Past, Present and Future of Solar Radiation in Lake Erie.

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Control of nutrient loads and colonization by *Dreissena* sp. are thought to have increased the transparency of Lake Erie to solar radiation, and continued expansion of *Dreissena* sp. into deeper waters may continue the trend to clearer water. Surface-incident ultraviolet-B radiation (280-320 nm) meanwhile continues to increase as stratospheric ozone concentrations decline. Greater water clarity may expand the photic zone of the lake but also increase the UV exposure of aquatic organisms. Forecasting the consequences for the lake depends on a good understanding of the factors controlling spectral transmission. We present evidence that the effects of *Dreissena* sp. on water clarity cannot be explained solely by their removal of phytoplankton, and that water column chlorophyll a concentration is a relatively minor influence of visible and ultraviolet radiation attenuation in Lake Erie. Consistent with this reality, transparency in some parts of the lake has deteriorated again in recent years even though chlorophyll a concentrations remain lower than in pre-*Dreissena* years. The role of *Dreissena* in facilitating sedimentation of non-phytoplankton particles, the fate of the sedimented material, and changes in the nature and extent of sediment re-suspension are likely to be key factors in the biological control of water clarity. Uncoupling of water transparency and UV transmission from phytoplankton abundance has significant implications for predictions of water clarity, UV exposure, and primary production in future years.