

We also evaluated the relationship between IBI scores and four measures of disturbance (ICI, IWI, percent urban, and percent agriculture). IBI scores were positively correlated with the ICI ($\rho = 0.53$) and IWI ($\rho = 0.61$) and had a strong negative correlation with percent urban land cover ($\rho = -0.62$) (Figure 12). IBI scores were weakly correlated with percent agriculture land cover ($\rho = 0.05$) but most sites had low percent agriculture ($<10\%$) (Figure 12).

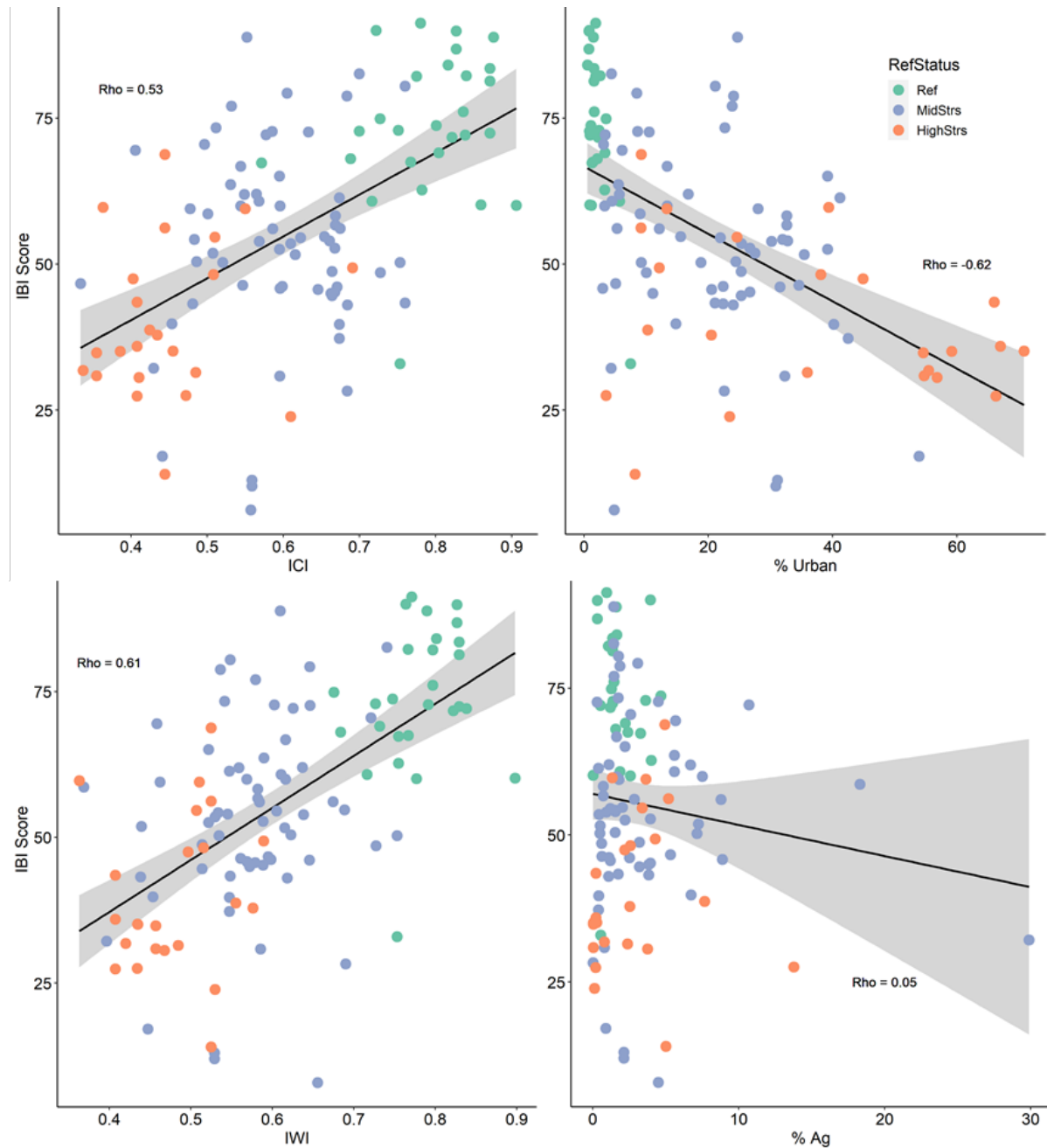


Figure 12. Relationship between the low gradient, multihabitat IBI vs. ICI (upper left), IWI (lower left), percent urban (upper right) and percent agriculture (lower right). The black line is the regression line and the rho value is the Spearman rank correlation coefficient.

5.5 Index verification

We had few sites to use in calibrating the index, so all were used in index calibration and none were reserved for independent application of the index and comparison to reference designations. Instead, index values were compared to stressors that were not used in defining the index calibration stressor gradient. Relationships with these independent indicators would show that the index was responsive along the stressor gradient, and it would be validated. The stressor variables that were compared included habitat scores, dissolved oxygen (DO), conductivity, and percent forest cover in the watershed. Other variables were compared, though they were not necessarily stressors in the low gradient streams. These included acidity (pH), substrate, and temperature.

When evaluated in relation to the RPB habitat score (maximum score = 189), maximum IBI scores declined as the habitat scores decreased from 120 (Figure 13). Not all IBI scores were high with better habitat scores. This suggests that other stressors might affect the macroinvertebrate community even when habitat conditions were fair or good. The individual habitat variables that went into the total habitat score show that some components of habitat were more influential on IBI scores than others. The most effective habitat components include available cover, sediment deposition, riparian vegetation, and bank stability (Figure 14). As with the total habitat score, these and other habitat variables only seem to affect the IBI scores when the values were low and IBI scores were variable with less habitat stress.

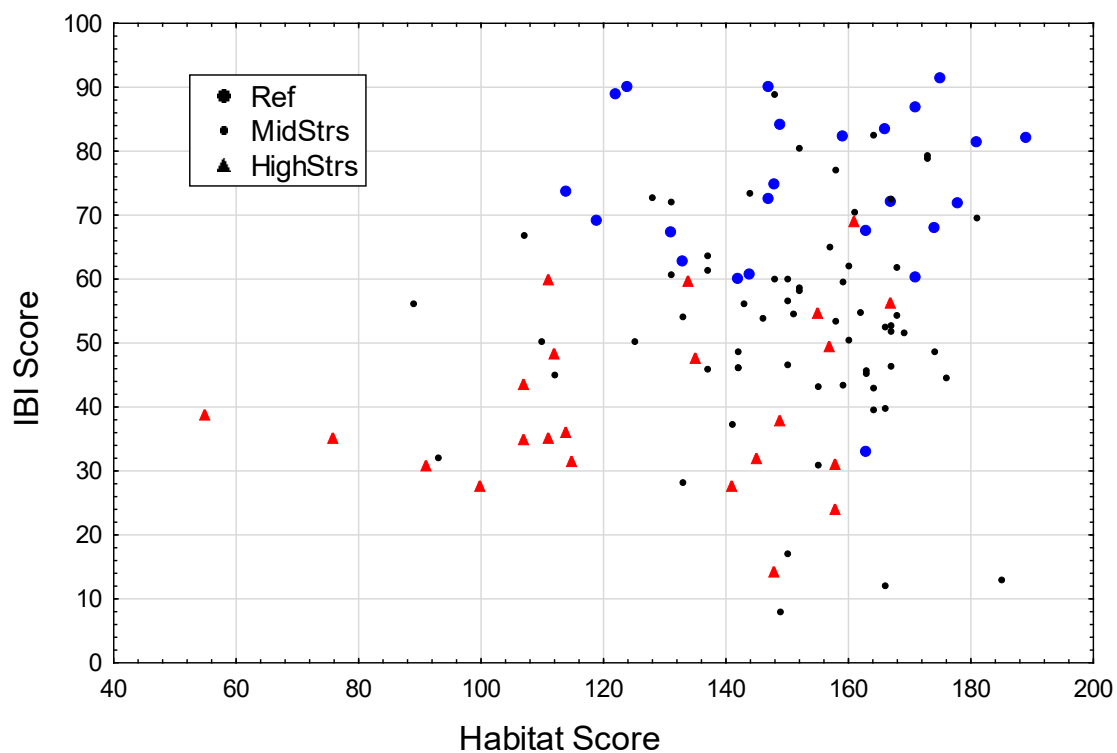


Figure 13. IBI scores in relation to RBP total habitat scores, marked by disturbance category.