Predicting Surface-Water Impacts from Concentrated Animal Feeding Operations: A National Analysis

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The U.S. Environmental Protection Agency has developed a methodology to quantify national-level water-quality impacts due to nutrient loads from concentrated animal feeding operations (CAFOs). The methodology provides a screening-level analysis of impacts to reservoirs, based on trophic status and hypolimnetic dissolved-oxygen concentration. The methodology incorporates various watershed model results, databases, and water-quality models. The watershed portion of the model is based on the eight-digit hydrologic cataloging unit and utilizes previously published nutrient export estimates generated by the U.S. Geological Survey's SPARROW model. The watershed-export estimates are adjusted using data from a manure-nutrient database, which was developed to estimate the amount of nutrients generated by livestock type and farm size in each watershed. A lake-response model is used to predict long-term responses of hypolimnetic dissolved-oxygen concentrations. A stream model also is being developed to estimate ammonia and dissolved-oxygen concentrations. Effects of policy changes on nutrient runoff are estimated externally, using a field-scale model, and then incorporated into the water-quality analysis.

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