

Use of an ecohydrology model to predict the impact on the Serengeti
ecosystem of deforestation, irrigation and the proposed Amala Weir Water
Diversion Project in Kenya

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Abstract

The Mara River catchment is the dry weather refuge for more than one million migrating wildebeest and zebras of the Serengeti ecosystem. The river flow is affected by developments in Kenya, including deforestation and water diversion for irrigation and the proposed Ewaso Ng'iro (South) Hydropower Project. An ecohydrology model was used to predict the likely impact of these developments on the Serengeti ecosystem. The model was forced by observed monthly rainfall in the period 1900-2000 and calibrated against observations of the number of wildebeest and lions also in the period 1960-1999. The projects are predicted to have little effect on the number of migrating wildebeest in the Serengeti until a drought occurs; historically a drought occurs about every seven years. At that time 20 to 80% of the migrating wildebeest may die, according to the severity and duration of the drought. With a 50% die-off, it may take twenty years for the population to recover; with an 80% die-off there may be no population recovery. In practice the economic benefits would go to Kenya while Tanzania would suffer the economic costs, for example, the negative impact on the tourism industry. To ensure sustainable development for both Kenya and Tanzania, a transboundary Mara River management plan needs to be implemented and be compatible with ecohydrology principles for the sustainable use of aquatic resources.

Notes to readers

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