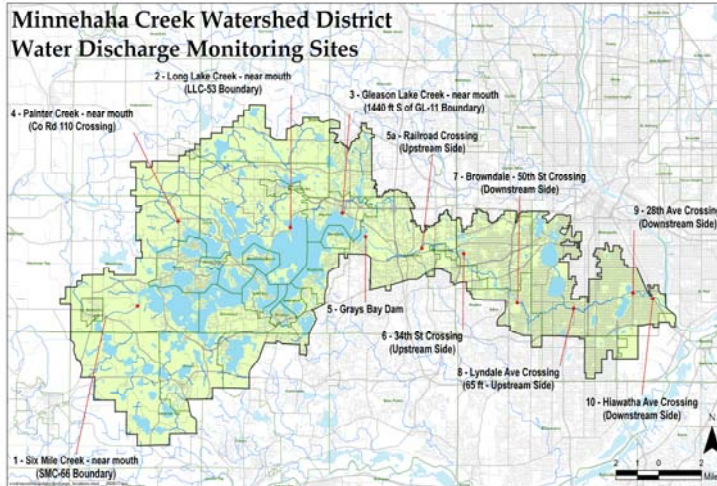




Expanding possibilities using an existing XP-SWMM model to analyze a 55-year continuous simulation of Minnehaha Creek Watershed.

MINNEHAHA CREEK HYDROLOGIC/ HYDRAULIC PERIOD OF RECORD SIMULATION



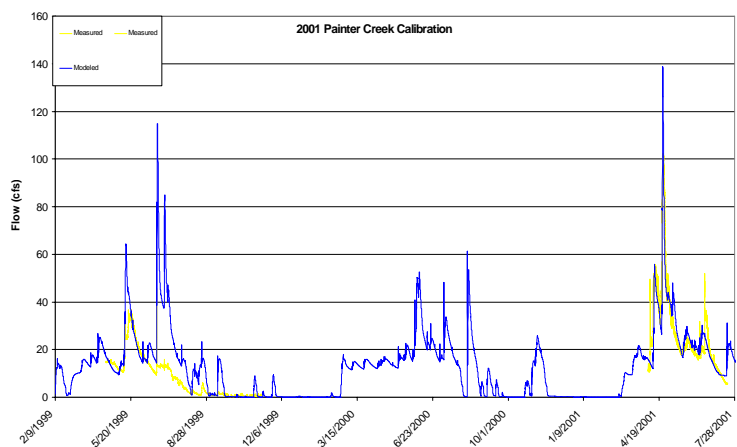
Utilizing an existing XP-SWMM model created for the Minnehaha Creek Watershed District (MCWD) Hydrologic/Hydraulic and Pollutant loading study (see case study), a 55-year continuous simulation was completed. Three conditions were modeled: existing land-use, future land-use, and a wetland restoration scenario.

Model features allowing simulation of Minnesota's changing

seasons, and critical for a good calibration, during the period-of-record run included infiltration and snowmelt simulation. Preparation for the run required assemblage of 55-years of precipitation (rain and snowfall), temperature records and base flow data. Precipitation data was compiled using the Thiessen Polygon method. Base flows, developed using Darcy's Law, were developed for the upper watershed streams to simulate a groundwater inflow. The flows were entered in the form of a user-defined inflow hydrograph that faded out during the winter and reemerged during the spring and summer months. The hydrology used Green-Ampt methodology.

The XP-SWMM model can accommodate any distribution of rainfall, but recommends 1-hour rainfall intervals or less for continuous simulation. Due to the models sensitivity to the precipitation interval, hourly data was used where available. When lacking, daily records were given an hourly distribution using an SCS Type II rainfall distribution.

The results, a 55-year hydrograph at 11 locations within the watershed calibrated to stream flow data. The modeling is being used by the United States Army Corps of Engineers (USACE) and MCWD to make decisions pertaining to the dam operation of Lake Minnetonka and wetland restoration work in Painter Creek (a tributary watershed).



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