Assessing Lake Clarity Using Landsat 8 OLI

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In 2014, employees, from NJDEP’s Ambient-Lake and Monitoring Network, measured and compiled Secchi Disk Transparency (SDT) of forty different lakes throughout New Jersey. The data from the NJDEP’s observed SDT data was compared to this study’s predicted SDT. Predicted SDT was calculated by using top-of-atmosphere reflectance from Bands 2, 3, & 4 of Landsat 8 Operation Land Imager (OLI). This study attempted to follow the methodology of other studies done in Minnesota (Kloiber et al., 2002; Olmanson et al., 2008), Michigan (Fuller et al., 2011), Taihu Lake in China (Zhao et al., 2011), Bung Boraphet lake in Thailand (Sriwongsitanon et al., 2011), and Río Tercero reservoir in Argentina (Bonansea et al, 2015). Two different predicted SDT models were tested, in order to see if they were applicable to New Jersey lakes. Both models yielded poor statistical correlations. However, because multispectral imagery is prone to light-scattering, it was reasonable to omit shallower lake depths. Thereafter, the second model outputted statistically significant findings. The objective of this study was to assess the clarity of New Jersey lakes using a predicted SDT, derived from Landsat 8 data, and to compare it to observed SDT field data.