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GIS Applications in Hydrologic Processes
Hydrogeology: GLG 3041

Instructor Notes:

1. To use this assignment as designed with paper-based map (Elko: 100,000) you will need to print out the included DRG file as paper maps. I routinely do this with a high-quality plotter with little loss of detail and certainly sufficient for these exercises. Students are asked to manually delineate the watershed boundary using the USGS gaging station at the watershed outlet.

2. Students are required to purchase "Physical Hydrology" by Dingman (2002) and I provide copies of "Drainage Basin Morphometry" by Gardiner (1974). They use these texts as they work through both the analog and digital assignments.

3. Most students struggle with manually defining Thiessen polygons to estimate areal precipitation and many struggle with delineating watershed by hand and using topographic maps with planimeters to characterize drainage basins. However, hand calculations associated with the Hargreaves equation require less unit conversions because they are only dealing with one specific location (Bishop Airport climate station). Therefore the transition from analog to digital alleviates some frustration and often creates new challenges for the students (i.e. – the GIS-based analyses are not always easier for all students).

4. I expect a greater understanding of basic GIS skills in this course and at this point in the semester. Prior to this lab I provide a few refresher homework assignments that focus on basic navigation and tools. I spend most of the encouraging students to think about assumptions and limitation of these methods – raster resolution, modeling solar radiation, extrapolation of temperature data using lapse rates, DEM-based watershed modeling versus topographic map interpretation, and strengths of landscape-scale modeling versus singular site assessments.