Rainfall-induced landslides are one of the most frequent hazards on slanted terrains. They lead to great economic losses and fatalities worldwide. Most factors inducing shallow landslides are local and can only be mapped with high levels of uncertainty at larger scales. This work presents an attempt to determine slope instability at large scales. Buffer and threshold techniques are used to downscale areas and minimize uncertainties. Four static parameters (slope angle, soil type, land cover and elevation) for 261 shallow rainfall-induced landslides in the continental United States are examined. ASTER GDEM is used as bases for topographical characterization of slope and buffer analysis. Slope angle threshold assessment at the 50, 75, 95, 98, and 99 percentiles is tested locally. Further analysis of each threshold in relation to other parameters is investigated in a logistic regression environment for the continental U.S. It is determined that lower than 95-percentile thresholds under-estimate slope angles. Best regression fit can be achieved when utilizing the 99-threshold slope angle. This model predicts the highest number of cases correctly at 87.0% accuracy. A one-unit rise in the 99-threshold range increases landslide likelihood by 11.8%. The logistic regression model is carried over to ArcGIS where all variables are processed based on their corresponding coefficients. A regional slope instability map for the continental United States is created and analyzed against the available landslide records and their spatial distributions. It is expected that future inclusion of dynamic parameters like precipitation and other proxies like soil moisture into the model will further improve accuracy.