This dataset includes information about total nitrogen (TN) concentrations, total phosphorus (TP) concentrations, TN:TP stoichiometry, and 12 driver variables that might predict nutrient concentrations and ratios. All observed values came from LAGOSLIMNO v. 1.054.1 and LAGOSGEO v. 1.03 (LAke multi-scaled GeOSpatial and temporal database), an integrated database of lake ecosystems (Soranno *et al.* 2015). LAGOS contains a complete census of lakes great than or equal to 4 ha with corresponding geospatial information for a 17-state region of the U.S., and a subset of the lakes has observational data on morphometry and chemistry. Approximately 54 different sources of data were compiled for this dataset and were mostly generated by government agencies (state, federal, tribal) and universities. Here, we compiled chemistry data from lakes with concurrent observations of TN and TP from the summer stratified season (June 15-September 15) in the most recent 10 years of data included in LAGOSLIMNO v. 1.054.1 (2002-2011). We report the median TN, TP and molar TN:TP values for each lake, which was calculated as the grand median of each yearly median value. We also include data for lake and landscape characteristics that might be important controls on lake nutrients, including: land use (agricultural, pasture, row crop, urban, forest), nitrogen deposition, temperature, precipitation, hydrology (baseflow), maximum depth, and the ratio of lake area to watershed area, which is used to approximate residence time. These data were used to identify drivers of lake nutrient stoichiometry at sub-continental and regional scales (Collins *et al,* submitted). This research was supported by the NSF Macrosystems Biology program (awards EF-1065786 and EF-1065818) and by the NSF Postdoctoral Research Fellowship in Biology (DBI-1401954).