Modeling the Seasonal Variation and Impact Factors of Nutrients in the Fanshawe Reservoir

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Human activities, such as mining, sewage discharge, fertilizer usage and dam construction for electricity, have been highly disturbed the biogeochemical cycling of the nutrients in terrestrial and aquatic systems. Negative effects of the excess inputs of nutrients have been observed in different rivers, lakes and oceans. Due to the intensive anthropogenic activities, including the rapid development of agriculture and mining, excess phosphorous (P) has been loaded into the Thames River Watershed, in Ontario. The water qualities in the Thames River Watershed has been highly affected by the inputs of the phosphorous and other nutrients. The polluted water could have significant negative effects on the downstream aquatic environment, such as Lake St. Clair.

The current study has built and simulated the 2-D hydrodynamic model, water qualities model and the sediment diagenesis model for the Fanshawe reservoir which is located in the Northern Thames River Watershed. Fanshawe Dam has been built for controlling the flood events which may damage the city of London. Meanwhile, excess nutrients could be stagnated into the reservoir and slowly release to the water column in a long period, which poses persistent negative effects on water qualities and significant difficulties for water management strategies. The major goal of this modeling study is to understand the fate of the P in the reservoir which includes the relationship between external loading and internal loading of P, and the relationship between nitrogen loading and P loading.