The surfaces of aqueous HNO₃ are examined using sum frequency generation (SFG). A molecular-level picture of these atmospherically relevant systems is developed. Consistent with previous interpretations, an electric double layer comprised of subsurface anions and cations develops in 0.005x and 0.01x HNO₃ solutions, where x = mole fraction. Compared to pure water, these solutions generate more SFG signal in the hydrogen-bonded region as water molecules respond to the subsurface electric field by aligning with the surface normal. At higher concentrations, 0.05x and 0.4x HNO₃, ionic complexes or molecules sufficiently approach the surface to disrupt the hydrogen-bonding network and perturb the first water layer. Neither liquid nitric acid nor its solutions show a clear O-H.