Lisa Helper
Project Progress Report
GISWR 2011

Title: Assessing Nutrient Export in the San Antonio and Guadalupe River Basins: a Preliminary Study

Objective: To assess nutrient flow using RAPID (Routing Application for Parallel computatIon of Discharge), a River Network Model (David et al. 2011), in the San Antonio and Guadalupe basins and quantify the impacts of urbanization.

Completed Tasks:

A. **Formatting the Nitrogen Budget for the Region**
   - **a.** As part of my research under the NASA IDS project I have compiled a nitrogen database that collected all land sources such as N inputs from fertilizer, livestock, and nitrogen fixation in crop/pasture lands. This data was in database form and was converted to vector format by symbolizing on Texas County Boundaries.
   - **b.** This Symbolized County boundary shape file was than rasterized to produce an evenly gridded N database across all the counties. Because of data limitations, the counties value of N inputs was divided by the area and a 1km database grid was developed.
   - **c.** This grid for all of Texas was snapped to the two basins of interest: the San Antonio and Guadalupe basin.

B. Nutrient Export Modeling
   - **a.** In addition to understanding nutrient flow through using a simple nutrient equation with RAPID, Stephanie Johnson's work parallels this idea well. To complete her methods a schematic network must be developed.
     - **i.** Developing the Network
       1. **1.** Downloaded all needed NHDplus data including catchment polygons for the two river basins of interest, flowline data for the correct regions, and elevation data for the two basins
       2. **2.** Created a flow accumulation raster for the full coupled basins using methods in Ex. 4
       3. **3.** Created a watershed out of the 2 basins to assess total outflow
   - **b.** For simple Nutrient model, collaboration has begun between Ahmad Tavakoly and myself using Steven Chapra's Surface Water-Quality Modeling Text to come up with a simple flow equation which involves only one input during one year.
   - **c.** The above data has been prepared (1-3) for later use on this front.

Remaining Tasks:

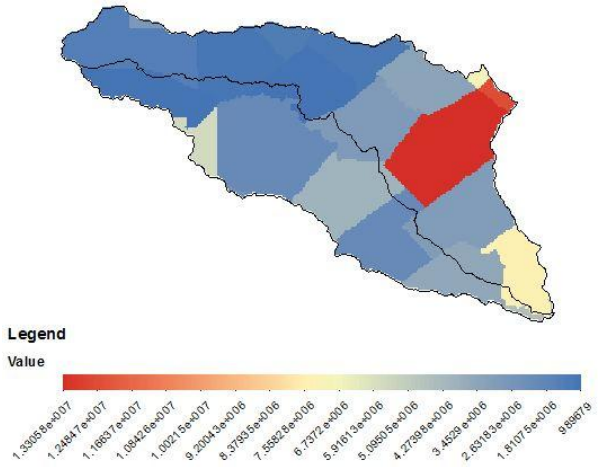
A. Finish the Schematic Network
B. Create Centroids for each catchment polygon
C. Use the Schematic Processor to model nutrient flow
D. Finish methods for simple N model; use Q from RAPID to model nutrient flow

Future Considerations/Additions:

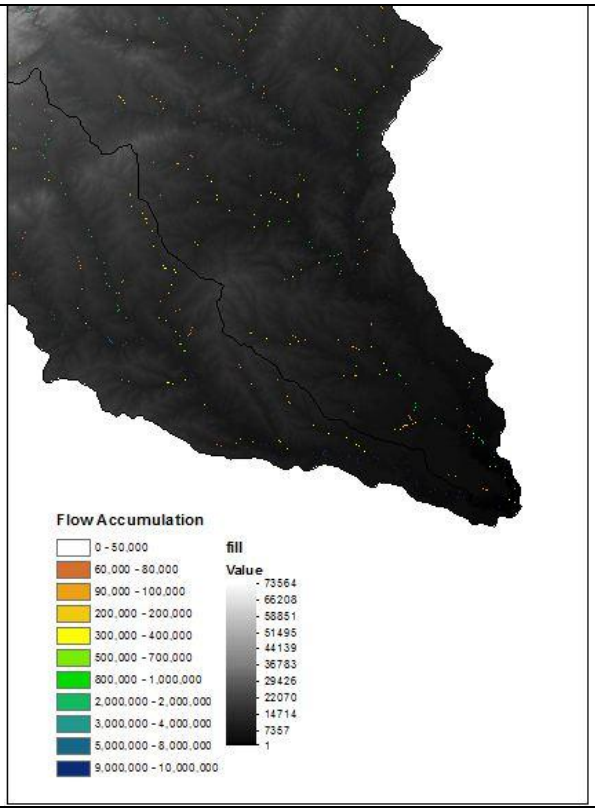
A. Time permitting consider comparisons with SPARROW nutrient model as well as Nitrogen budget developed at Cornell

Lisa Helper
Project Progress Report
GISWR 2011

Figures:



Formatting the Budget for the Basins



Flow accumulation for both basins
With filled pits in the DEM data