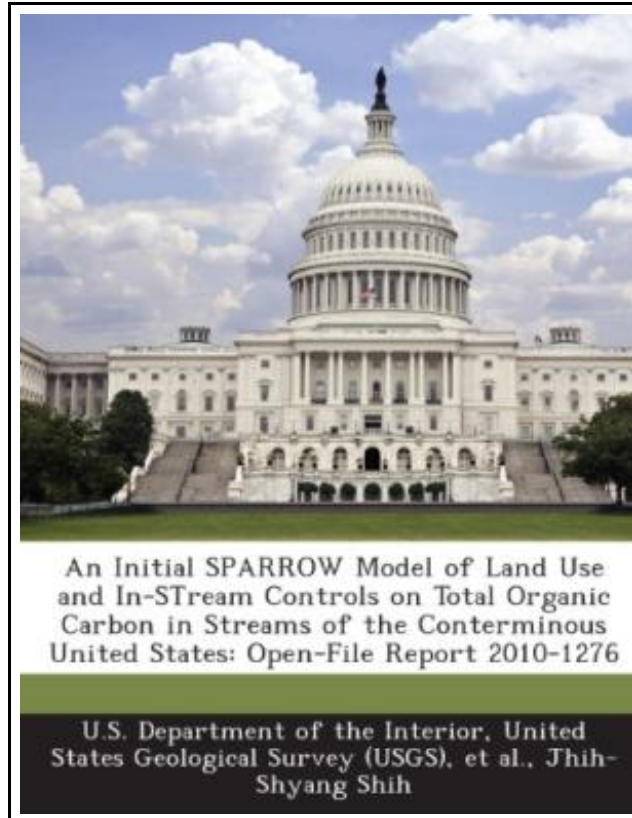


# An Initial Sparrow Model of Land Use and In-Stream Controls on Total Organic Carbon in Streams of the Conterminous United States: Open-File Report 2010-1276



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## **AN INITIAL SPARROW MODEL OF LAND USE AND IN-STREAM CONTROLS ON TOTAL ORGANIC CARBON IN STREAMS OF THE CONTERMINOUS UNITED STATES: OPEN-FILE REPORT 2010-1276**



Bibliogov, United States, 2013. Paperback. Book Condition: New. 246 x 189 mm. Language: English . Brand New Book \*\*\*\*\* Print on Demand \*\*\*\*\*.Watersheds play many important roles in the carbon cycle: (1) they are a site for both terrestrial and aquatic carbon dioxide (CO<sub>2</sub>) removal through photosynthesis; (2) they transport living and decomposing organic carbon in streams and groundwater; and (3) they store organic carbon for widely varying lengths of time as a function of many biogeochemical factors. Using the U.S. Geological Survey (USGS) Spatially Referenced Regression on Watershed Attributes (SPARROW) model, along with long-term monitoring data on total organic carbon (TOC), this research quantitatively estimates the sources, transport, and fate of the long-term mean annual load of TOC in streams of the conterminous United States. The model simulations use surrogate measures of the major terrestrial and aquatic sources of organic carbon to estimate the long-term mean annual load of TOC in streams. The estimated carbon sources in the model are associated with four land uses (urban, cultivated, forest, and wetlands) and autochthonous fixation of carbon (stream photosynthesis). Stream photosynthesis is determined by reach-level application of an empirical model of stream chlorophyll based on total phosphorus concentration, and a mechanistic model of photosynthetic rate based on chlorophyll, average daily solar irradiance, water column light attenuation, and reach dimensions. It was found that the estimate of in-stream photosynthesis is a major contributor to the mean annual TOC load per unit of drainage area (that is, yield) in large streams, with a median share of about 60 percent of the total mean annual carbon load in streams with mean flows above 500 cubic feet per second. The interquartile range of the model predictions of TOC from in-stream photosynthesis is from 0.1 to 0.4 grams (g) carbon (C) per square meter (m<sup>2</sup>) per...

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