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The impact of weather and stormwater management ponds on the transmission of West Nile virus

West Nile virus (WNV) is the most widely distributed arbovirus in the world and the spread is influenced by complex factors including weather conditions and urban environmental settings like stormwater management ponds (SWMP). By investigating the data from larvae surveillance program launched by Toronto and Region Conservation Authority (TRCA), Canada, we develop an ordinary differential equation model to explore the impacts of SWMP, temperature and precipitation on WNV vector abundance and the transmission of WNV between mosquito and bird populations. The results found that an excess of precipitation and fiercer intraspecific competition will reduce vector population and the peak value of infectious vectors and birds. This information can be used to identify measures that would be useful to control larval abundance in SWMP and the transmission of WNV. This is a joint work with Wendy Pons, Jessica Fang and Huaiping Zhu.