

## **USING AMBIENT DATA TO ESTABLISH ANTIDEGRADATION STANDARDS: THE UTILITY OF NON-PARAMETRIC CONFIDENCE LIMITS**

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### **ABSTRACT**

Antidegradation regulations arising from the federal Clean Water Act provide a powerful tool to protect water quality and ecological integrity. Frequently, however, the antidegradation designation for a particular waterbody is based on very little water quality data, thus precluding both the establishment of water quality standards and future assessments of whether the antidegradation standards are being maintained. On the interstate waters between New Jersey and Pennsylvania, the Delaware River Basin Commission has established an antidegradation program called Special Protection Waters for 70 miles of the Delaware River based on a 5-year intensive monitoring program for the main stem and its tributaries. Like most ambient water quality data sets, two of the central challenges are the lack of normally-distributed data and the large proportion of censored observations. An additional challenge for this densely populated region of the eastern United States is the need to incorporate some flexibility and room for modest infrastructure growth while maintaining the integrity of the river and its tributaries. This is accomplished by establishing confidence limits for each water quality parameter. The Delaware River Basin Commission has specifically chosen non-parametric confidence intervals of median parameter values to define Existing Water Quality as a means to simultaneously address these technical and political challenges. Such confidence intervals are well established theoretically, but have seen limited use in water quality applications. We discuss the relatively small loss of statistical power in these tests, and the advantages in utilizing such a robust analytical approach.

### **KEYWORDS**

Antidegradation, non-parametric, water quality standards