

Development of a Methodology to Assess Standards Violations in the Everglades Utilizing Secondary Data Sources

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Biographical Sketch of Author

Kenneth Weaver is an Environmental Specialist in the Water Quality Standards and Special Projects Program within the Florida Department of Environmental Protection with training and experience in aquatic ecology, statistics, and water quality. Since joining the Department in 1998, he has provided technical and regulatory support for Everglades restoration projects. This support has included water quality standards attainment assessments, Everglades phosphorus and dissolved oxygen criteria development, monitoring network design, and providing expert testimony in court and before technical advisory committees. Currently, Ken is coordinating the development of statewide numeric nutrient criteria for streams, canals, and lakes.

Abstract

The Florida Legislature directed the South Florida Water Management District and Florida Department of Environmental Protection to annually issue a peer-reviewed report identifying water quality variables, which exceed water quality standards or are causing or contributing to adverse impacts in the Everglades. Although the mandate exists to report standards compliance, there is no uniquely designed and operated monitoring program to measure such compliance. The authors of these reports have attempted to use, in a scientifically sound manner, data collected for other purposes (found data) to assess standards compliance. The methods used to assess standard violations have evolved between 1999 and 2003 through a process that sought to balance consistency with previous Everglades reports, other state of Florida water quality programs, and U.S. Environmental Protection Agency guidance, while acknowledging the limitations of using found data. Prior to the 2003 report, an exceedance was reported when more than 5 percent (raw score) of the annual measurements exceeded numeric criteria. Because a raw-score approach does not account for uncertainty associated with sampling, it was replaced in 2003 with a binomial hypothesis test for sample sizes greater than 27 measurements. Using the binomial hypothesis test at the 90 percent confidence level a standards violation was reported if the annual exceedance rate was greater than 10 percent. For sample sizes less than 28 a violation was preliminarily reported if the annual exceedance rate was greater than 20 percent as a raw score. These preliminary violations were confirmed by applying a binomial hypothesis test over a longer five year period of record.