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Author: Lauren Padilla

Project: NAS Gulf Research Program SWAT model

# Objective

Calculate overall drainage area total at each subbasin outlet and use in regression equations for channel dimension parameters.

# Data sources

Flow accumulation raster generated by ArcSWAT for project -C:\Users\lpadilla\Documents\NASHealthyGulf\Data\Intermediate\SWAT\GalvBay3\Watershed\Grid\flowacc

Subbasin outlet point locations generated by ArcSWAT - C:\Users\lpadilla\Documents\NASHealthyGulf\Data\Intermediate\SWAT\GalvBay3\Watershed\Shapes\outlets1.shp

# Manual steps

Step: 1

Purpose: Use Extract Values to Points tool in ArcGIS Spatial Analyst toolbox to extract the flow accumulation value in units of pixels at each outlet point

Input: flowacc, outlets1.shp

Output: C:\Users\lpadilla\Documents\NASHealthyGulf\Data\Intermediate\SWATprep.gdb\outlet\_flowacc

Step: 2

Purpose: Calculate drainage area in units of km2 from pixel counts at each outlet by adding a field DA\_km2 = RASTERVALU\*900/1e6

Input: outlet\_flowacc

Output: outlet\_flowacc

Step: 3

Purpose: Check drainage area calculation against cumulative watershed areas for select groups of sub watersheds and total basin area

Input: outlet\_flowacc, C:\Users\lpadilla\Documents\NASHealthyGulf\Data\Intermediate\SWAT\GalvBay3\GalvBay.mdb\ArcHydro\Watershed

Output: verification of DA calculation

Step: 4

Purpose: Compute channel dimensions by Bieger et al. 2015 regression equations for Atlantic Plains physiographic division as Width\_m = 2.22DA0.363 , Depth\_m = 0.24DA0.323 , Crosssec\_m2 = 0.52DA0.680

Input: outlet\_flowacc

Output: outlet\_flowacc; C:\Users\lpadilla\Documents\NASHealthyGulf\Data\Intermediate\SWAT\GalvBay3\channel\_dims.txt

Step: 5

Purpose: Spot check some of the regression-calculated widths against measurements from imagery and measurements of NHDPlus NHDArea StreamRiver feature widths.

Input: outlet\_flowacc, ArcGIS imagery basemap, C:\Users\lpadilla\Documents\NASHealthyGulf\Data\Source\NHDPLUS\_H\_1204\_HU4\_GDB\NHDPLUS\_H\_1204\_HU4\_GDB.gdb\Hydrography\NHDArea

Output: Agreement varies, is acceptable outside of tidal range. Within tidal influence, for example Buffalo Bayou east of Shepherd Drive Bridge, the width is actually much greater than estimated. A refinement of the approach could use NHDArea feature widths in the subbasins that have tidal influence. However, for now seems appropriate to use dimensions as though there is not inflow from Galveston Bay because we cannot include these flows in the simulations.

Step: 6

Purpose: Update SWAT database parameters: CH\_W2 = Width\_m, CH\_D = Depth\_m, CH\_WDR = Width\_m/Depth\_m in the rte table by joining on subbasin id and overwriting default values.

Input: channel\_dims.txt, C:\Users\lpadilla\Documents\NASHealthyGulf\Data\Intermediate\SWAT\GalvBay3\GalvBay.mdb\rte

Output: rte

# Notes