

Workplan: Watershed Subdivision TxDOT Project 0–5822

16 July 2008

Introduction

The purpose of this document is to present a workplan for completion of our part of TxDOT Project 0–5822, *Subdivision of Watersheds*. This document should be considered a plan and may be changed as we learn about the process.

Workplan

Hypothesis: *Subdivision of a watershed using a bifurcation approach produces improved estimates of runoff hydrographs at the outlet from the watershed.*

My intent is that we test this hypothesis using HEC-HMS, supplemented with HEC-GeoHMS for developing watershed subdivisions and parameter sets.

The rainfall-runoff data from measurements at the outlets of the study watersheds (HMS files included) are stored on one of Dr. Ted Cleveland's linux servers, at http://cleveland1.cive.uh.edu/research/txdot_0-5822/Data/. Additional instructions for obtaining these data are forthcoming.

It is assumed that HEC-GeoHMS and HEC-HMS are operational on the TTU computer set aside for student use.

The suite of tests will include:

1. Check the delineation of the study watersheds using Arc-Hydro and extract needed parameters for generation of HEC-HMS models.
2. Assemble the HMS models for the study watersheds assuming no subdivision is undertaken.
3. Use the study events from the DSS files provided to operate HMS and extract runoff

hydrographs at the watershed outlet assuming no subdivision is performed (a purely lumped model).

4. Use Arc-Hydro to develop a suite of subdivisions per notes following.
5. Operate HMS using the subdivisions and parameter sets developed to generate runoff hydrographs at the watershed outlet for further processing.

There are a number of games to play with the subdivision process. They are:

1. No parameter changes to subdivided watershed (just the effect of subdivision).
2. Adjust runoff parameters such that one sub-watershed is completely impervious.
3. Adjust timing parameters such that one sub-watershed responds more quickly or more slowly than expected.
4. Operate HMS and extract runoff hydrographs at the watershed outlet for further analysis.

Once the models are operated for the study watersheds and test cases, compare results of each change to both the lumped watershed results and the calibrated watershed results. The intent is to measure the impacts of subdivision and parameter changes to sub-watersheds to develop a set of guidelines for TxDOT application when conducting hydrologic modeling.

Timetable

The project officially ends 31 August 2008. We'll have about two months after that for you to write your thesis, (due about the end of October) and then a couple more months to prepare the final reports for submission to TxDOT for review. That means the bulk of your computational work should be completed about 15 September 2008. Dr. Cleveland and I will take your results and begin writing the final report. You will continue working on your thesis in parallel to our writing the final project report.

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