Assessment of Digital Land Cover Maps for Hydrological Modeling in the Yampa River Basin, Colorado, USA

J.M. Repass[1], S.R. Fassnacht[1] and R.M. Reich[1]
[1] Department of Forest, Rangeland and Watershed Stewardship, Colorado State University, Fort Collins, Colorado USA 80523-1472

Abstract. Land cover data are required to parameterize watersheds for hydrological modeling. There is a multitude of different land cover maps, and determining which input map for the model can be unclear. The objective of this study is to quantify the differences between various publically available land cover maps to determine their relative suitability for hydrological modeling of the Yampa River Basin in northern Colorado. The land cover maps compared in this study are derived from Advanced Very High Resolution Radiometer (AVHRR), Landsat Thematic Mapper (TM), and Moderate Resolution Imaging Spectroradiometer (MODIS) imagery. These maps are compared to a 30-m land cover map modeled from ground data and remote sensing imagery collected in 2004, and will be used to rank publicly available TM, AVHRR and MODIS land cover maps. In order to compare the different land cover products, all data must be resampled to a common spatial resolution and reclassified to a common species resolution. Once this is accomplished, the maps are compared on 4 levels. The 4 comparisons are based on: (i) total aggregated land class percentages; (ii) pixel accuracy; (iii) scene accuracy; and (iv) cumulative streamflow model output from the US Geological Survey Precipitation-Runoff Modeling System (PRMS) in relation to observed cumulative streamflow. The results will determine the best input land cover data for modeling streamflow in the Yampa River Basin, and provide information about the required spatial, spectral, and classification resolution of these maps to optimize results for streamflow modeling.