We combine the digital geological maps of New Zealand (QMAP) with 9256 samples of the rock density measurements from the national rock catalogue PETLAB and supplementary geological sources to generate a first digital density model of New Zealand. This digital density model has been used for various applications in regional gravimetry. The geological map GIS dataset contains 123 unique main rock types spread over more than 1800 mapping units. Through these main rock types, rock densities from measurements in the PETLAB database and other sources have been assigned to geological mapping units. Our results revealed that the mean surface rock density in New Zealand is 2440 kg/m$^3$. The estimated mean surface rock density for North Island of 2336 kg/m$^3$ reflects the predominance of relatively young, weakly consolidated sedimentary rock, tephra and ignimbrite compared to the South Island’s 2514 kg/m$^3$ mean where igneous intrusions and metamorphosed sedimentary rocks including schist and gneiss are more common. All of these values are significantly lower than the mean density of the upper continental crust that is commonly adopted in geological, geophysical, and geodetic applications (2670 kg/m$^3$) and typically attributed to the crystalline and granitic rock formations. The lighter density has implications for the calculation of the geoid surface and gravimetric reductions through New Zealand.