Quality Assurance

Detailed instructions will be provided for collection and processing of samples. Analytical procedures will follow published methods. Quality-assurance samples will be used to document the precision and accuracy of analytical results. Quality-assurance samples will consist of laboratory duplicates (10 percent), blind duplicates and blanks (10 percent), and distilled water spikes (5-10 percent).

DATA ANALYSIS METHODS AND REPORTS

Because of the short-term temporal variability inherent in herbicide concentrations at an individual site and the effects of precipitation and runoff patterns, results from this study cannot be used to make statements about changes in herbicide concentrations in an individual basin. Instead the 53 sites selected for this study are assumed to be a random sample of Midwestern streams. Statistical procedures will be used to analyze the results and to statistically compare the 1994 data with data collected from these same sites in 1989 and 1990. Because the herbicide data are not expected to be normally distributed, nonparametric statistical procedures such as the Wilcoxon signed rank test for paired samples and logistic regression (Helsel and Hirsch, 1992) will be used to determine if the distributions of herbicide concentrations in 1994 are different from those reported for 1989 and 1990. These procedures will be performed for all major herbicides, nitrate, streamflow, and some physical parameters. Boxplots will be used to graphically compare results.

If atrazine use has decreased and the use of other herbicides, such as cyanazine and metolachlor has increased, the ratios of the concentrations of these herbicides to atrazine may be more sensitive to changes than the herbicides themselves. Consequently, the statistical tests described above will also be made for these ratios. The above statistical comparisons between the 1994 and 1989-90 time periods will also be attempted on a subregional scale for individual and combinations of States.

Results of the statistical analysis and results of the atrazine, cyanazine, and alachlor metabolite analyses will be interpreted and presented in one or more scientific papers. The data will be published in a USGS Open-File Report.

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