Dale Robertson and David Saad are both research hydrologists with the U.S. Geological Survey. Dale Robertson received his Ph.D. in Oceanography and Limnology from the University of Wisconsin-Madison.

Due to high nutrient loads, eutrophication in the Great Lakes has been a recurring problem. Unfortunately, the number of monitored tributaries flowing into the Great Lakes has been shrinking and nutrient loads for many of the tributaries are unknown. For this reason, Robertson and Saad developed SPARROW models for the phosphorus and nitrogen loading into each of the five Laurentian Great Lakes. The study area contained the U.S. watersheds feeding the Great Lakes and 2002 was used as the base year for their model. The goals of this study were to quantify the nitrogen and phosphorus loads entering the lakes, identify which tributaries contribute the most nutrients, and identify the sources of these nutrient inputs.

In an attempt to reduce the severity of eutrophication problems, target nutrient loads for phosphorus were established in the 1972 GLWQA. In the Great Lakes, phosphorus is considered to be of greatest concern although nitrogen has been identified as a problem nutrient as well. In addition to the goals stated above, this study set out to see if these target loads are being met and if nutrient loads have increased of decreased since this target was set.

The phosphorus model was calibrated using six P sources: point sources, confined manure, unconfined manure, farm fertilizers, urban areas, and forested areas. The nitrogen model was calibrated using five N sources: atmospheric deposition, point sources, confined manure, farm fertilizers, and additional agricultural sources in cultivated areas.

Phosphorus yields were found to be highest in areas with animal agriculture and nitrogen yields were found to be highest in areas with crop-oriented agriculture. The Lake Erie Basin produced the highest yields for both P and N. This was due to high amounts of agriculture and a large number of point sources in this watershed. Agricultural operations contributed between 33-44% of the total phosphorus load and between 33-58% of the total nitrogen load for each of the lakes. Point sources were also significant contributors, contributing between 14-44% of the total P load and between 13-34% of the total N load. In each lake the target nutrient loadings were met and the total annual load was found to be similar or less than the estimated values from the 1980s measurements.