# CLIMATE CHANGE IMPACT ON THE WATER QUALTY OF THE KISSIMMEE RIVER – LAKE OKEECHOBEE SYSTEM

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Lake Okeechobee and its drainage basins, the Northern Lake Okeechobee (NLO) watershed, have faced climate changes. This study evaluated the impacts of climate change on the water quantity and quality of the NLO watershed–Lake Okeechobee system using a spatially integrated modeling framework combining watershed loading and receiving waterbody models together. Future climate projections and water level operation scenarios were incorporated into the modeling to investigate how the watershed–lake system may react to projected climate changes and how management practices can mitigate the impacts. The modeling experiments found that the flow and TSS loads from the upstream drainage basins of the lake might decrease in the future. The projection of TN load to the lake varied depending on the basins, their land uses, and RCPs. The TP load was projected to increase in the future when the current manure and fertilizer rates were maintained the same in agricultural lands. The water quality of Lake Okeechobee was projected to degrade in the future due to the projected increase in air temperature and/or in the external nutrient loads from the upstream watersheds. The water level operation was found to be able to reduce the TN and TP concentrations of Lake Okeechobee but led to little change in the Chl-a concentrations. The modeling experiment found that the Chl-a and DO concentrations of the lake would be more sensitive to the climate forcings, while the TN and TP concentrations would be more responsive to the external loadings from the upstream basins and the water level operation scenarios. The results demonstrate that the water quality of the lake was a function of air temperature and internal hydrodynamics driven by lake water level operation and wind as well as nutrient loads from the upstream areas.

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