**LASSO Regression Results**

LASSO regressions are regressions that penalize adding more variables into the model and decrease coefficient values of variables that contribute less to the model. Two LASSO penalized regressions were run in R with the package ‘glmnet’ to reduce dimensionality of predictors. The first regression was used to determine the best lambda value for penalizing adding more predictors. The second regression was used to select predictors to retain in the model.

**Step 1: Initial LASSO regression to determine lambda value**

(1) Code:

cvmodel <- cv.glmnet(x, y, alpha=1, family='binomial')

(2) Cross-validation error plot:

A graph with red line

AI-generated content may be incorrect.

(3) Best lambda value with the lowest error: 0.003145

**Step 2: Final LASSO regression to select variables**

(1) Code:

bestlasso <- glmnet(x, y, alpha=1, lambda=best\_lambda, family='binomial')

(2) Coefficients:

|  |  |
| --- | --- |
| **Table 1:** LASSO regression coefficients | |
| **Predictor** | **Coefficient values** |
| (Intercept) | 3.03 |
| Blue\_R | . |
| Green\_R | 16.79 |
| Red\_R | . |
| NIR\_R | . |
| SWIR1\_R | . |
| SWIR2\_R | -31.04 |
| NDVI | . |
| NDWI | 6.82 |
| NDSI1 | 2.52 |
| NDSI2 | . |
| SI1 | . |
| SI2 | . |
| SI3 | . |
| SI4 | . |
| SI5 | . |
| SAVI | . |
| VSSI | -0.10 |
| NBR | . |
| NBG | . |
| NBNIR | 12.35 |
| NBSWIR1 | . |
| NBSWIR2 | -14.16 |
| NRSWIR1 | -3.81 |
| NRSWIR2 | . |
| NGSWIR1 | -5.63 |
| NGSWIR2 | . |
| NNIRSWIR1 | -0.66 |
| NNIRSWIR2 | . |

(3) Retained predictors (with non-zero coefficient values): Green\_R, SWIR2\_R, NDWI, NDSI1, VSSI, NBSWIR, NBSWIR2, NRSWIR1, NGSWIR1, NNIRSWIR1.