Determination of the Area Weighted Curve Number Distribution in a South Miami Catchment Utilizing Maximum Likelihood Classification in ArcGIS

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Abstract. The evaluation of the amount of runoff infiltrated for a given site is essential in the quantification of the effects of urbanization, determination of the resulting peak and volume of runoff from a site, and for use in stormwater management design to mitigate the effects of development, preserve the natural hydrologic regime of streams and rivers, and to satisfy municipal, state, and federal stormwater management and water quality regulations. The curve number method developed by the Soil Conservation Service (SCS), now known as the Natural Resources Conservation Service (NRCS) is a common method used in the determination of infiltration loss within a defined drainage area. The area weighted curve number for the 15 acre high density residential catchment area located within a portion of the Kings Creek Apartments in Miami, Fl was determined using digital ortho quads (DOQs), and maximum likelihood classification techniques. Digital Ortho Quads (DOQs) from 1938, 1999, 2004, and 2009 were utilized in the area weighted curve number determination for each of the thirteen subcatchment areas. A maximum likelihood classification technique was applied to determine the distribution of curve numbers using ArcGIS. The area weighted curve numbers determined from the 1938 and 2009 DOQs were input into a hydrologic model and used to evaluate the changes in runoff characteristics and nonpoint source pollutant loading from the catchment area. The differences in the area weighted curve number, and land cover areal distribution using DOQs of varying resolutions, 1999, 2004, and 2009 DOQs were evaluated. The percentage of the area classified as impervious in the 2004 and 2009 DOQs produced a mean difference of 7.5% and a standard deviation of 5.7% with previously published values (Bedient, 2008).