

Northeastern Section (39th Annual) and Southeastern Section (53rd Annual) Joint Meeting (March 25–27, 2004)

Paper No. 58-9

Presentation Time: 1:00 PM-5:00 PM

THE CHEMICAL COMPOSITION OF WASTEWATER TREATMENT PLANT EFFLUENT IN UPSTATE SOUTH CAROLINA

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As population continues to grow, wastewater treatment effluent will become a larger component of river water. Few studies however, have examined the chemical composition of effluent. In the upstate of South Carolina, small piedmont rivers have relatively low discharge and are naturally dilute, thus local wastewater treatment plants have a large impact on the chemistry of the streams.

In order to assess the variation in the chemical composition of effluent, eighteen wastewater treatment plants were sampled in the summers of 2002 and 2003. The discharge of effluent from the plants ranges from less than 2000 to as much as 75,000 cubic meters per day. Upstream, downstream and wastewater treatment plant grab samples were collected during base river flow to decrease the potential of dilution by storm water. All samples were analyzed for pH, conductivity, turbidity, alkalinity, and the concentrations of anions, major cations, dissolved organic carbon, and total dissolved nitrogen. These data are compared to limited influent and effluent chemical data obtained for some of the treatment plants.

Influent chemistry varied considerably among the various plants for which we have data. Treatment reduced the concentration of phosphorous and converted organic nitrogen and ammonia to nitrate in the effluent. The chemical composition of effluent was more variable than anticipated. The median conductivity of effluent was 400 microsiemens per centimeter compared to less than 50 microsiemens per centimeter for most effluent free streams and rivers. The effluent was nutrient enriched with median concentrations of approximately 40 mg/L nitrate and 4 mg/L phosphate, compared to average concentrations of 1.5 mg/L nitrate and less than 0.1 mg/L phosphate in effluent free river water. In general, the effluent can be classified as a sodium-chloride-sulfate composition. The greatest variation is in the sodium-calcium and the chloride-bicarbonate ratios. The results indicate that the signature of effluent discharge in rivers may vary considerably, especially when more than one wastewater treatment plant discharges into a single river.

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Session No. 58--Booth# 55

[Undergraduate Research \(Posters\) II](#)

Hilton McLean Tysons Corner: Ballrooms A and B

1:00 PM-5:00 PM, Friday, March 26, 2004

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