

Detection of temporal trends in transparency across North America using volunteer-collected “snapshot” data

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Abstract

The Great North American Secchi Dip-In has continuously collected transparency data in North America since 1994. Volunteers collect the data during two weeks spanning Canada Day (July 1) and July 4th. More than 31,000 transparency records have been collected on 6,200 waterbodies. The Dip-In works through existing volunteer monitoring programs, which provides assurance that the data comes from trained volunteers.

Transparency values obtained during this “snapshot” event are found to have a low year-to-year within-lake variability (5-6% RSD) and even lower if the data were detrended (3-4% RSD).

Using data from waterbodies with five years or more of data, we used a Kendall’s Tau-b to detect temporal trends. Only 54 of 1,362 waterbodies were found to have significant ($P = 0.5$) decreases in transparency, while 61 had significant increases in transparency.

An Ohio volunteer database was used to detect weekly variability throughout the season. The highest weekly variability occurred during the early spring. The second peak (3-4% RSD) occurred in late June, decreasing thereafter into the fall. Year-to-year transparency trends varied throughout the season in slope and significance throughout the season, suggesting that “snapshot” monitoring can provide an estimate of change for a specific seasonal period. The comparability of trends obtained by “snapshot” monitoring and whole-season monitoring will be discussed.