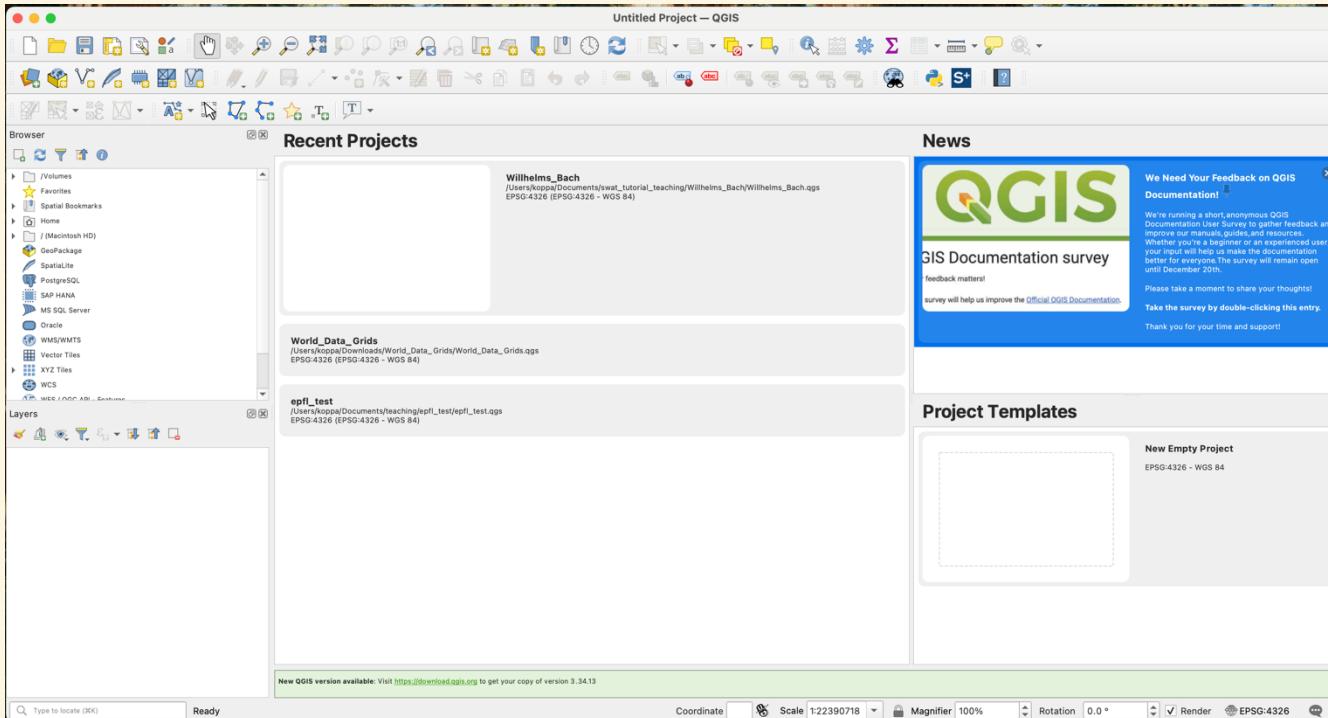




SWAT+ Model Setup Hydrology for Engineers

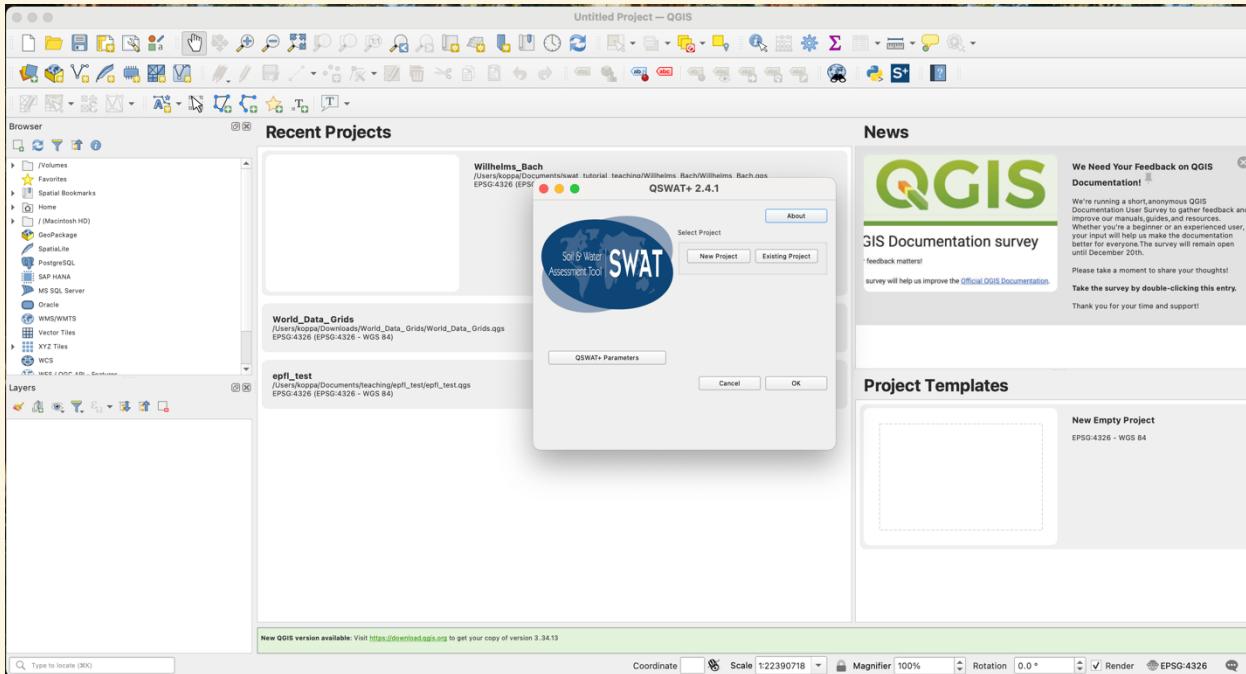
Prerequisites

Make sure QGIS is installed



Prerequisites

Make sure QSWAT+ and SWAT+ editors are installed

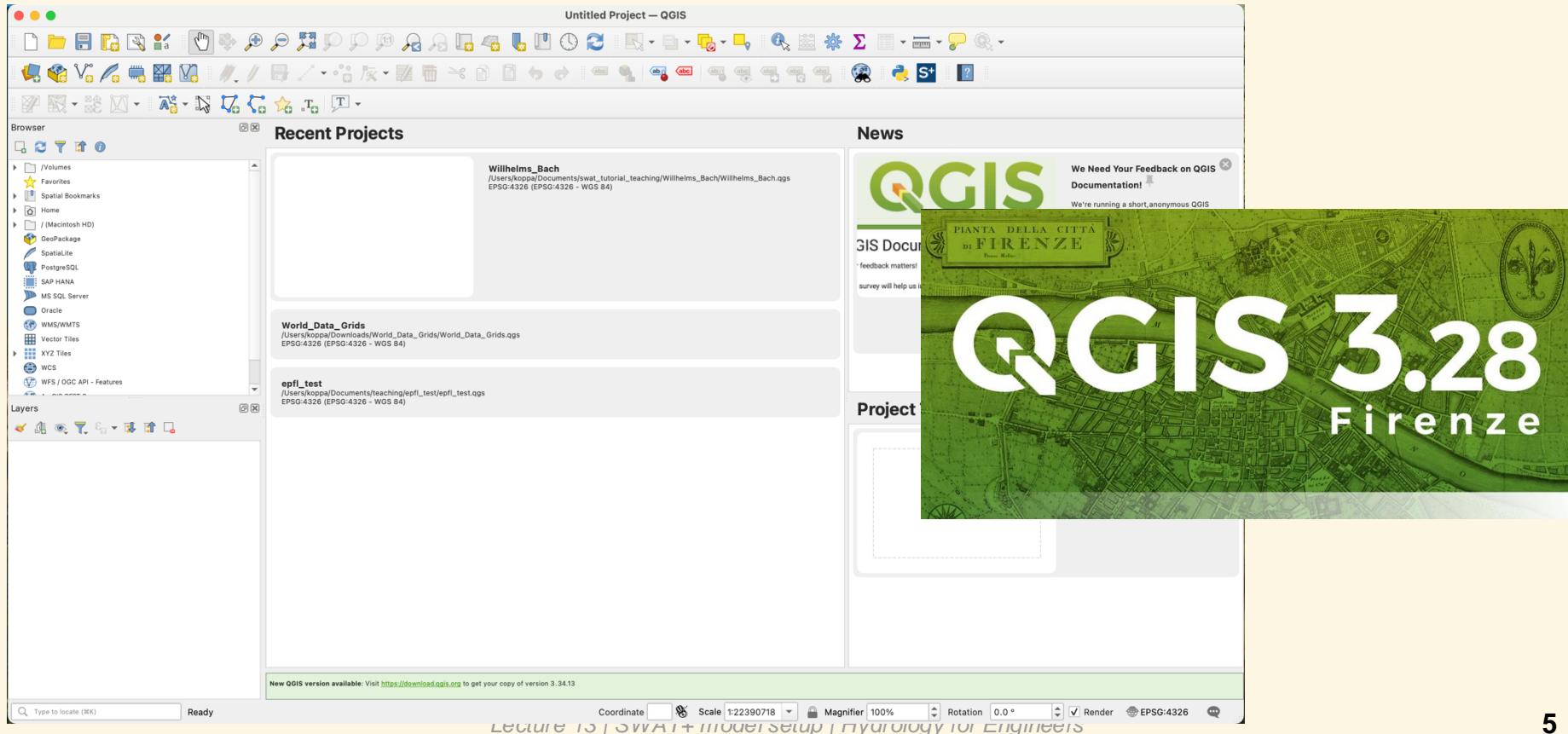


Download the input datasets

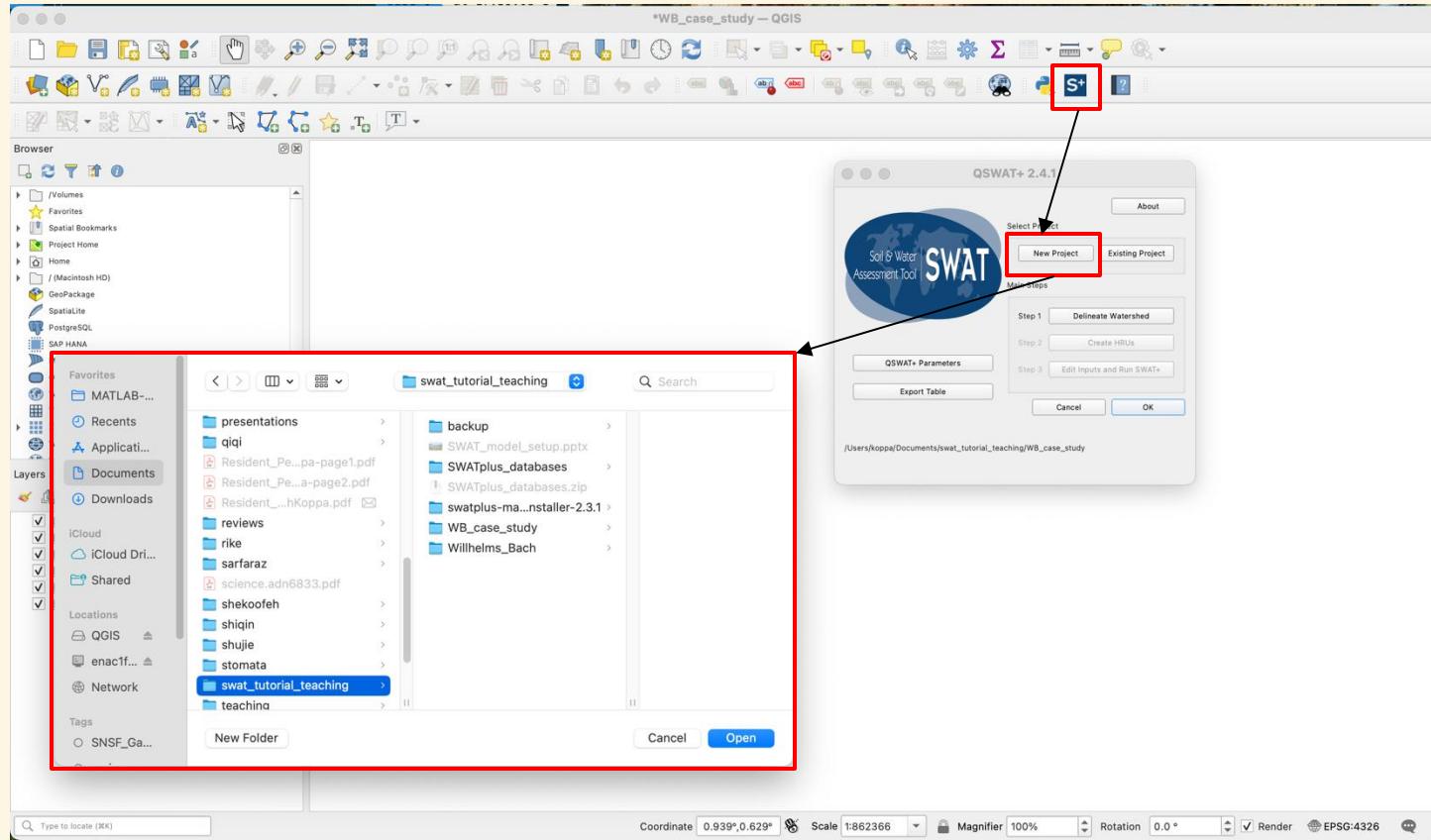
[Google drive download link](#)

| Name | Date Modified | Size | Kind |
|---|----------------------|-----------|-----------------|
| Climate | Today at 12:46 | -- | Folder |
| future | Today at 12:19 | -- | Folder |
| historical | Today at 12:46 | -- | Folder |
| swatplus_wgn.sqlite | 15 Jul 2022 at 13:21 | 350.5 MB | SQLite database |
| DEM | 15 Jul 2022 at 12:47 | -- | Folder |
| dgm_wb.tif | Today at 12:19 | -- | Folder |
| dgm_wb.tif.aux.xml | 13 Jul 2021 at 09:52 | 301 KB | TIFF image |
| Hillshade.tif | 22 Jul 2022 at 12:47 | 154 KB | XML |
| Landuse | 18 Jul 2022 at 13:06 | 76 KB | TIFF image |
| landuse_lookup.csv | Today at 12:19 | -- | Folder |
| landuse_wb.tifw | 11 Jul 2022 at 22:22 | 145 bytes | CSV Document |
| landuse_wb.tif | 9 Jul 2021 at 17:11 | 94 bytes | Document |
| landuse_wb.tif.aux.xml | 9 Jul 2021 at 17:11 | 134 KB | TIFF image |
| landuse_wb.tif.vrt | 20 Jul 2022 at 12:22 | 2 KB | XML |
| landuse_wb.tif.vat.cpp | 9 Jul 2021 at 17:11 | 33 KB | Document |
| landuse_wb.tif.vat.dbf | 9 Jul 2021 at 17:11 | 5 bytes | Document |
| plant.csv | 22 Mar 2022 at 13:46 | 392 bytes | Document |
| urban.csv | 11 Jul 2022 at 11:28 | 63 KB | CSV Document |
| Observations | Today at 12:48 | -- | Folder |
| Outflow_Ziegenhagen.txt | 29 Dec 2021 at 11:38 | 65 KB | Plain Text |
| Streamflow_Rautenbach.csv | 15 Nov 2022 at 17:27 | 2 KB | CSV Document |
| Streamflow_WilhelmshaeuserBach.csv | 15 Nov 2022 at 17:25 | 2 KB | CSV Document |
| Streamflow_Ziegenhagen_WilhelmshaeuserBach.xlsx | 29 Dec 2021 at 14:31 | 184 KB | Microsoft .xlsx |
| Shapesfiles | Today at 12:19 | -- | Folder |
| ezg_wb.cpp | 18 Jul 2022 at 13:06 | 5 bytes | Document |
| ezg_wb.dbf | 18 Jul 2022 at 13:06 | 581 bytes | Document |
| ezg_wb.prj | 18 Jul 2022 at 13:06 | 403 bytes | Document |
| ezg_wb.shp | 18 Jul 2022 at 13:06 | 188 bytes | Document |
| ezg_wb.shp | 18 Jul 2022 at 13:06 | 22 KB | ESRI Shapefile |
| WilhelmshaeuserBach.cpp | 18 Jul 2022 at 13:06 | 188 bytes | Document |
| WilhelmshaeuserBach.dbf | 18 Jul 2022 at 13:06 | 5 bytes | Document |
| WilhelmshaeuserBach.prj | 18 Jul 2022 at 13:06 | 3 KB | Document |
| WilhelmshaeuserBach.shp | 18 Jul 2022 at 13:06 | 403 bytes | Document |
| WilhelmshaeuserBach.shx | 18 Jul 2022 at 13:06 | 6 KB | ESRI Shapefile |
| Soil | 18 Jul 2022 at 13:06 | 188 bytes | Document |
| BUEK1000_Legende_lang.pdf | Today at 12:19 | -- | Folder |
| soil_lookup.csv | 9 Jul 2021 at 13:09 | 78 KB | PDF Document |
| soil_wb | 9 Jul 2021 at 16:21 | 146 bytes | CSV Document |
| soil_wb.aux.xml | Today at 12:19 | -- | Folder |
| soil_wb.tif | 11 Jul 2022 at 18:29 | 359 bytes | XML |
| soil_wb.tif.aux.xml | 9 Jul 2021 at 14:47 | 68 KB | TIFF image |
| usersoil_wb.csv | 22 Jul 2022 at 12:47 | 807 bytes | XML |
| | 11 Jul 2022 at 22:35 | 4 KB | CSV Document |

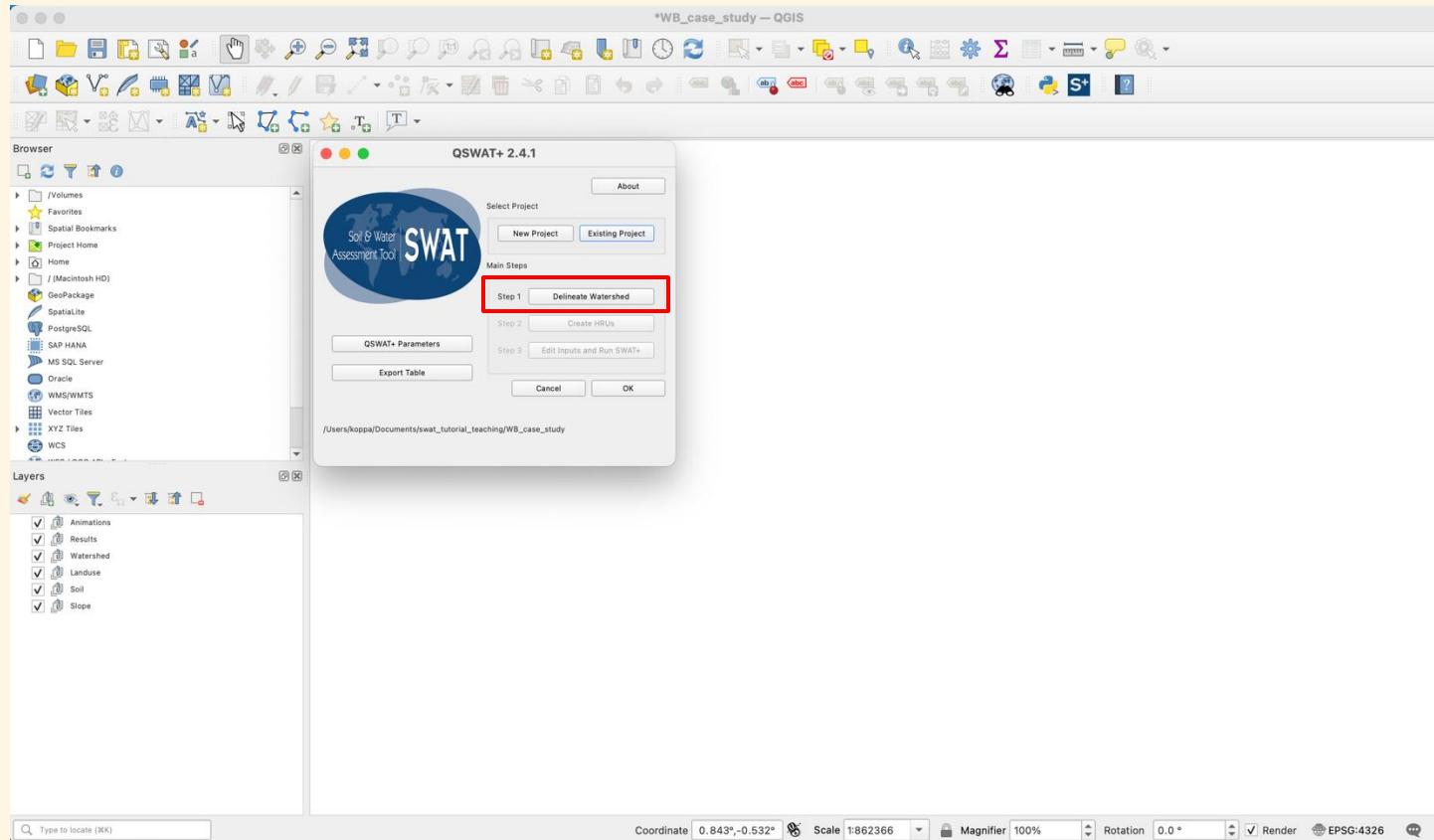
Start QGIS



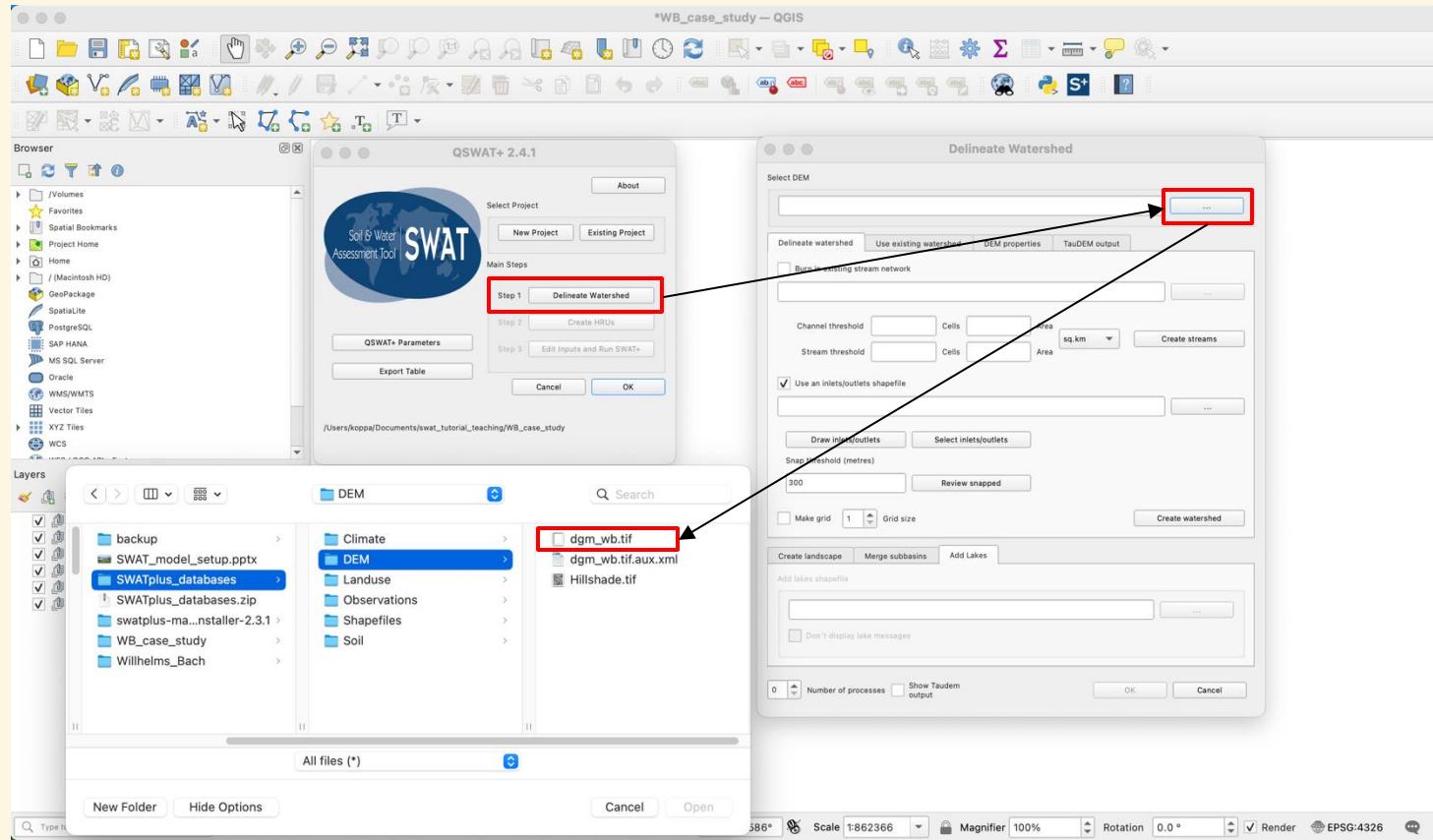
Start QGIS



Delineate Watershed

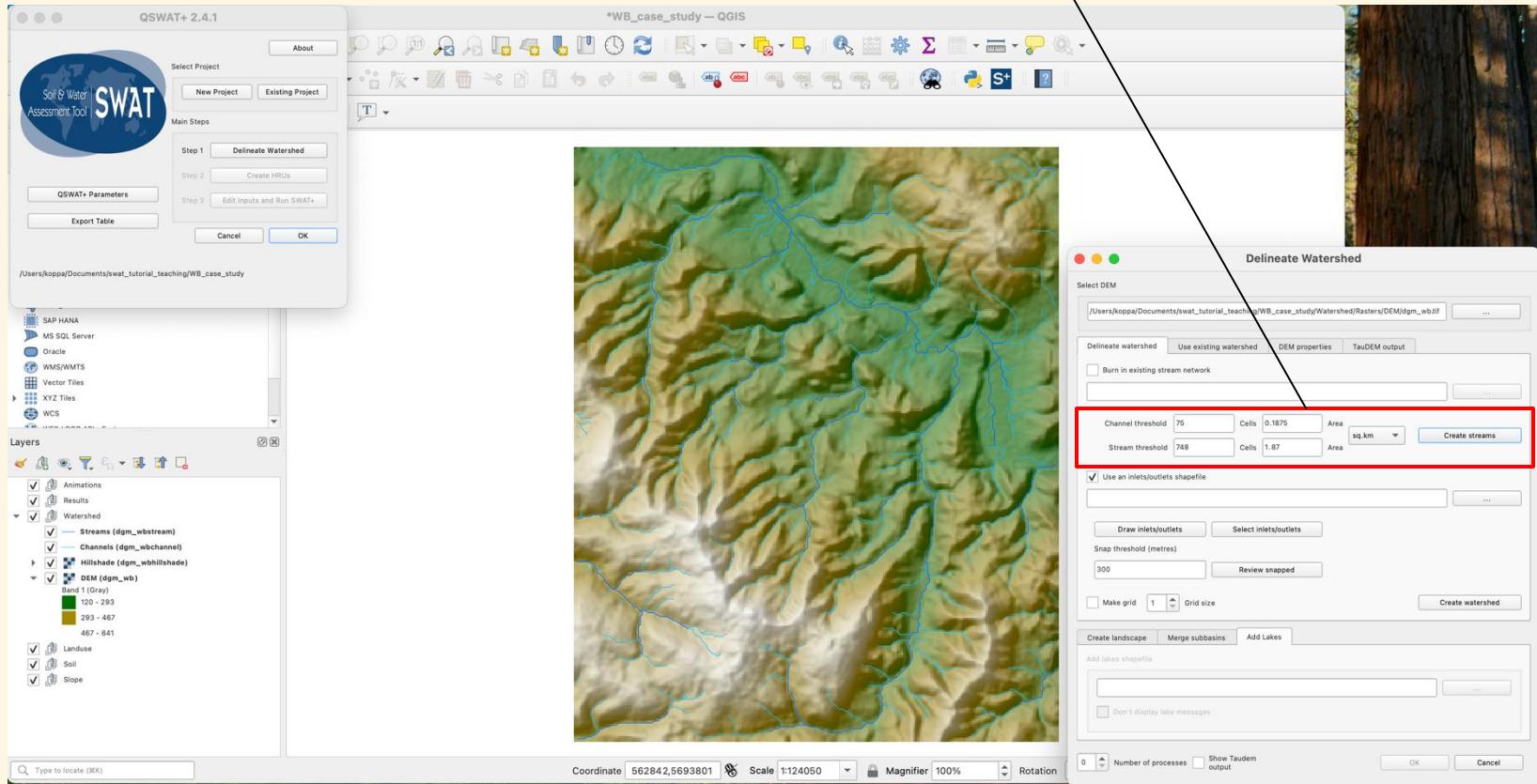


Load digital elevation model (DEM)



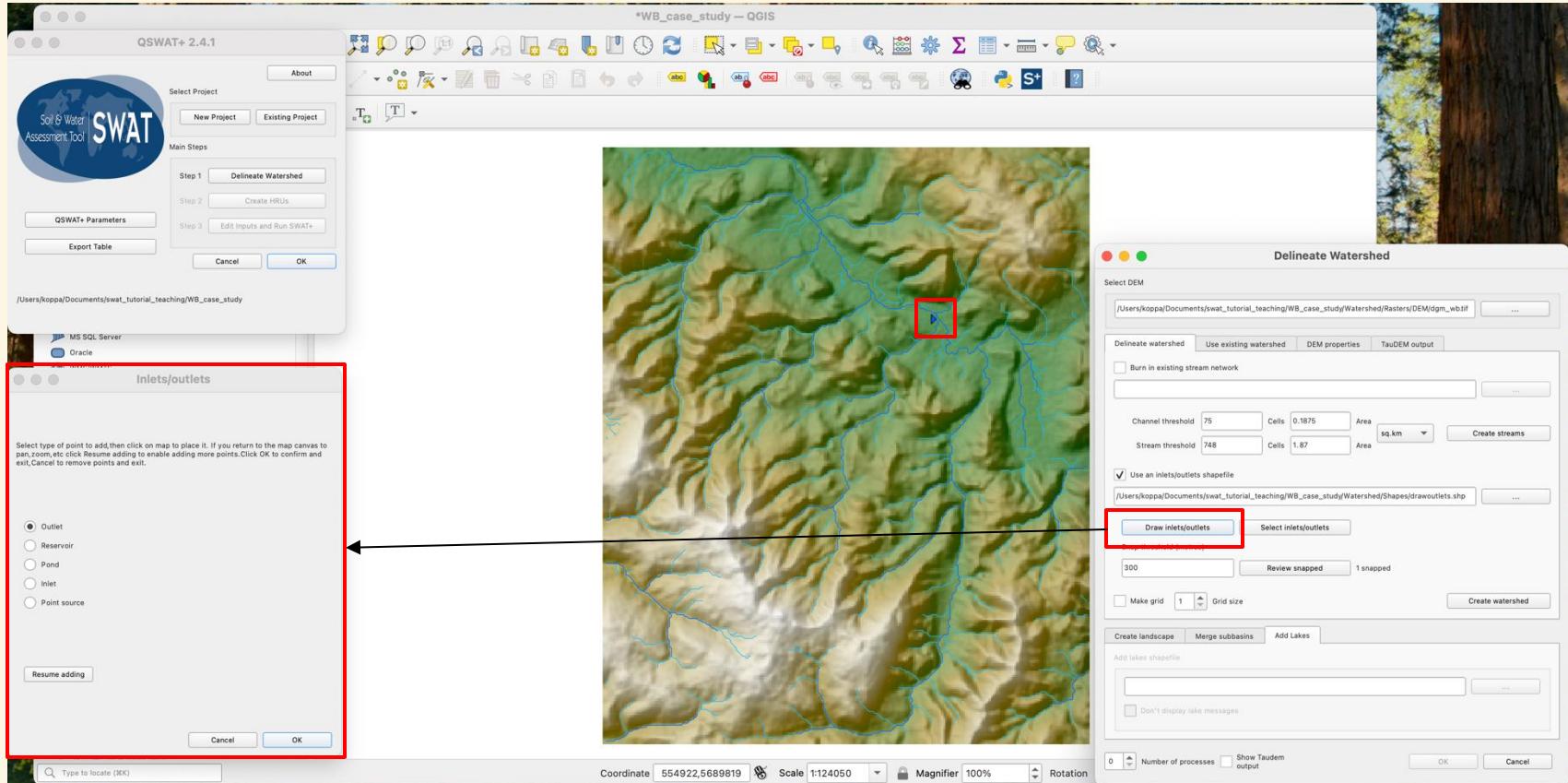
Create streams

What happens when these parameters are changed?

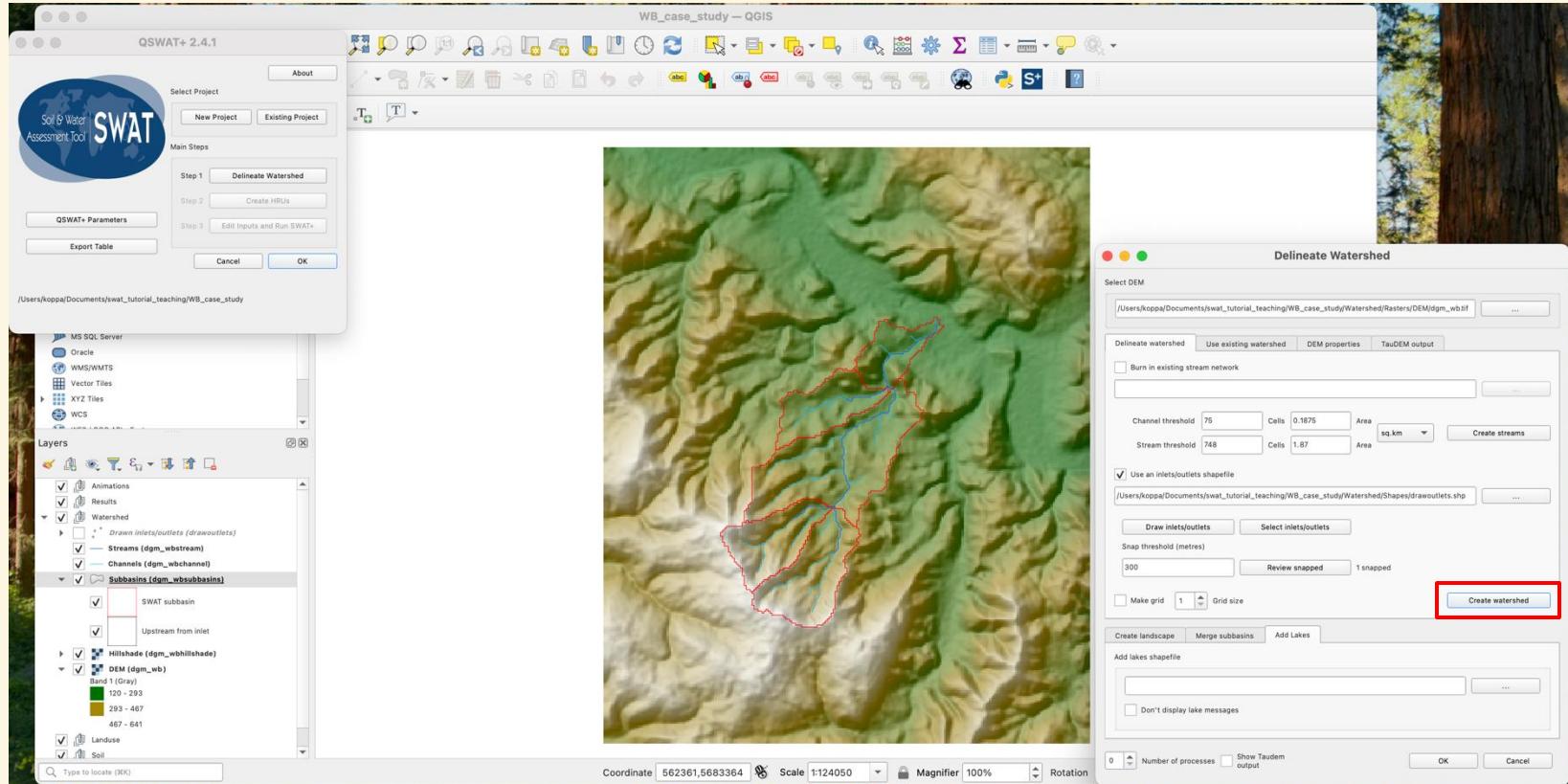


Create outlet

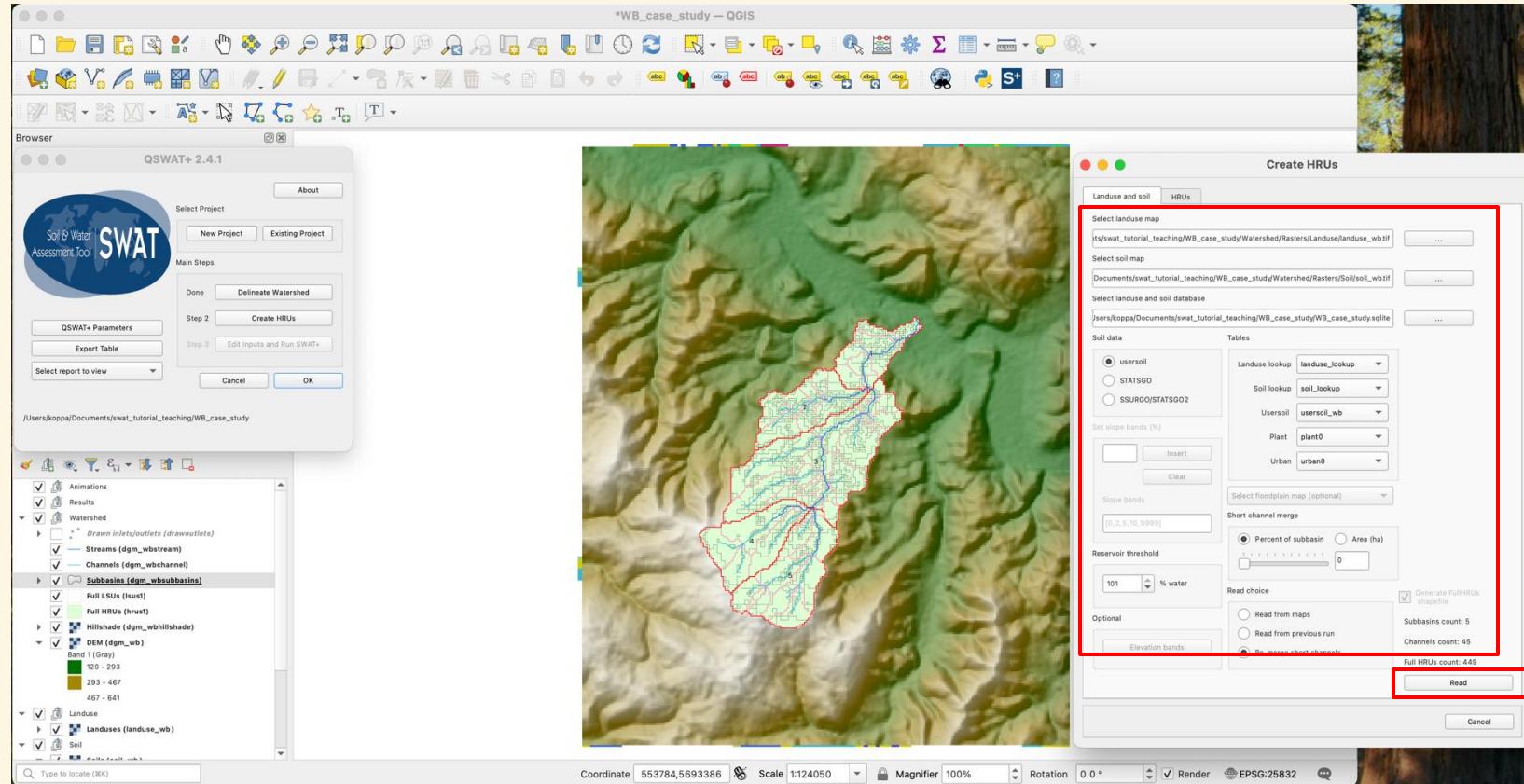
What is an outlet and why is it needed?



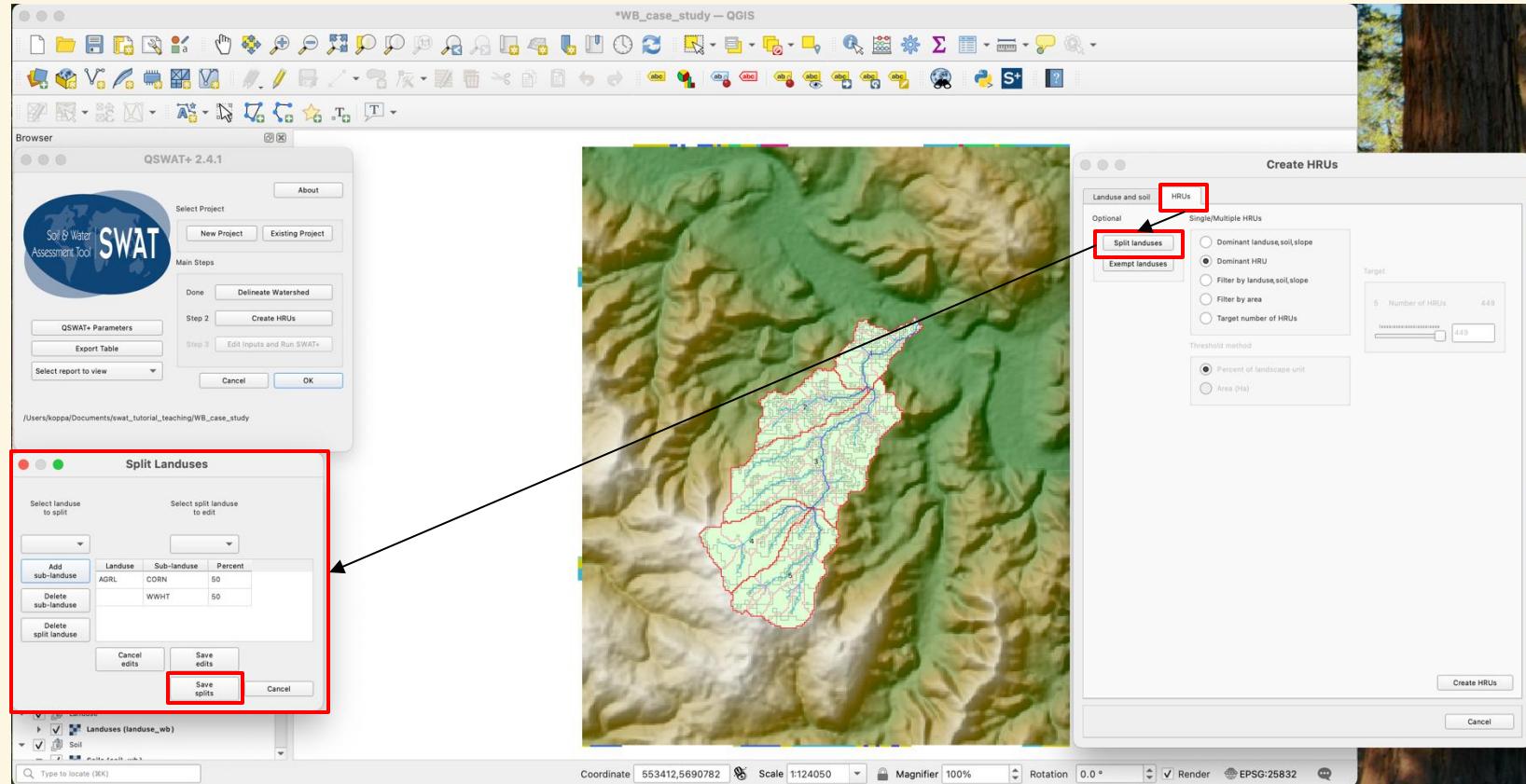
Create watershed



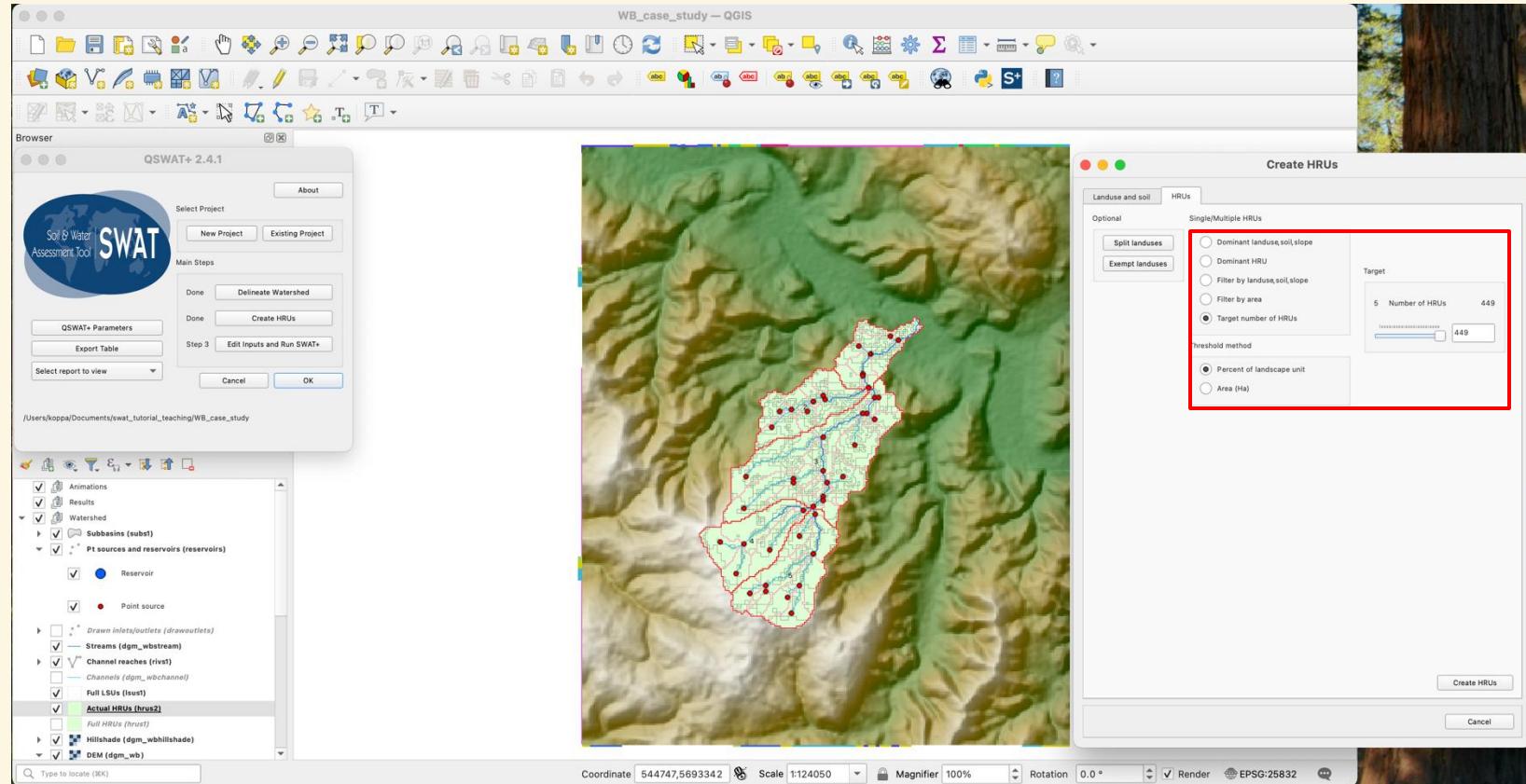
Create HRUs – Landuse and soil maps



Create HRUs

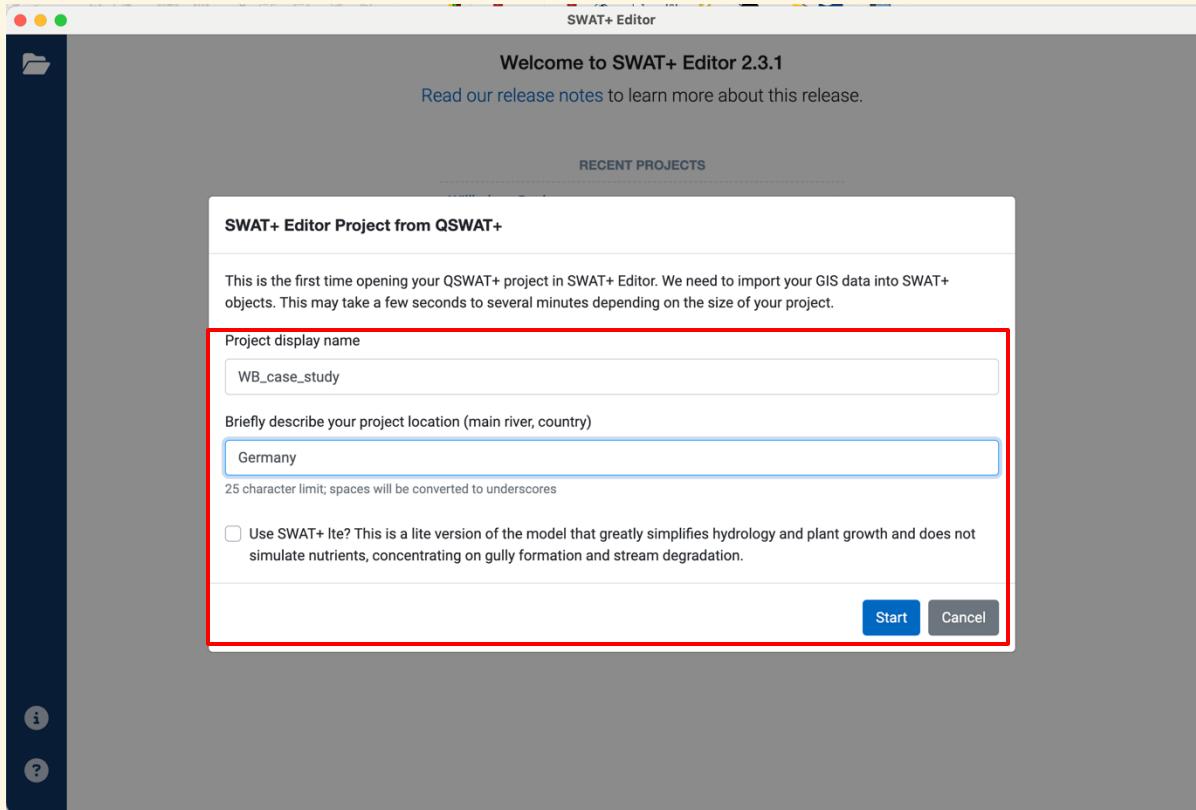


Create HRUs



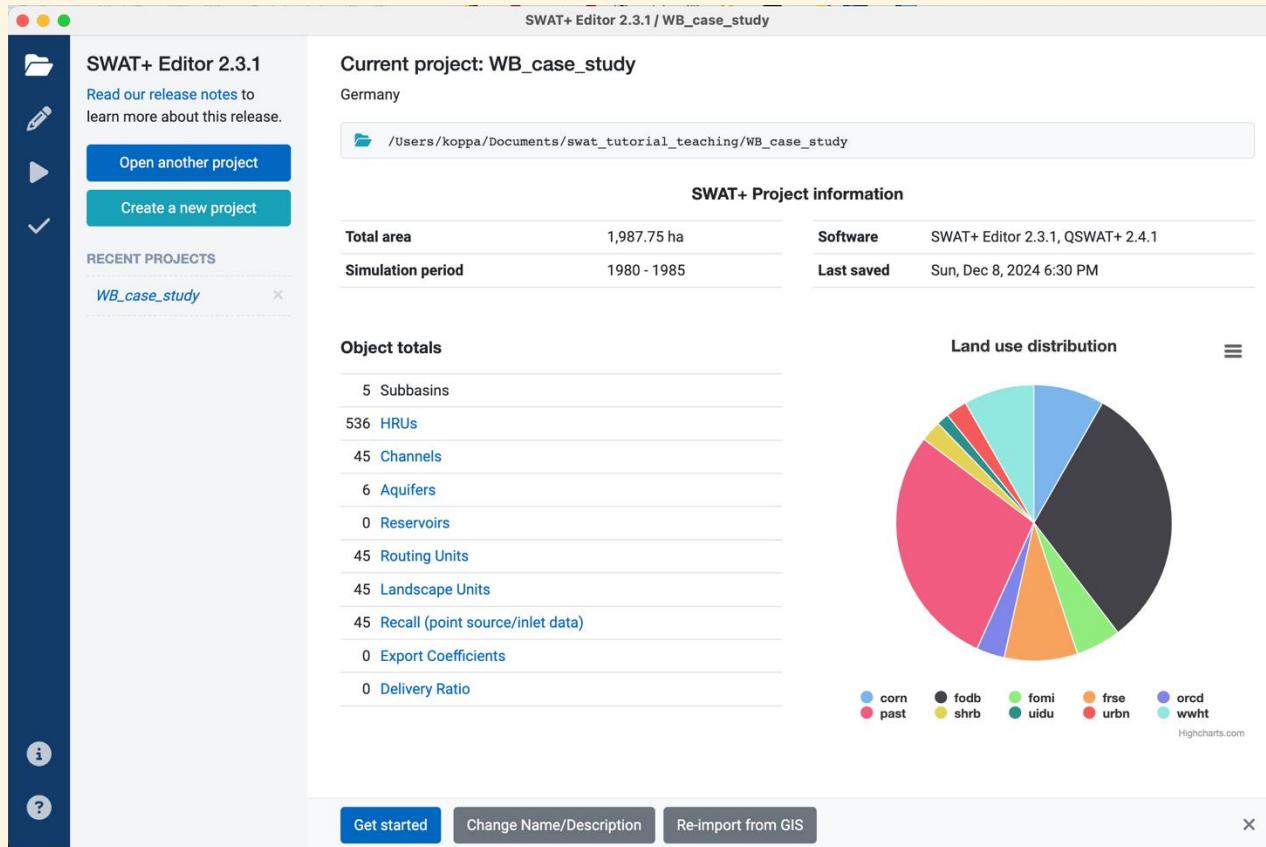
Open SWAT+ editor

Enter relevant details and start the editor

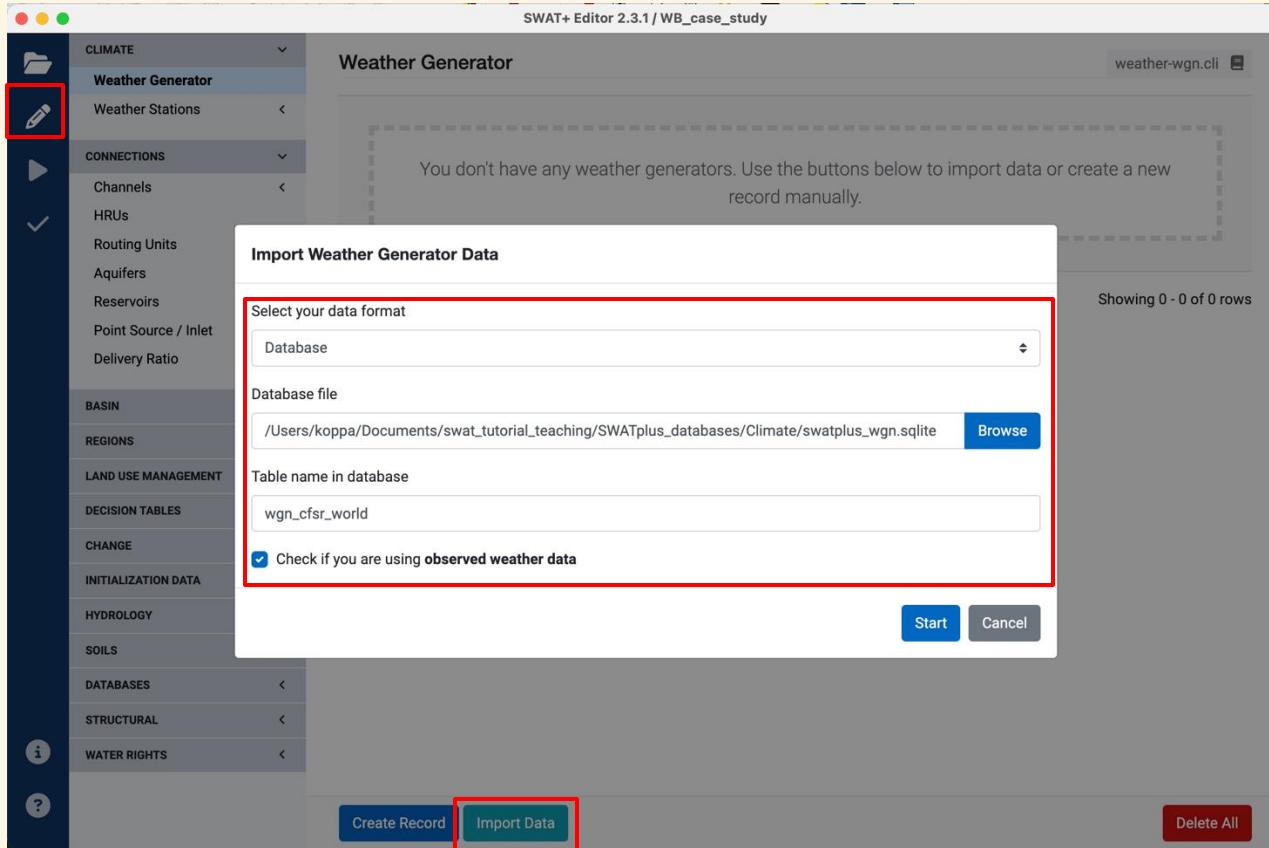


Open SWAT+ editor

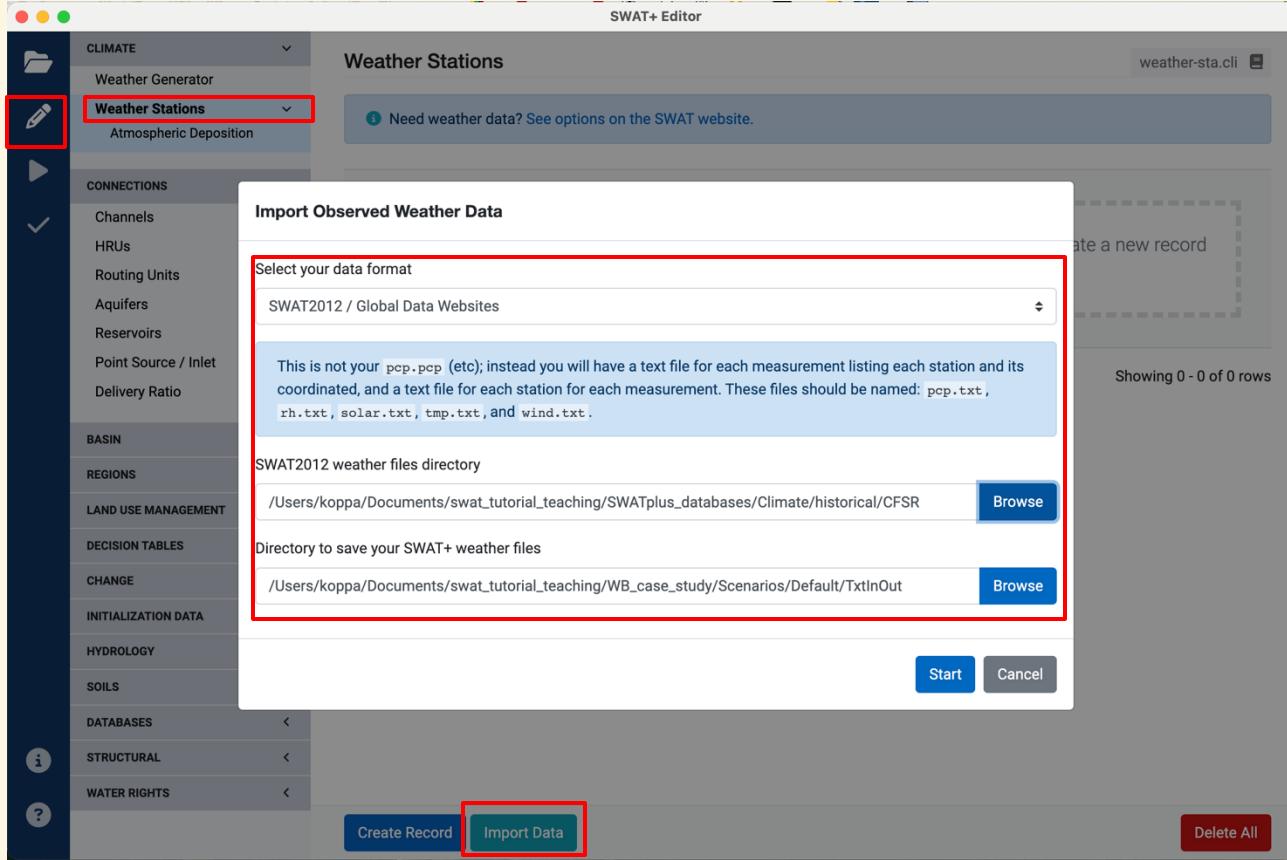
Explore the different watershed characteristics



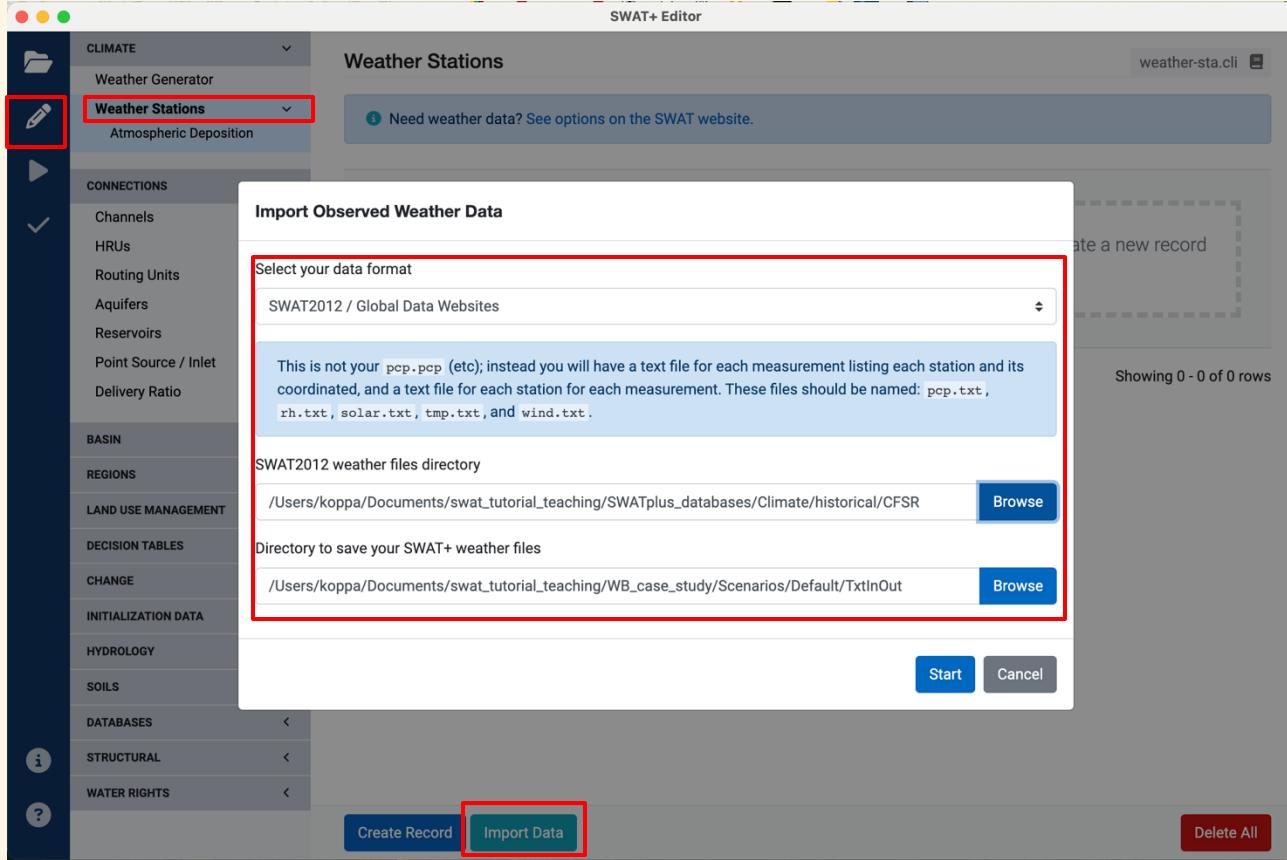
Load weather generator data



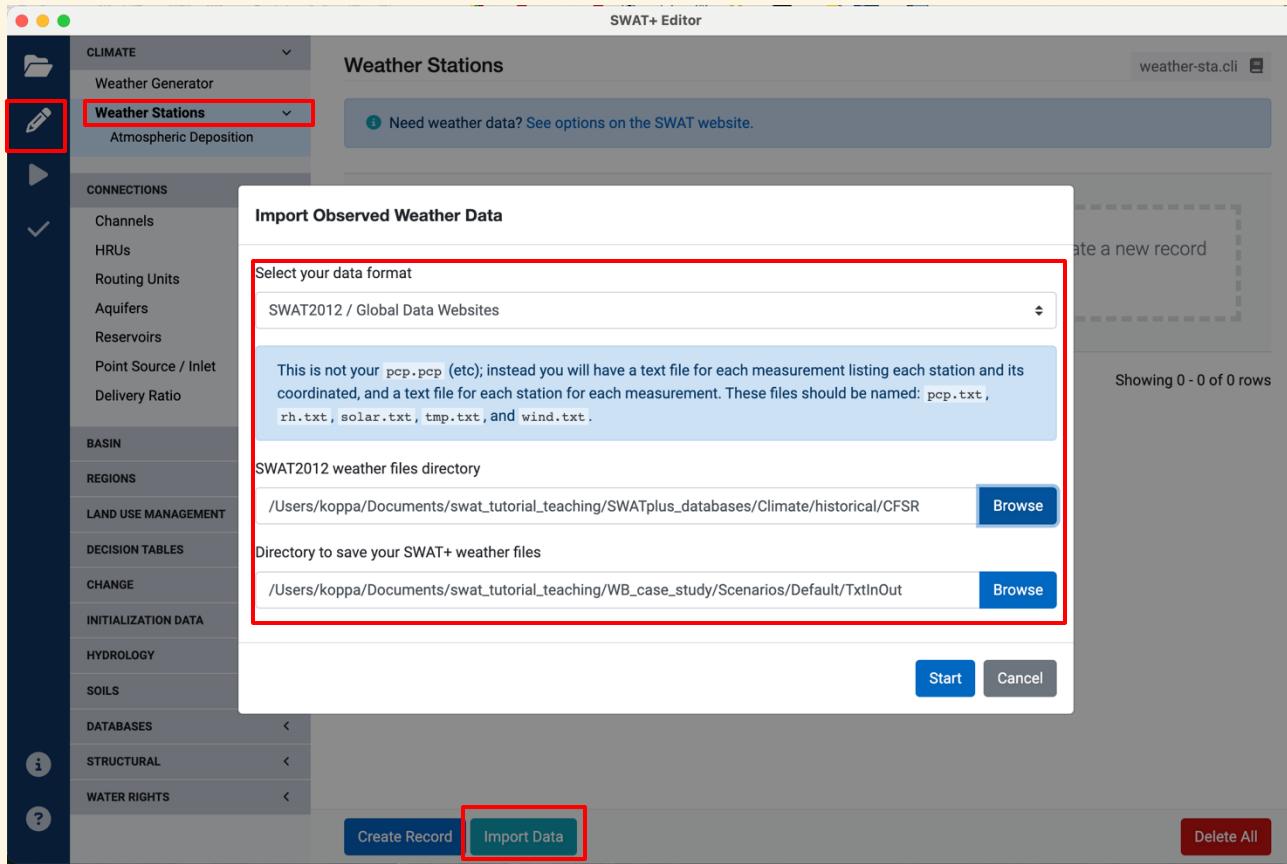
Load observed data



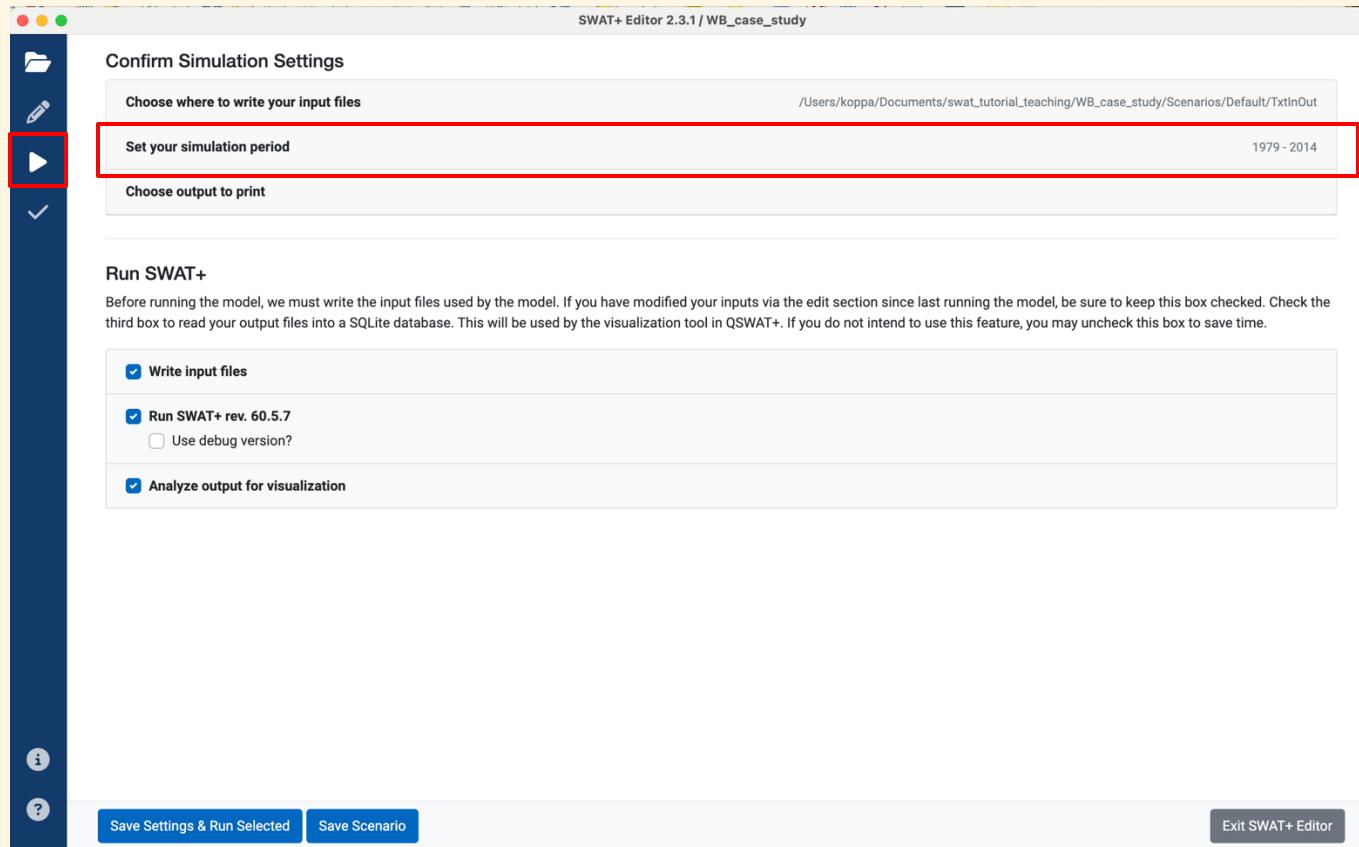
Load observed data



Run SWAT+

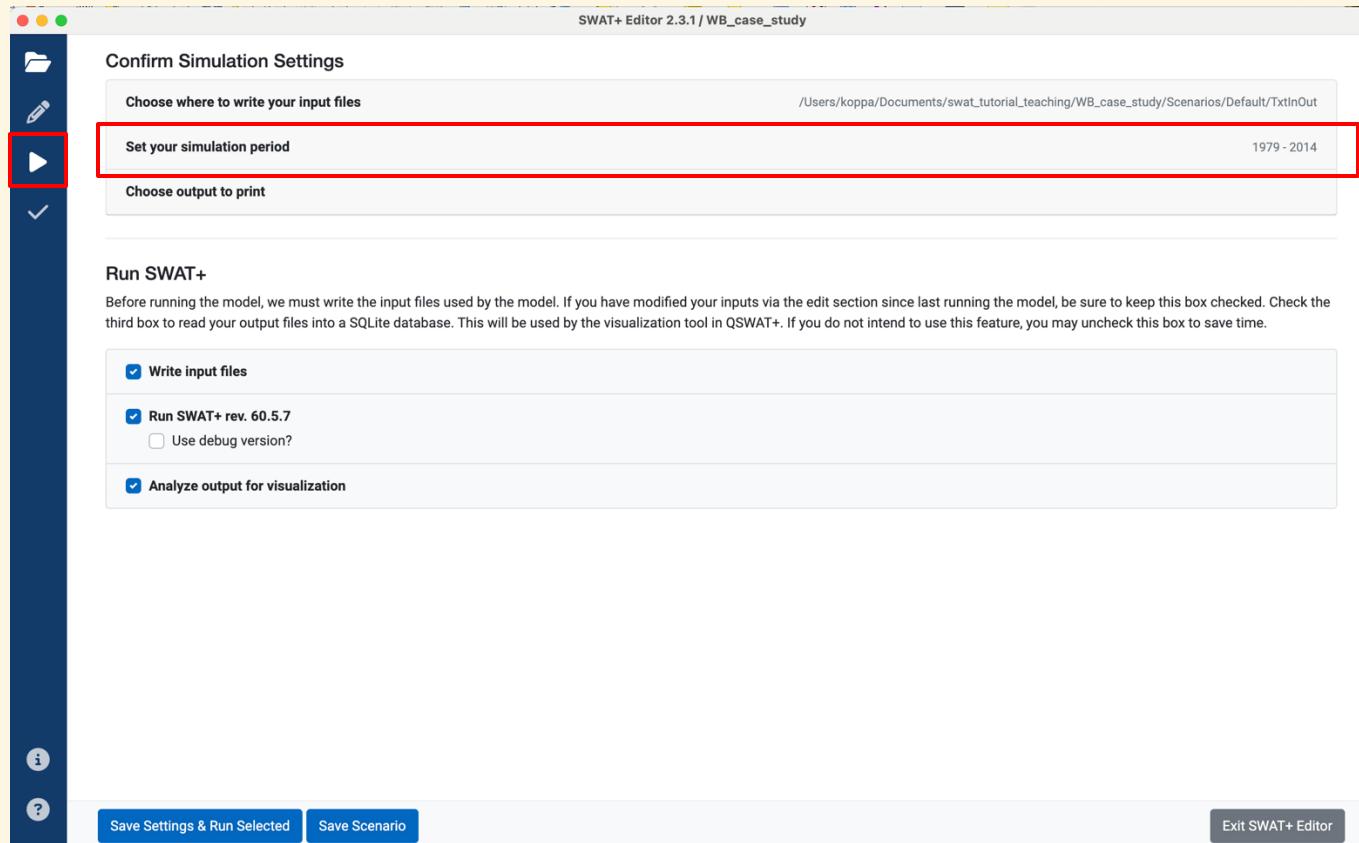


Run SWAT+: set simulation period



Run SWAT+: choose output to write out

Figure out how to set model time step to daily



Run SWAT+: choose output to write out

The screenshot shows the 'Output Selection' dialog box of the SWAT+ software. The interface includes a vertical toolbar on the left with icons for edit, play, checkmark, and info. The main area is a table with sections for different model components, each with checkboxes for daily, monthly, yearly, and average output, and a column for the corresponding output file name.

| Number of years to skip printing output | | | | | |
|---|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-----------------------------------|
| | Daily | Monthly | Yearly | Average | Outputs |
| Model Components | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Channel | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | channel_sd channel_sdmorph |
| Aquifer | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | aquifer |
| Reservoir | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | reservoir |
| Point Source (Recall) | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | recall |
| Routing Unit | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | ru |
| Hydrology | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | hyd |
| Water Allocation | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | water_allo |
| Basin Model Components | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | |
| Channel | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | basin_sd_cha basin_sd_chamorph |
| Aquifer | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | basin_aqu |
| Reservoir | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | basin_res |
| Point Source (Recall) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | basin_psc |
| Nutrient Balance | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | |
| Basin | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | basin_nb |
| Landscape Unit | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | lsunit_nb |
| HRU | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | hru_nb |
| Water Balance | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | |
| Basin | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | basin_wb |
| Landscape Unit | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | lsunit_wb |
| HRU | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | hru_wb |
| Plant Weather | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | |
| Basin | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | basin_pw |

Run SWAT+: choose output to write out and run the model

Run SWAT+

Before running the model, we must write the input files used by the model. If you have modified your inputs via the edit section since last running the model, be sure to keep this box checked. Check the third box to read your output files into a SQLite database. This will be used by the visualization tool in QSWAT+. If you do not intend to use this feature, you may uncheck this box to save time.

Write input files

Run SWAT+ rev. 60.5.7

Use debug version?

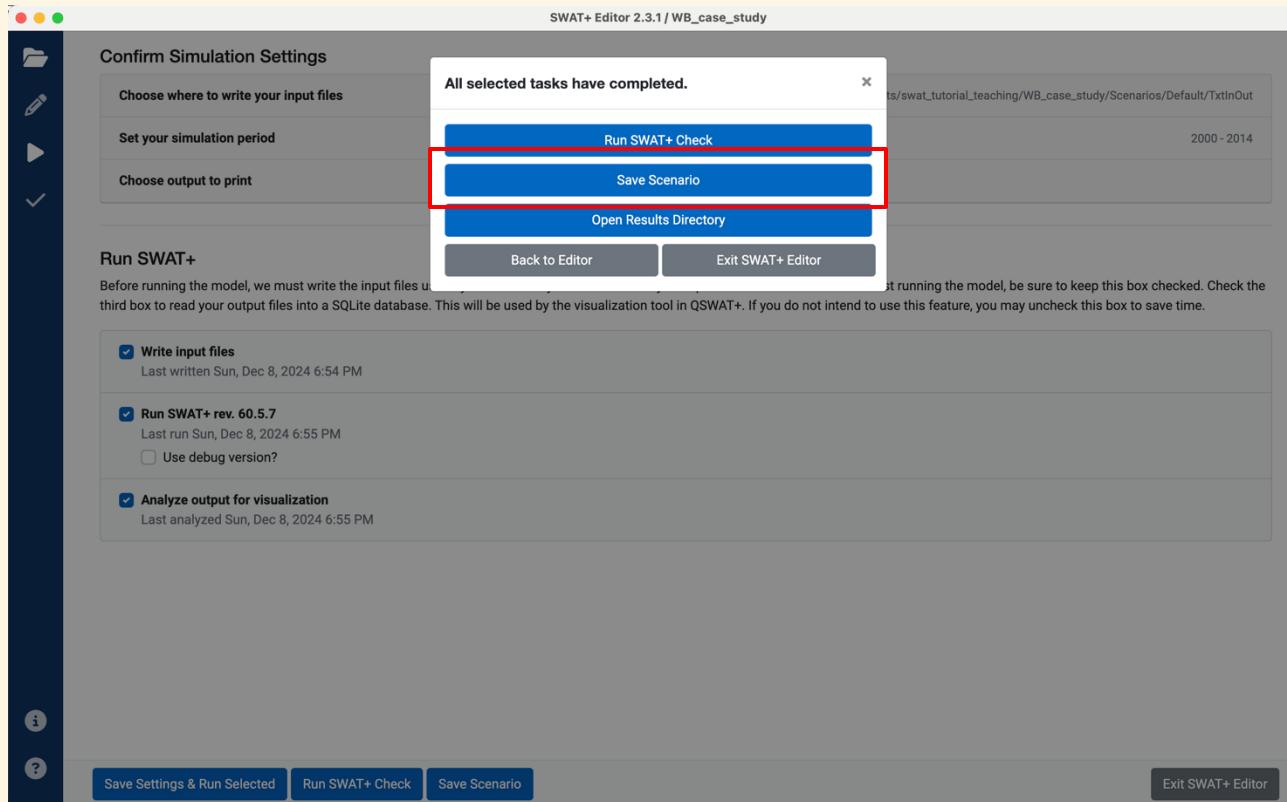
Analyze output for visualization

Save Settings & Run Selected

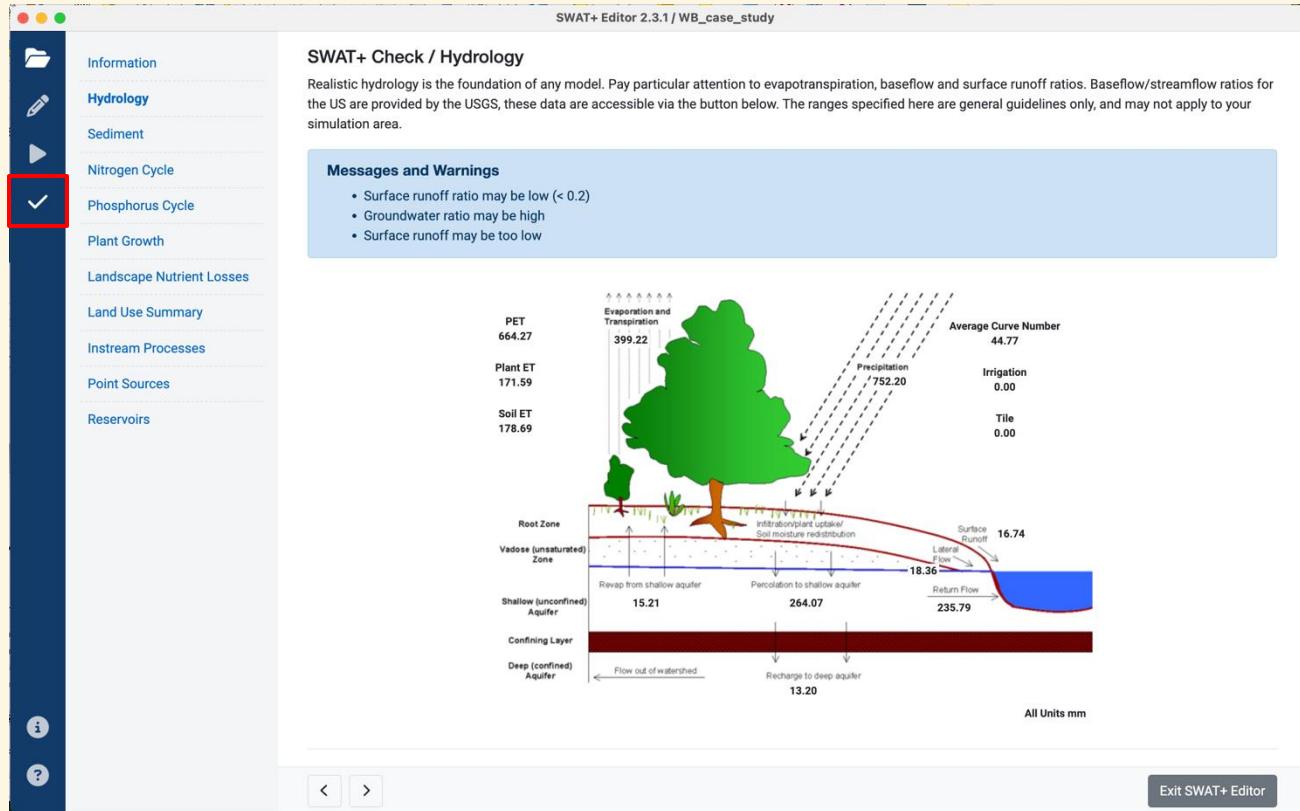
Save Scenario

Exit SWAT+ Editor

Save the model run as a scenario



Check output with SWAT+ check



Visual results with QSWAT+

