Partial least squares regression (PLS) is a supervised multivariate statistical technique that allows one to ask how a multivariate dataset co-varies with an explanatory variable. PLS works with data that other multivariate analysis techniques can't—it’s robust to small sample size relative to number of variables measured, multicollinearity, and missing data. Ecological data is becoming increasingly multivariate due to advances in high-throughput sampling, automated data logging, and remote sensing. We believe PLS is a powerful way to analyze these types of data. We developed a set of "tidy" tools for simulating multivariate data and used them to explore the performance of PLS under different data scenarios. We give recommendations and best practices for using and reporting results from PLS on ecological data.