An investigation of Northeastern forest health over the past 26 years

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Abstract: Northeastern forests are subject to a variety of stressors, such as acid deposition and extreme climate events. Temporal and geographical limitations have made the study of forest resilience to these stressors difficult. There has been an effort to address these limitations with remote sensing images, which can be used to assess the crown condition of forests over long time periods and large areas. This study utilized a Landsat TM-5 derived forest health trend that was developed by Pontius et al. (in review) to select sites in the Northeast for field data collection. The field data included site, stand, and soil characteristics, which were regressed with the Pontius health trend, and also used in a matched pairs analysis (n=12) between improving and declining health sites. The regressions indicate that high elevation, rapidly drained sites are less resilient, and tend to have low calcium, as well as high aluminum concentrations in the organic soil horizon. The matched pairs test, which was used to control for variables such as elevation, forest composition, climate, and soil parent material, also showed that cation concentrations may have predisposed sites for decline. This study suggests that acid deposition plays an important role in Northeastern forest health, but that further long term studies like this one should be conducted to explore the drivers of forest health decline.