The files in this folder (Case Study 1--Models) are designed to allow a person to reproduce all the simulations and results presented in the Groundwater Project book “Groundwater Resource Development: Effects and Sustainability” in the Section “Case Study #1: Hypothetical Stream-Aquifer System.” Box 3 of the book discusses how to run the model and post-process the results.

The book can be downloaded at: <https://gw-project.org/books/groundwater-resource-development/>

This folder and its subfolders contain all the input and output files for Case Study #1: Hypothetical Stream-Aquifer System. The subfolder “MODFLOW-NWT.Model” contains a copy of the executable software for MODFLOW-NWT (version 1.1.4), which was used in the analyses of this problem, as described in the book. It also includes a copy of the model documentation report. The source code and additional documentation are available from links at: <https://www.usgs.gov/software/modflow-nwt-a-newton-formulation-modflow-2005>

The Case Study includes three different scenarios, and the files for each are contained in separate subfolders, labeled (1) Base Case (No Recharge and No ET), (2) Low ET Case, and (3) ET and Recharge Case. Instructions for running a simulation for each case are provided below. The Base Case represents a scenario in which there is no areal recharge from precipitation and no evapotranspiration (ET) losses. The Low ET Case includes no areally diffuse recharge. The third scenario (ET.and.Recharge Case) includes both ET discharge (at a higher rate than in the previous case) and areal recharge from precipitation.

The folder for each of the three scenarios includes a subfolder containing all the input files needed to run that simulation and a subfolder containing all the output files. The input file folder also includes the ModelMuse project file used to generate the input files (you do not need to use ModelMuse to run the simulation, although it is possible to do that). ModelMuse is a USGS public domain model pre- and post-processor (<https://www.usgs.gov/software/modelmuse-a-graphical-user-interface-groundwater-models>). The input folder also contains a batch file that can be used to run that simulation using those input files.

RUNNING THE MODEL: There are a number of alternative ways that the input files for each scenario can be run with MODFLOW-NWT. We offer one straightforward way that is consistent for the three scenarios. Specifically, we have placed a batch file (“*name*.bat”) in each input folder (where “*name*” is the name of the scenario). Double-clicking on this batch file will cause it to execute a script contained within it. The scripts are written to link to the executable version of MODFLOW.NWT contained in the “Model” folder, to start executing it, and to provide it the name and location of the input files for each scenario. It will route all output files to the “Output” folder. Note that if you run (or re-run) the model with this folder and file configuration, the original output files will be overwritten and lost. If you want to save them for future comparisons, then you will first need to either rename the previous output files or move them to a separate new folder before running the simulation.