Observed streamflow data are important for water related development projects and water resources management. When such data are not available, various rainfall-runoff models are used to simulate them. However, required input rainfall, evapotranspiration and other data may also not always be available to employ these models. Remote sensing data can then be used instead. They represent features of the aforementioned input variables. Moderate Resolution Imaging Spectrometer (MODIS) sensor data were used to generate daily streamflow in this study. Thomson catchment in Victoria in Australia was selected as study area, mainly due to its unregulated flow records. Daily MODIS reflectance and radiance data were first used to generate Normalized Difference Vegetation Index (NDVI), Cloud Top Temperature (CTT) and Land Surface Temperature (LST). These were used as surrogates for landuse landcover, precipitation and evapotranspiration. Artificial Neural Network (ANN) model was used to generate streamflow from these variables. A number of ANN models with one hidden layer were developed using combinations of present day NDVI, CTT and LST, and several daily lags of these variables. Results showed that output of a seasonally stratified ANN model predictions were comparable with observed streamflow. This indicates that remote sensing data can be directly (without a rainfall-runoff model) used to generate streamflow with acceptable accuracy, and points to the applicability of ANN as alternative simulation approach.