Mehdi, B., Lehner, B., Gombault, C., Michaud, A., Beaudin, I., Sottile, M.-F., & Blondlot, A. (2015). Simulated impacts of climate change and agricultural land use change on surface water quality with and without adaptation management strategies. Agriculture, Ecosystems & Environment, 213, 47–60. doi: 10.1016/j.agee.2015.07.019

The Workshop article examined the impacts of climate change and land-use change of agricultural land on water quality within the Pike River Watershed with and without the implementation of various management strategies. The article was written by Mehdi et al. from McGill University Department of Geography and Quebec's Institute of Research on Development and the Agro-environment (IRDA). The article examined only non-point source pollutants, specifically nitrogen, phosphorus, and sediment entering the Pike River Watershed from agricultural and forest activities. Climate change increases the average temperature and causes greater amounts of precipitation, which deteriorates water quality through increased sediment transport and increased nutrient loading. Agricultural land use change can also negatively affect water quality through increased sediment and nutrient loading. The goal of Mehdi et al. was to determine if field management strategies could reduce the combined effects on water quality. The water quality model SWAT (Soil and Water Assessment Tool) was used to assess the surface water quality of the Pike River Watershed. SWAT is a "comprehensively based, semi-distributed model" that uses a daily time step to simulate the future water quality of this agricultural watershed. First, Mehdi et al. predicted future climate simulations from regional climate models (RCMs) and the predicted future land-use changes which were developed through stakeholder input. Next, SWAT was used to model the three climate change scenarios with and without the two land-use change scenarios. Three different management strategies were developed, ranging in reduction goals, and input into the model to identify if management strategies reduced the water quality impacts of climate change and land use change. Mehdi et al. found that climate change impacted water quality much greater than land-use change. Additionally, the field management strategies greatly reduced the modeled increased nutrient and sediment loading, specifically the significant spring-time melt loading. Surface water quality modeling can be a useful tool to aid in the creation of agricultural policies and management strategies in order to reduce sediment and nutrient loading to vulnerable waterbodies.