Pacific Northwest
NATIONAL LABORATORY

Quick Guide for Generating Stream Network Files

1. Introduction

Download sourcecode and tutorial from DHSVM official GitHub website:
https://github.com/pnnl/DHSVM-PNNL/tree/master/CreateStreamNetwork_PythonV

The code is currently in beta version and welcomes user feedbacks.

The following files are required to run the module successfully:

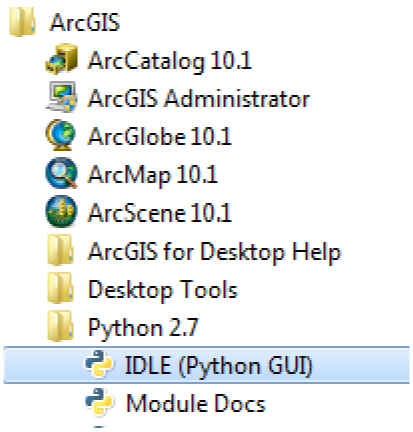
createstreamnetwork.py
channelclass.py
roadaspect.py
rowcolmap.py
soildepthscript.py
streammapfile.py
wshdslope.py

Note that Java is no longer needed to run the module.

2. Generating Stream Network Files

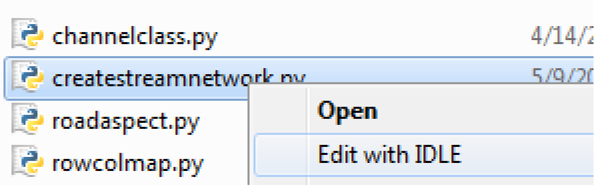
2.1 Check your environment setting

Python 2.7 for ArcGIS is essential to run the scripts
Spatial Analysis Tool is required (for now)



2.2 Working directory and Inputs

- Put the input and the scripts in the same directory;
- Right click on "createstreamnetwork.py" – Edit with IDLE (see below)



Required input:

- Set **“workplace”** to the current working directory using the format in example below.
- Set **“path”** the same as workspace but follow the format given in example. * (*for path, **“/”**at the end is required.)
- **elev** – raster file of DEM (pre-filled), best to use non-clipped DEM
- **wshed** – watershed mask(raster) OR watershed outlet (raster or shapefile). The mask must be defined as InBasin=1, outside basin=NoData.
- **key** - ‘MASK’ or ‘MOUTH’; insert ‘MOUTH’ if input is watershed outlet and ‘MASK’ if input is watershed mask. If ‘MOUTH’ is specified, a mask file will be created.
- **source** – min source area to initiate stream.
- **mindepth** – min soil depth.
- **maxdepth** – max soil depth.

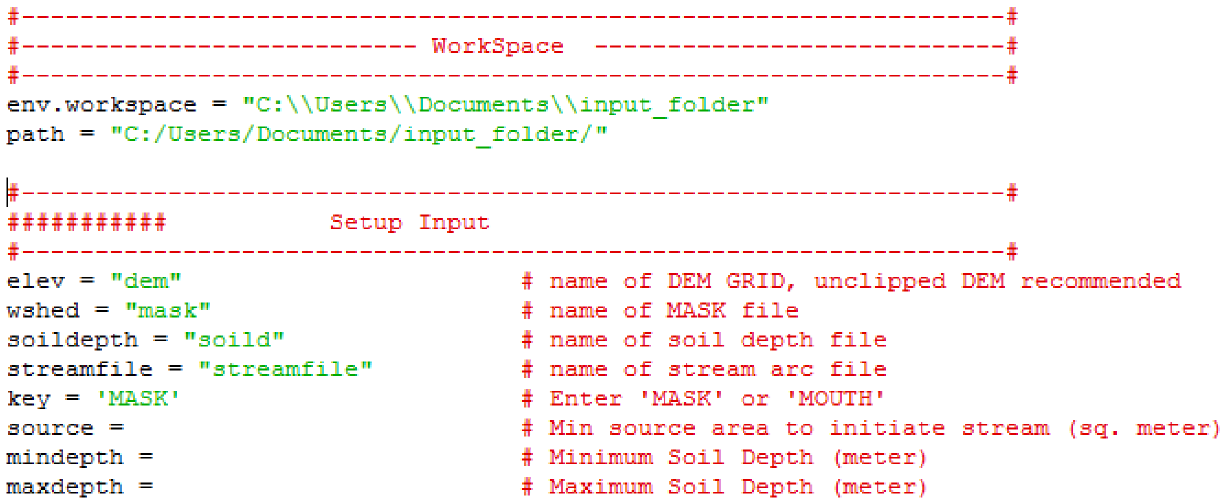
Required input with name only:

- **soildepth** –soil depth file. This is an output of the createstreamnetwork.py script, so specify the file name you’d like the output to have in this script. It will be created as a function of cumulative drainage area and slope. Note that the code will overwrite existing file with the same name.
- **streamnet** –stream network shapefile. This is an output of the createstreamnetwork.py script, so specify the file name you’d like the output to have in this script. Note that the code will overwrite existing file with the same name. The feature class will be stored at the output.gdb geodatabase created by the scripts.

All raster files should have the same extent, projection and resolution.

The “source”, “middepth”, “maxdepth” values represent the minimum contributing area before a channel begins, the minimum soil depth, and the maximum soil depth. Input these values based on your knowledge of the watershed. The smaller the minimum contributing area is, the more stream segments will be created by the program (ie. higher stream density). Check the river feature file output in ArcMap to see if the stream density is desirable. The thicker the soil depth is the slower the peak response to rain events tends to be. All three values must be provided.

Sample Input:

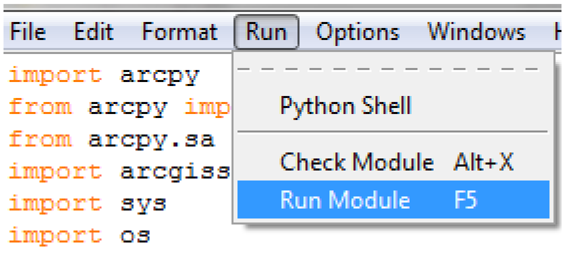


```
#--------------------------------------------------------------------#
#-------------------------- WorkSpace  ----------------------------#
#--------------------------------------------------------------------#
env.workspace = "C:\\Users\\Documents\\input_folder"
path = "C:/Users/Documents/input_folder/"

#--------------------------------------------------------------------#
###########           Setup Input
#--------------------------------------------------------------------#
elev = "dem"                       # name of DEM GRID, unclipped DEM recommended
wshed = "mask"                     # name of MASK file
soildepth = "soild"                # name of soil depth file
streamfile = "streamfile"          # name of stream arc file
key = 'MASK'                       # Enter 'MASK' or 'MOUTH'
source =                           # Min source area to initiate stream (sq. meter)
mindepth =                         # Minimum Soil Depth (meter)
maxdepth =                         # Maximum Soil Depth (meter)
```

2.3 Run Scripts

Run script from IDLE editor Toolbar – Run – Run Module



```
import arcpy
from arcpy imp
from arcpy.sa
import arcgiss
import sys
import os
```

2.4 Output

This module creates the raster file of soil depth, text files stream.network.dat and stream.map.dat that are needed by DHSVM, and the stream network feature will be stored in the geodatabase (output.gdb) under the same directory

3. Re-run the Module

The module will not overwrite original DEM, MASK/MOUTH inputs therefore can run repeatedly. If any error happened during the run, simply removes all extra files generated during the process and repeat from step 2.3 once the error have been corrected.

Last edited in 04/2018 by Z. Duan