Navigation and Discovery Script Documentation

Description:

This script takes a user-supplied file of network starting points and a user-supplied file of objects linked to the network. For each starting point, the script navigates downstream (with divergences) and discovers downstream linked objects. The script output is a list of the start point/linked object combinations found along with the distance between the two.

Inputs: The script needs 3 inputs –

(A) .csv file of navigation starting points that contain:

POIID, ComID, Start Measure, Max Distance

POID is a user-assigned identifier

ComID is the starting flowline identifier

Start Measure – the m-value along the flowline for the starting point. -1 for no start measure

Max Distance is the maximum navigation distance to search. 0 specifies to navigate to the end of the network

If the start point is a linear event with from/to measures, then Measure should hold the "from measure"

(B) .csv file of objects linked to the NHDPlus network that contain:

LinkObjID, ComID, Measure

LinkObjID is a user-assigned identifier

ComID is the flowline identifier of the linked object location

Measure – the m-value along the flowline for the linked object location.

If the linked object is linear with from/to measures, then Measure should hold the "to measure". Note: the LinkObject.csv input file requires a header line that identifies the columns/fields in the file (e.g. LinkObjID,ComID,Measure). The other two input files should not have a header line.

(C) .csv file containing the paths to the NHDPlusV2 VPU data needed for the process. Data should be uncompressed into the native NHDPlusV2 folder structure (as described in the NHDPlusV2 User Guide). For example:

E:\NHDPlusV21\NHDPlusCO\NHDPlus14

For each VPU, the script needs the NHDSnapshot and NHDPlusAttributes components

Output File:

A .dbf with the following fields

POIID, LinkObjID, Distance

Distance is the approximate distance between the starting point (POIID) and the linked object (LinkObjID). In the initial implementation of the script, distance is computed from the bottom of the POI ComID to the bottom of the LinkObjID ComID.

The distance computation may be compromised if the path(s) between the POI and Linked Object includes minor divergence sections of the network.

Input Parameters:

Several parameters are specified in the first several lines of the script and must be edited before running the script:

Path and Name of input (A)
Path and Name of input (B)
Path and Name of input (C)
Path and Name for the output file
Path to a working folder with read/write access.

Processing Notes:

It is not recommended trying to load and run more than one drainage area at one time. At a minimum, there will be some memory issues. Break up the input and linked object files into separate drainage areas.

The drainage areas in the Continental U.S. are Region 01, 02, 03, 04, the Mississippi (05,06,07,08,10, 11, and 0318), 09, 12, 13, and Colorado (14 and 15), 16, 17, and 18. If necessary, break Region 03 into its smaller parts, 03N, 03W, and 03S.

Don't have a separate open session of ArcMap or ArcCatalog while running the script. Especially with the output file (e.g., POILNKDST.dbf) open in another program like ArcMap.

Make sure to close the Pythonwin application containing the script before trying to open the output file.

Possible Future Enhancements:

(1) Accept Reachcode, Measure for input (A)
(2) Accept Reachcode, Measure for Input (B)
(3) Refine Distance field in output to be point-to-point.
(4) Use Time of Travel rather than distance.
(4) Enable script to operate on the National Seamless NHDPlusV2 data (downloadable from NHDPlus website)
(5) Add GNIS_Name to Output