The ecosystems of Conesus Lake have been changed significantly by the introduction of exotic Eurasian watermilfoil. The loss of nutrients and soil from farm land around the lake encourages the growth of macrophytes. Research was carried out to understand how the macrophytes affect flow currents and nutrient distribution with the goal of decreasing nuisance plant species in downstream ecosystems. A three-dimensional, macrophyte-drag hydrodynamic model was used to study water circulation and predict the sediment deposition pattern in Conesus Lake. Spring and summer conditions were taken into account for simulation. Local weather conditions and stream flow data were used to drive the model. The simulated velocity fields show relatively good agreement with the geo-referenced map of macrophytes distribution. The simulated sediment deposition pattern shows a better agreement with the observed macrophytes distribution when the macrophyte drag is taken into account in the modeling.