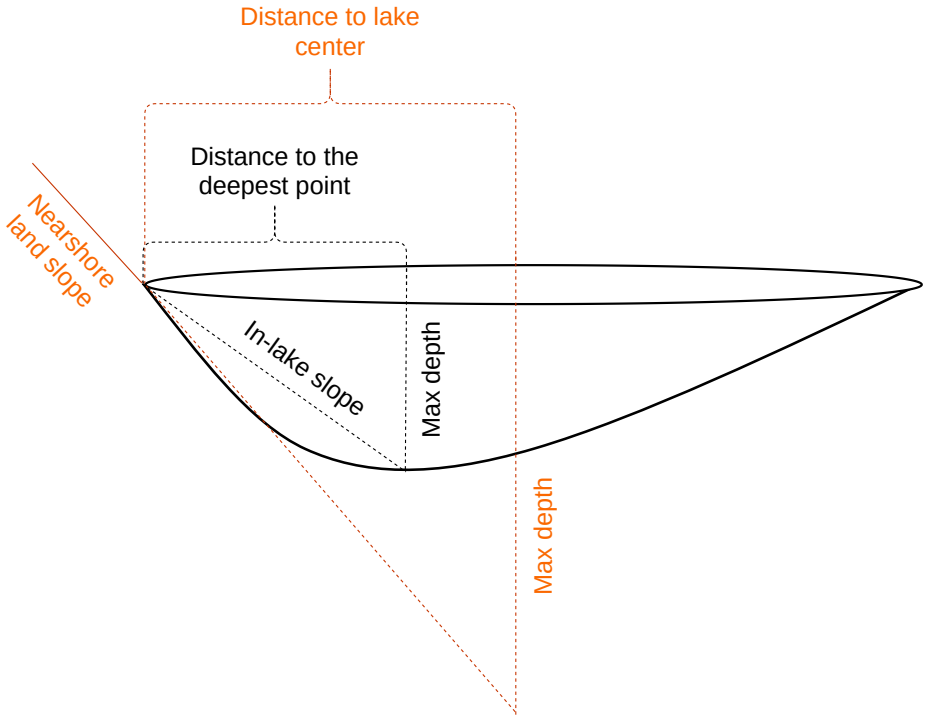

Figure 1: Diagram showing the relations between true (black) and proxy (orange) metrics of lake geometry. Geometric depth calculated via Equation 1 requires a single distance and slope metric.

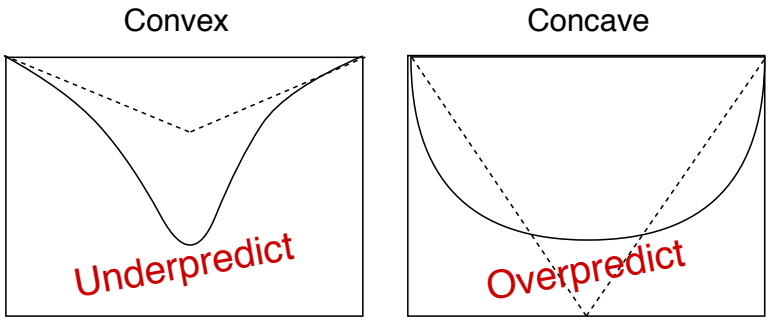

Figure 2: Diagram showing our expectation that slope-based models of lake depth will under predict true depth in convex lakes (left) and over predict true depth in concave lakes (right). Dashed lines represent extrapolated nearshore land slope while solid lines represent the lake bottom.

Variable	Median	Q25	Q75	n
Max depth (m)	8.2 (7)	4.6 (3.7)	14 (12)	4850 (17700)
Elevation (m)	300 (340)	180 (210)	400 (460)	4850 (17700)
Area (ha)	55 (33)	21 (11)	140 (100)	4850 (17700)
Island area (ha)	0 (0)	0 (0)	0.18 (0.076)	4850 (17700)
Perimeter (m)	4400 (3500)	2500 (1800)	8100 (7300)	4850 (17700)
Shoreline development	1.7 (1.7)	1.4 (1.4)	2.1 (2.2)	4850 (17700)
Watershed-lake ratio	7.8 (10)	3.9 (4.4)	17 (28)	4850 (17700)
Distance to deepest point (m)	180 (-)	110 (-)	290 (-)	4850 (-)
Distance to lake center (m)	240 (-)	160 (-)	380 (-)	4850 (-)
In-lake slope (m/m)	0.046 (-)	0.024 (-)	0.079 (-)	4850 (-)
Nearshore land slope (m/m)	0.077 (-)	0.051 (-)	0.11 (-)	4850 (-)

Table 1: Summary of lake characteristics for the present study (and for lakes in the contiguous United States from <LAGOSUS-Depth citation>). Predictor variables for computing random forest offsets (Eq 2) are printed in bold face. Dashes (-) indicate an identical sample size among this study and that of the contiguous United States.

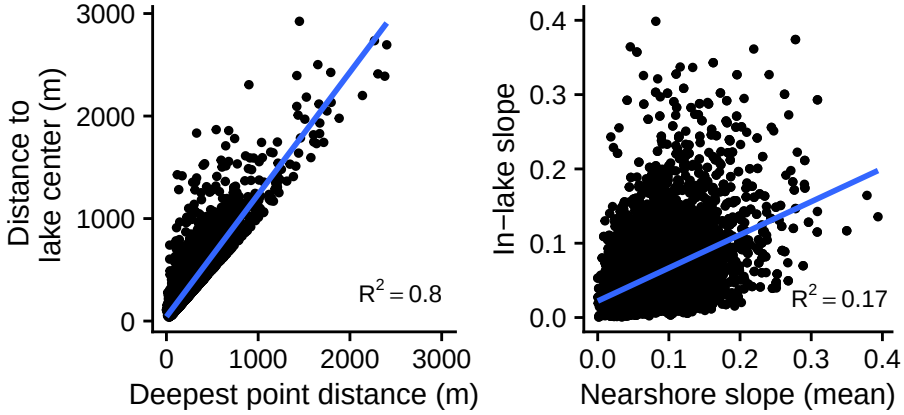

Figure 3: Comparison among proxy and true values of lake geometry for A) distance to deepest point versus distance distance to lake center and B) nearshore land slope versus in-lake slope. A best-fit line and coefficient of determination is shown to illustrate representativeness.

slope	distance	rmse	rsq
true	true	-	-
true	proxy	4.2 m	0.73
proxy	true	6.9 m	0.26
proxy	proxy	6.6 m	0.31

Table 2: Model fit and predictive accuracy metrics (RMSE = root mean square error, R2 = coefficient of determination) for all combinations of true (in-lake slope, distance to the deepest point of the lake) and proxy (nearshore land slope, distance to lake center) metrics.

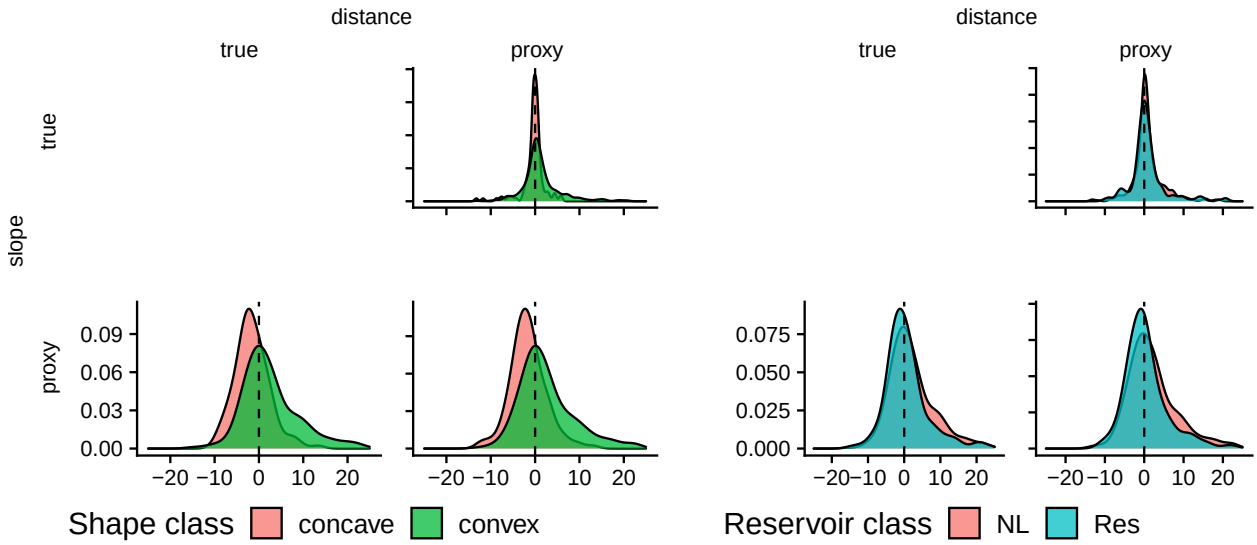

Figure 4: Depth model residuals (residual = observed - predicted) in meters by cross-section shape and reservoir class indicating overprediction of concave and reservoir lakes.