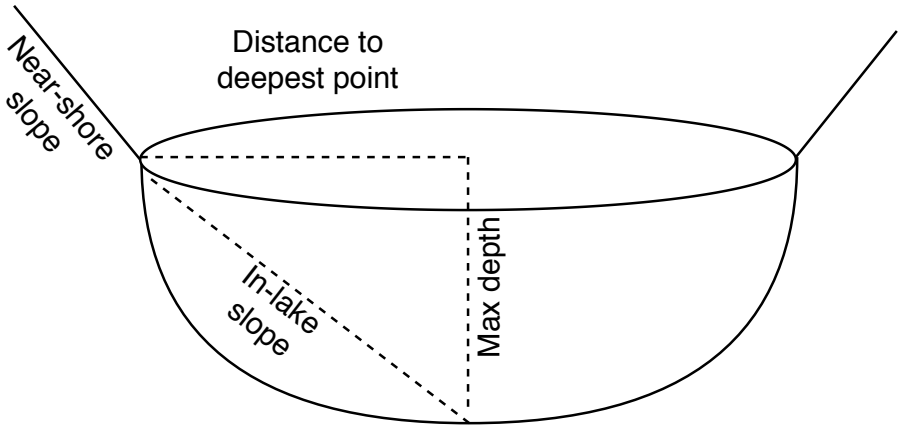

Figure 1: Diagram showing the assumption of most lake depth models that the nearshore slope extends into the lake and that all lakes have a common relationship between nearshore and in-lake slope.

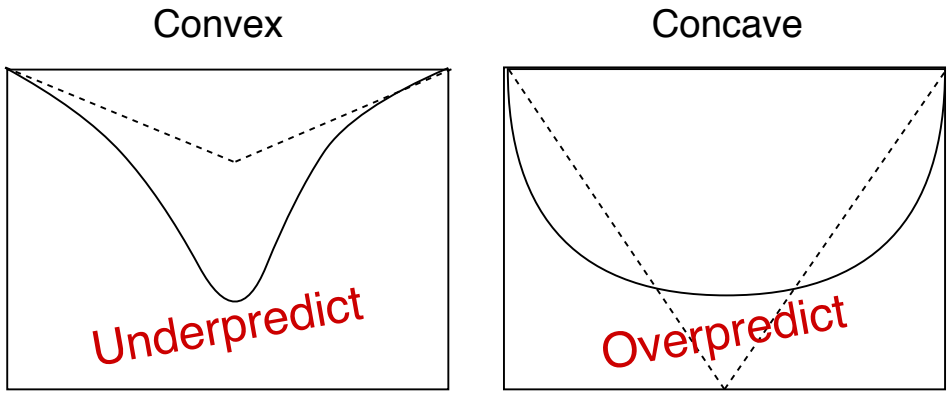

Figure 2: Diagram showing our expectation that slope-based models of lake depth will under predict true depth in convex lakes (left) and over predict true depth in concave lakes (right)

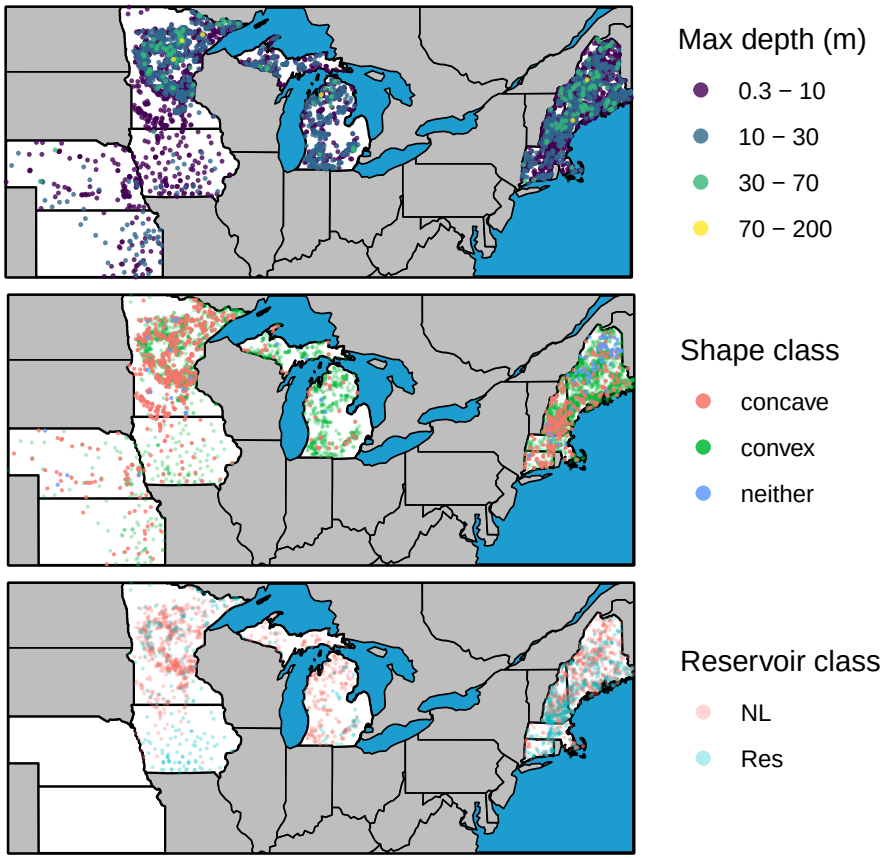

Figure 3: Map of study lakes showing A) lake maximum depth measurements, B) cross-section shape class, and C) reservoir classification.

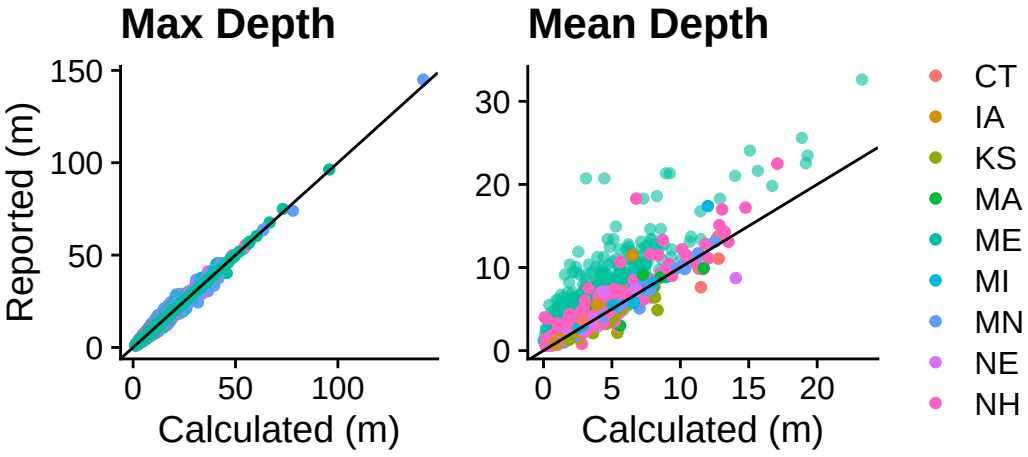

Figure 4: Comparison between reported depth and depth calculated from bathymetry surfaces by US State.

variable	Median	Q25	Q75	n
lake_maxdepth_m	7	3.7	12	5020
lake_meandepth_m	3	1.7	4.8	5020
lake_elevation_m	340	210	460	5020
lake_waterarea_ha	33	11	100	5020
lake_islandarea_ha	0	0	0.076	5020
lake_perimeter_m	3500	1800	7300	5020
lake_shorelinedevfactor_nounits	1.7	1.4	2.2	5020
ws_lake_arearatio	10	4.4	28	5020
dist_deepest	180	110	290	5020
dist_viscenter	240	150	390	5020
inlake_slope	0.046	0.024	0.079	5020
buffer_slope	1	0.65	1.4	5020

Table 1: Summary of lake depth predictor variables.

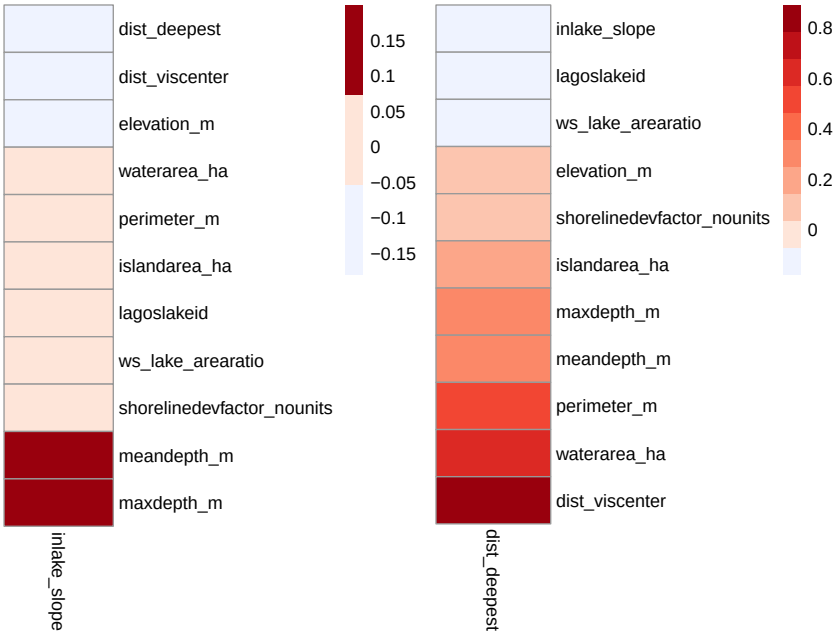

Figure 5: Pearson correlation coefficients of map-derived metrics against inlake slope and deepest point distance metrics.

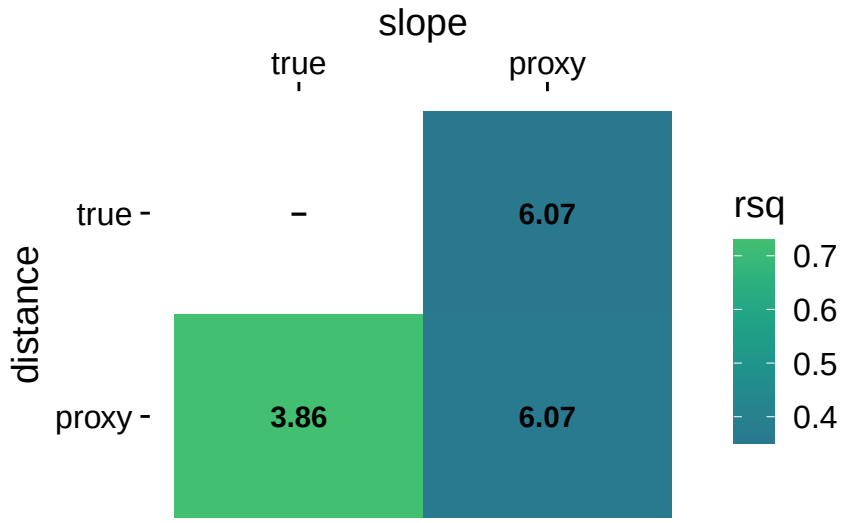

Table 2: Model fit and predictive accuracy metrics for all combinations of true (inlakeslope, distdeepest) and proxy (slopemean, distviscenter) metrics. Tiles are colored by their R2 values and labeled with their RMSE values.

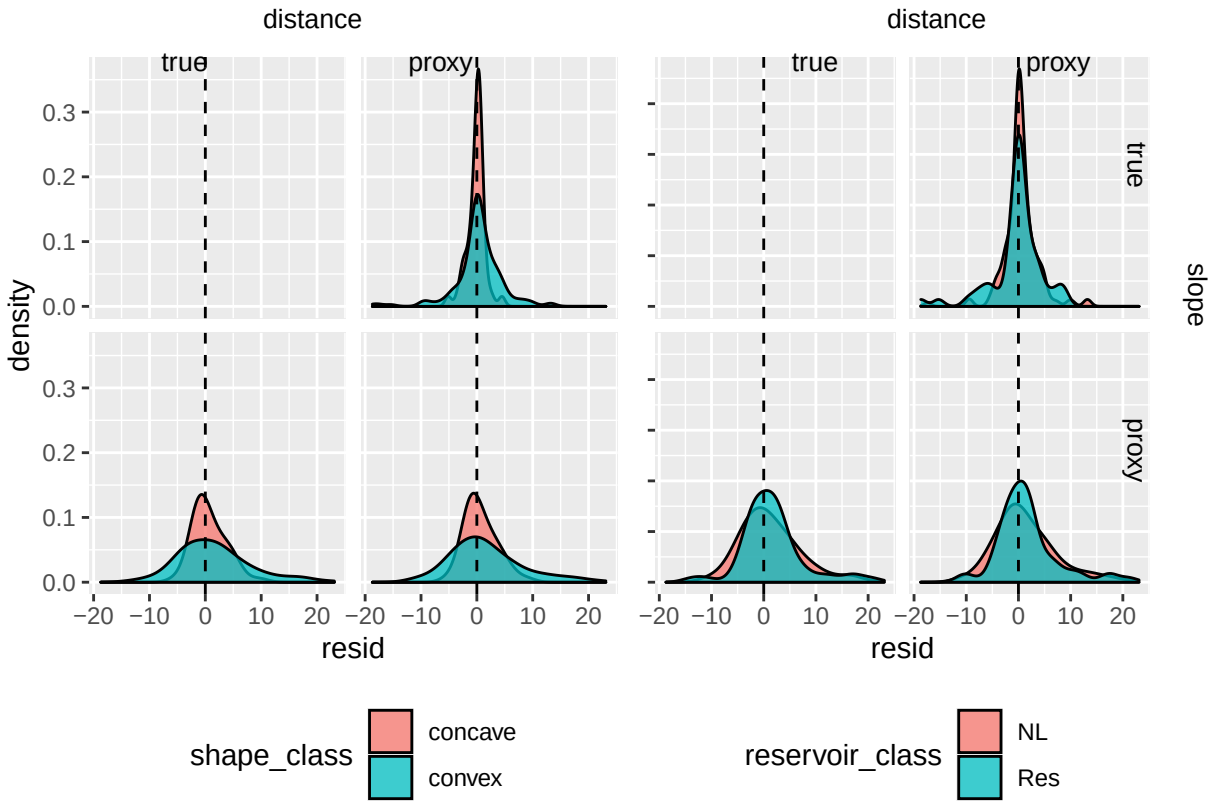

Figure 6: Depth model residuals by shape and reservoir class.

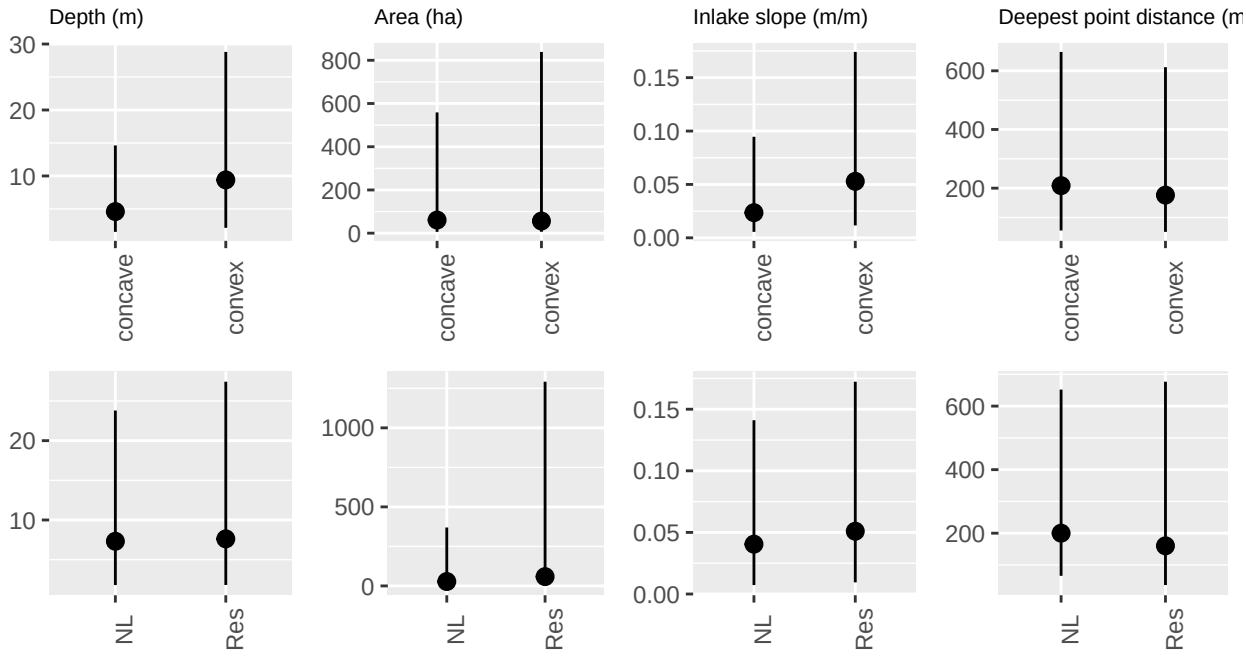

Figure 7: Lake characteristics by categorical variables.

Appendix

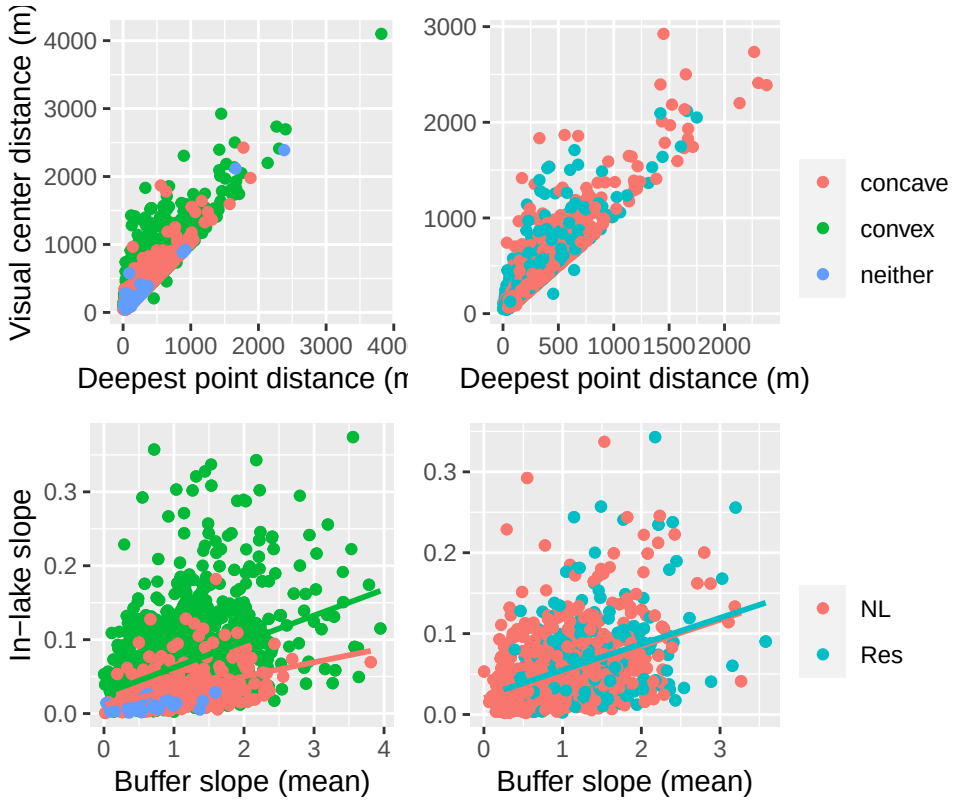

Figure 1: Comparison among lake shape and reservoir classes for A-B) distance to deepest point versus distance to lake visual center and C-D) buffer slope versus inlake slope.

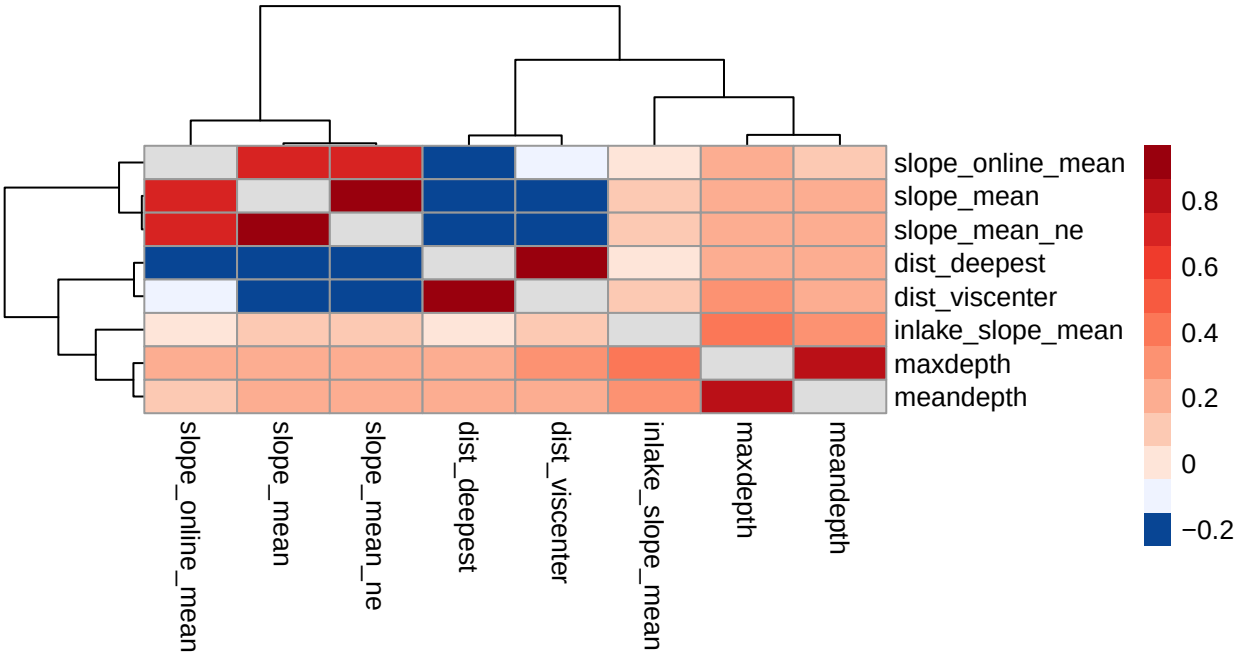

Figure 2: Correlation matrix heatmap.

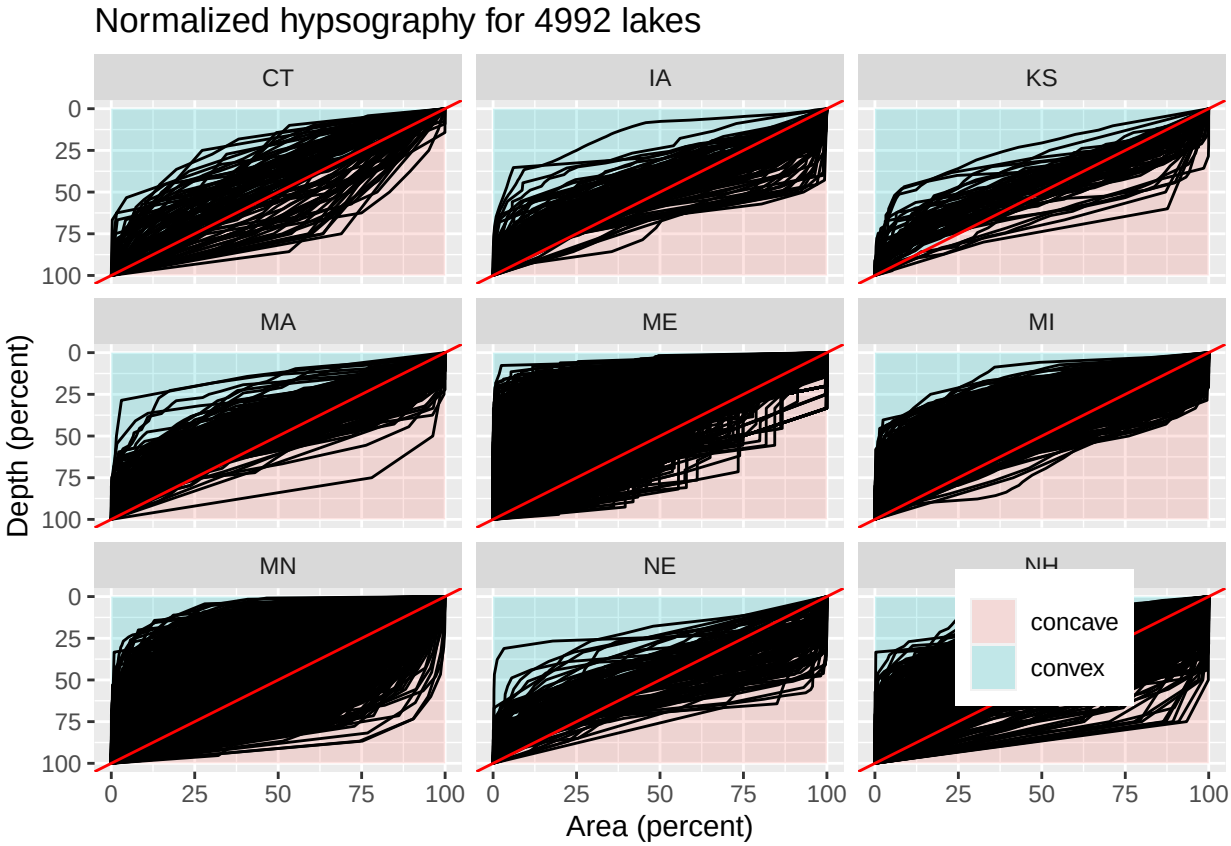

Figure 3: Hypsography classification by state.

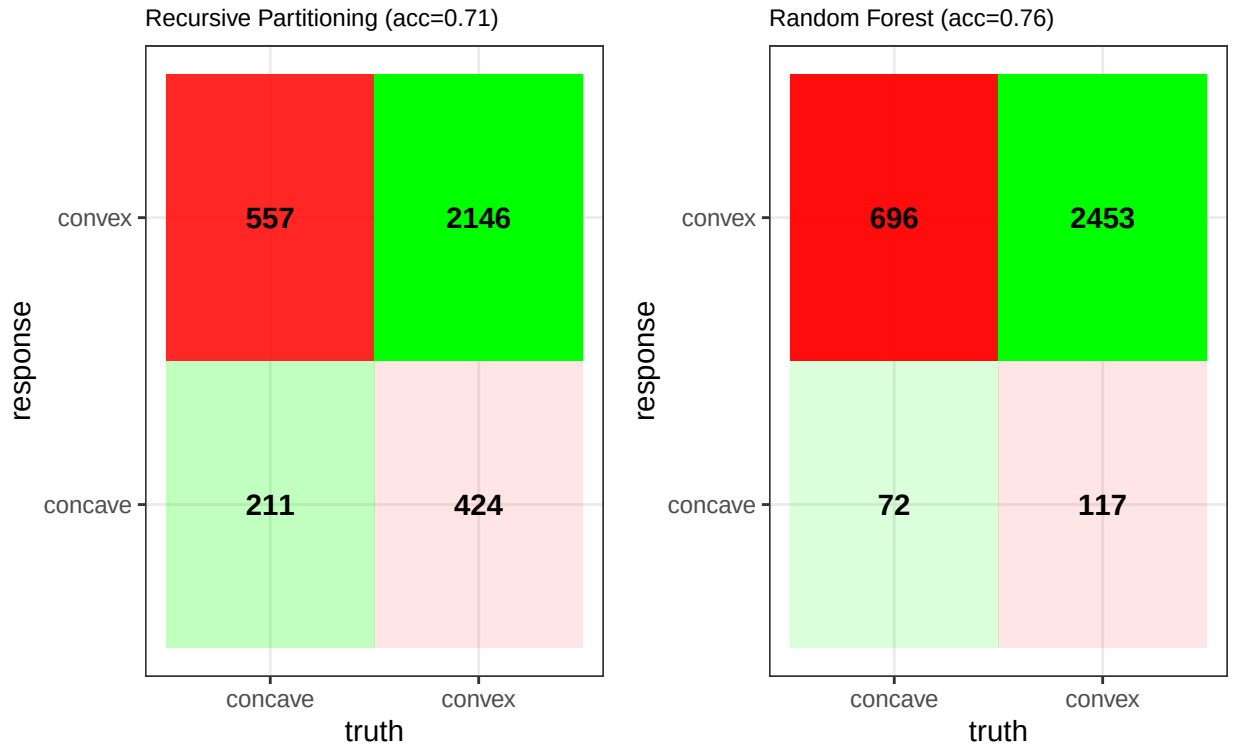

Figure 4: Confusion matrix comparing two classification methods

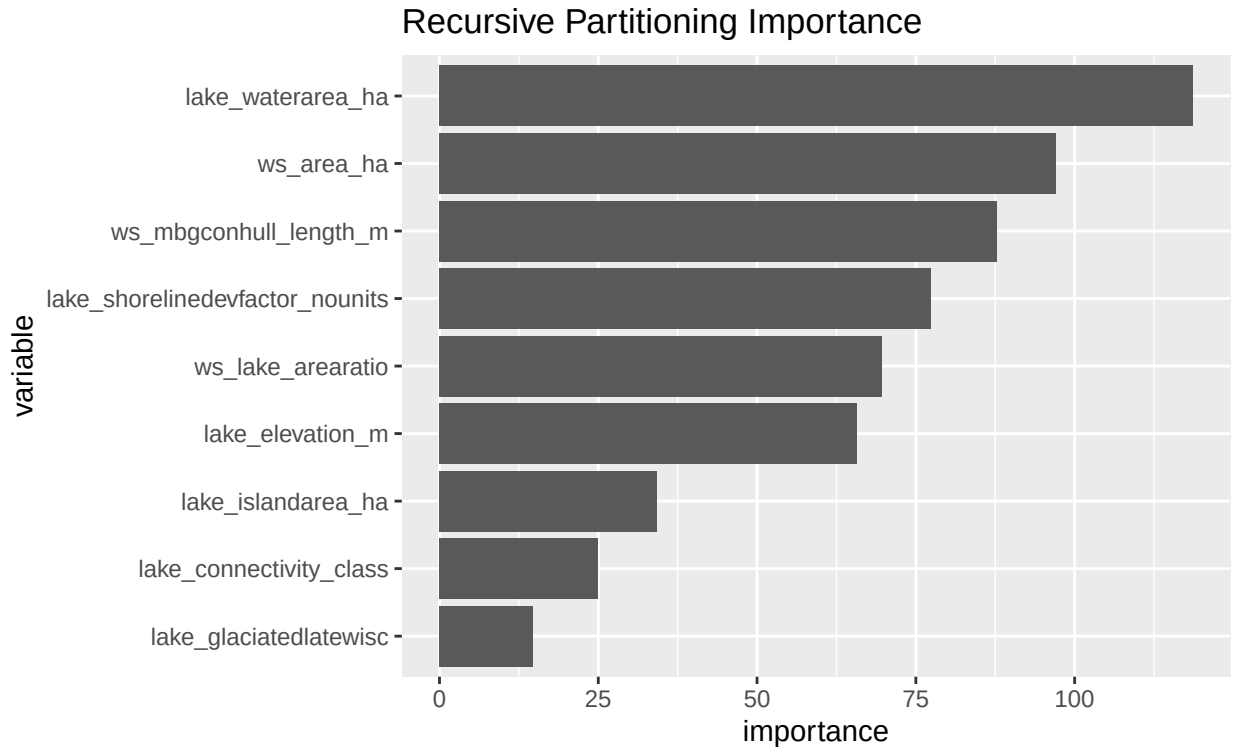

Figure 5: Recusive Partitioning variable importance.