

Chatfield Modeling Summary Update

11/16/2015

The initial model set-up time has been spent collecting input datasets and transforming them to the necessary formats required by the HSPF model. The model input phase is nearly complete with the final watershed delineation is the major outstanding item. Looking ahead, the model parameterization and calibration is the next project phase (2C).

Climate Data

PRISM daily gridded precipitation data was used to analyze the annual precipitation volumes within the watershed. The HSPF model requires hourly precipitation so daily data has been disaggregated to hourly using the closest available hourly precipitation sites.

- Roxborough State Park (COOP 057249) will be used to represent the precipitation for the mountainous regions of the watershed.
- Castle Rock (COOP 051401) will be used to represent the precipitation and temperature for the Plum Creek lowlands.
- Kassler (COOP 054452) will be used to represent the lowland areas around Chatfield Reservoir
- Strontia Springs (COOP 058022) will be used to represent the precipitation in the lower mountainous regions.

Temperature and snow data is available at these four stations and will be used as inputs to the HSPF model. Other datasets required by the HSPF model for in-stream water quality processes, and snow modeling include wind, dew point, and cloud cover which will be used from the Centennial Airport since this data has less availability. Other inputs to the HSPF model include solar radiation and potential evapotranspiration, which will be calculated from cloud cover and temperature, respectively.

Land Use

The National Land Cover Database (NLCD) 2011 dataset has been combined into eight land use types comparable to those provided by the CWA. The land use types are open water, low intensity developed, high intensity developed, forest, grassland and shrubs, pasture/hay, cultivated crops, and wetlands.

Soils

SSURGO and STATSGO soils data have been analyzed and will be used to parameterize the layers within the model. For simplicity, hydrologic soil groups (HSGs) will be combined into low runoff potential (A and B) and high runoff potential (C and D). This is common practice utilized by the USGS when building HSPF models.

Challenges

The HSPF model is rather input intensive, but has automated download schemes to aid in the gathering of data via BASINS. Unfortunately these datasets end in 2009, which is too early for our modeling period of record (2000-2015). Collecting the necessary cloud cover data has been especially time consuming as it is not provided in the "standard" NOAA output and instead has to be manually extracted year by year and appended to the other data (precipitation, wind, dew point).

Next Steps

The following actions provide a look into the next steps of the model development:

- Finalize the watershed delineation
- Create the initial HPSF model parameterization
- Begin the hydrologic calibration of the model

