ReadMe File for Pareto Model Fits
"Extremes of Physical-Chemical Drivers and Cyanobacteria Concentrations . . . ."

Pareto models were used to determine best-fitting models for extreme values of precipitation, phosphorus load, and phycocyanin. The methods were based on Coles (2001) using the R package extRemes (Gilleland & Katz, 2016). Alternative models were compared with AIC.

An earlier paper reported Pareto models and thresholds for precipitation, discharge, and phosphorus load for years ending in 2015 (Carpenter, Booth, & Kucharik, 2018). We used the same thresholds for precipitation and phosphorus load, and estimated the threshold for phycocyanin concentrations using the same procedure (Coles, 2001). We did not consider discharge as a potential predictor in Pareto models for phycocyanin.

Figure S4 was generated by the R script
**GenPareto_precip1940-2021_v1+ReturnTime_2022-02-06.R**

Figure S5 was generated by the R script
**GenPareto_Pload_f(Precip)_v0best_2016-12-28.R**

Phycocyanin was transformed as Z-scores by year for log10(phycocyanin). The threshold for transformed phycocyanin was estimated using the R script
**Phycocyanin_Generalized_Pareto_thresh_expts_2022-04-24.R**

The Pareto results for phycocyanin described in the text were computed by
**GenPareto_Blooms_f(Pload)_f(precip)_v0_2022-03-09.R**

References

Carpenter, S. R., Booth, E. G., & Kucharik, C. J. (2018). Extreme precipitation and phosphorus loads from two agricultural watersheds. *Limnology and Oceanography, 63*(3), 1221-1233. doi:doi:10.1002/lno.10767

Coles, S. G. (2001). *An Introduction to Statistical Modeling of Extreme Values*. New York: Springer.

Gilleland, E., & Katz, R. W. (2016). extRemes 2.0: An extreme value analysis package in R. *Journal of Statistical Software, 72*(8), 1-39. doi:doi:10.18637/jss.v072.i08