Appendix E** for downloading soil available water capacity from Web Soil Survey (https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx).
  - Recommendations:
    - Use your Study Area's shapefile to define your Area of Interest (AOI) on WSS
    - After downloading, reproject the "soilmu_a" shapefile from GCS to the grid-based projection used for your DEM. This way, when you create a grid of AWC, it will already be in the necessary projection.
    - The easiest way to reproject the shapefile:
      - Insert a new Data Frame in ArcGIS
      - Add Data – your study area's shapefile. This assigns the Data Frame the projection of your study area (since it was the first file added).
      - Add soilmu_a.shp.
      - Right-click on its name in the Table of Contents, then select Data-Export Data.
      - For "use the same coordinate system as" select "the data frame." Name the new shapefile appropriately (e.g. "soil_polygons_utm").

- After the soil grid is created according to **Appendix E** guidelines, follow this step in **Appendix B**, for *Step 1 – Soil AWC*:
  - Snap Soils to grid (Using previously-created constant grid (grid.tif) as reference raster)
    - Water Balance Tool: Misc - Snap Raster
    - Final processed soil grid named "soils.tif."

PRISM Precipitation/Temperature

- Run this tool twice, once for "ppt" (precipitation), then again for "tmean" (temperature). (After creation of a "prism" folder, this download step is not necessary subsequent model runs (e.g., for different study areas)).
  - o Water Balance Tool: Data Fetching - Download: Monthly PRISM Data
- Run this tool twice, once for ppt and again for tmean:
  - o Water Balance Tool: Data Fetching - Process: Extract Prism Data by Mask
    - ▪ Select the "prism_raw_ppt" or "prism_raw_tmean" subfolder when specifying "prism download folder."

Solar Radiation

- Determine the centroid of your study area shapefile. (You will later download data for the closest NSRDB grid point to this centroid.) The steps below first reproject the study area shapefile to a geographic coordinate system, so the centroid will be reported in degrees of latitude and longitude.
  - o Insert a new Data Frame in ArcGIS.
  - o Right-click its name, select Properties, and in the Coordinate System tab select a GCS projection such as "GCS_WGS_1984." Hit OK.
  - o Add Data – your Study Area shapefile.
  - o Right-click on its name in the Table of Contents, then select Data-Export Data.
  - o For "use the same coordinate system as" select "the data frame." Name the new shapefile appropriately (e.g. "Study Area GCS").
  - o When the new shapefile is added to your Table of Contents, from the ArcGIS Toolbox select Data Management Tools – Features – Add XY Coordinates. This will add the latitude and longitude value to its attribute table.
- Access the NSRDB Data Viewer site (https://maps.nrel.gov/nsrdb-viewer).

  - o Click on the Zoom to Location icon
  - o Enter your study area's lat/lon values and "find location."
  - o Click on the Data Download tab, then select "NSRDB Data Download (Point)"
  - o Place the point in the center of your screen (that is, the location of your site's centroid).
  - o For PSM3 Data,
    - ▪ Select year(s)
    - ▪ Select attributes GHI, Temperature, Relative Humidity
    - ▪ For Download Options, only select "Convert UTC to Local Time." (Uncheck other two.)
  - o A download link is provided via email. Each year will be a separate csv file. These can be concatenated into one (stripping out the header information of subsequent years). Save the file as "nsrdb.csv" in your project folder. Recommended Row 1 Header order:

Temperature	Hour	Day	Month	Year	GHI	Minute	Relative Humidity

  - o (with data beginning in row 2.)

At this point, your input data are prepared, and you can continue with "Step 2" of the Automatic Run.