

Sampling Schedule

The first sample (pre-application) will be collected at each site prior to the application of herbicides in March or early April. To the extent possible, this sample will be collected when some overland runoff is occurring to help determine the extent to which herbicides are carried over from previous application periods.

A second (post-application) sample will be collected at each site after herbicides have been applied and following the first precipitation event that produces overland flow. Collection of this sample will require a special visit to the site. To the extent possible, this sample will be collected near the discharge recorded when the 1990 sample was collected. Attempts were made in 1990 to collect the sample near the peak discharge for the event. Results and hydrographs from the 1989 sampling and studies using autosamplers in 1990 show that this is when the largest concentrations occur.

Sampling Procedures

Samples will be collected with a depth integrating sampler from three or more verticals. Sufficient volume of water will be collected in glass, Teflon, or stainless-steel sampling bottles (for example, sediment bottles) to make field measurements of pH and specific conductance (unless these are measured in situ). Samples from the three or more verticals will be composited in a 1-liter or larger glass, Teflon, or stainless-steel container. All sampling equipment will be cleaned with non-phosphate detergent, rinsed thoroughly with tap water, then distilled/deionized water, followed by a final rinse with a 50-percent solution of methanol and organic-free water. Samples will be filtered through glass fiber filters for herbicide analysis, and through membrane filters for nitrogen and phosphorus analysis.

Four 125-ml glass bottles from each site will be sent to the USGS laboratory in Lawrence, Kansas, for the analysis of herbicide compounds, and a 125 ml polyethylene bottle will be sent to the USGS National Water Quality Laboratory in Denver for analysis of dissolved nitrogen and phosphorus compounds. Field measurements for specific conductance, pH, and temperature will be taken for all samples and a discharge will be obtained by direct measurement, from a rating curve, or estimated from a nearby gaging station.

Analytical Procedures

All samples will be analyzed for 11 herbicides and 2 atrazine metabolites (table 2) by gas chromatography/mass spectrometry according to procedures described by Thurman and others (1990) and Meyer and others (1993). ESA will be analyzed by the method of Aga and others (1994) and cyanazine metabolites will be analyzed by a method developed by M.T. Meyer (unpublished). Nitrogen and phosphorus compounds (table 2) will be analyzed by the method described by Fishman and Friedman (1989).