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**A SYNTHESIS OF SPATIALLY EXPLICIT MODELING RESULTS FOR MAJOR REGIONS OF THE
CONTERMINOUS UNITED STATES**

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ABSTRACT: Management of the Nation's surface water quality requires significant quantities of information that are expensive to collect and difficult to integrate and interpret. To support the efficient use and interpretation of the available water-resource information, the U.S. Geological Survey (USGS) developed a spatial water-quality modeling framework known as SPatially Referenced Regressions On Watershed attributes or SPARROW. SPARROW models have been developed in the United States (U.S.) over spatial extents ranging from the conterminous U.S. to smaller regions such as the Chesapeake Bay watershed. A recent USGS effort included the systematic development of nutrient models in six major regions of the conterminous U.S.; the Northeast, the Southeast, the Upper Midwest, the Lower Midwest, the Missouri Drainage and the Pacific Northwest. These regional models extend over most of the country and collectively describe water quality both within and across regions, thus providing information that may be useful for both regional and national resource management agencies. The effort to develop the models included improvements in the types and resolution of selected geospatial datasets and a greatly expanded number of stream monitoring sites compared to those used in prior SPARROW models. The results provide new insights on nutrient sources and processes, including improved understanding of the relative importance of point and diffuse sources in urban areas and the effects of soil phosphorus and channel erosion processes on the quantities of phosphorus in streams. In all of the regions, urban and agricultural sources were identified as the greatest contributors of nutrients to streams, but the model results show regional differences in the relative importance of urban versus agricultural sources and in the types of urban (point, diffuse) and agricultural (fertilizer, manure) sources. Environmental processes affecting the transport of nutrients from the land surface to streams also differed by region, with climatic factors (precipitation, temperature) being among the most important in all regions. Overall, the regional SPARROW models provide a consistent and reliable approach for identifying the major sources and environmental factors affecting nutrient fate and transport in U.S. watersheds.

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