Physically-based spectral rendering is becoming increasingly popular in both commercial and academic areas due to its ability to accurately simulate natural phenomena. However, the production of materials defined by their spectral properties is a tedious and expensive process, which makes the utilization of RGB-based assets in spectral renderers a desired feature. To convert RGB values to their spectral representations, a process called spectral uplifting is employed. As the RGB color space is a finite subset of the visible gamut, there exist multiple conversion techniques producing distinct results, which may cause color inconsistencies under various lighting conditions. This thesis proposes a method for constraining the spectral uplifting process. To be specific, pre-defined mappings of RGB values to their spectral representations are preserved and the rest of the RGB gamut is plausibly uplifted. In order to assess its correctness, this technique is then implemented and evaluated in a spectral renderer. The renders uplifted via our method show minimal discrepancies when compared to the original textures.