

## **MANAGED FLOODS IN THE KAFUE FLATS, ZAMBIA**

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This is a case study based on a MSc. thesis in Watershed Hydrology from Wageningen University. The study area is the Kafue Flats in Zambia and the research was part of a WWF Partners for Wetlands project. The aim of this research was to investigate the possibility of introducing managed floods in the Kafue Flats that mimic to a certain extent the natural flooding pattern. The ultimate goal is to rehabilitate the valuable wetlands of the Kafue Flats. The Kafue Flats are annually flooded plains covering about 6500 km<sup>2</sup> along the banks of the Kafue River in southern Zambia. The Kafue Flats are extremely important for wildlife, fishing, cattle grazing and sugar cane farming but also for the production of hydroelectric power.

In the seventies two dams were built in the Kafue River. The Kafue Gorge Dam and the accompanying hydroelectric power plant were constructed just downstream of the wetlands and the Itezhi-tezhi Dam was built just upstream of the Kafue Flats. The Itezhi-tezhi Dam releases water at a relatively constant rate to ensure a continuous supply to the Kafue Gorge hydroelectric plant, thus greatly reducing the seasonal fluctuations in the discharge in the Kafue River. Consequently the height and extent of the floods have been reduced and the timing has changed. In the downstream end of the Flats the storage of water in the Kafue Gorge Reservoir causes a backwater curve that raises the water levels further upstream and thus delays the fall in water levels in the Flats after the flooding. In combination with the dry season flow now being larger than natural, flood conditions persist at the end of the dry season at the eastern end of the Flats.

To investigate the possibility of introducing managed floods in the Kafue Flats, a cell-type model representing the area was used. This model simulates the flooding pattern in the Flats before the dams were built, the so-called natural situation and for the same set of years it also simulates the flooding in the Flats for the situation when the dams exist. First the natural flooding pattern was determined for dry, average and wet years and then the flooding pattern for the situation with both dams was simulated. After comparing these two scenarios and drawing conclusions on the effects of the dams on the flooding pattern, a number of managed floods with varying volumes and durations were simulated. Conclusions were drawn on the possibility and effectiveness of managed floods in dry, average and wet years.