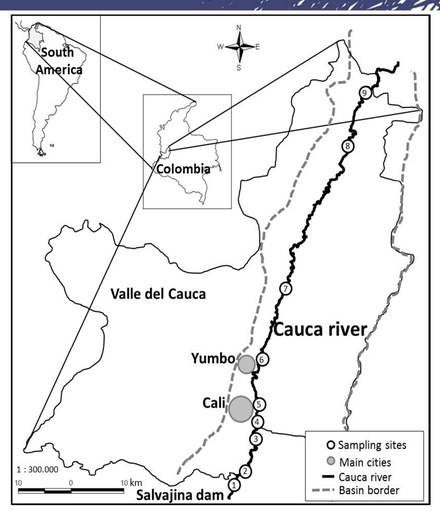
Integrated Ecological Modelling for Decision Support in River Management of the Cauca River in Colombia

Holguin Javier. E.[1], Goethals Peter. L.M.[1] and Galvis Alberto

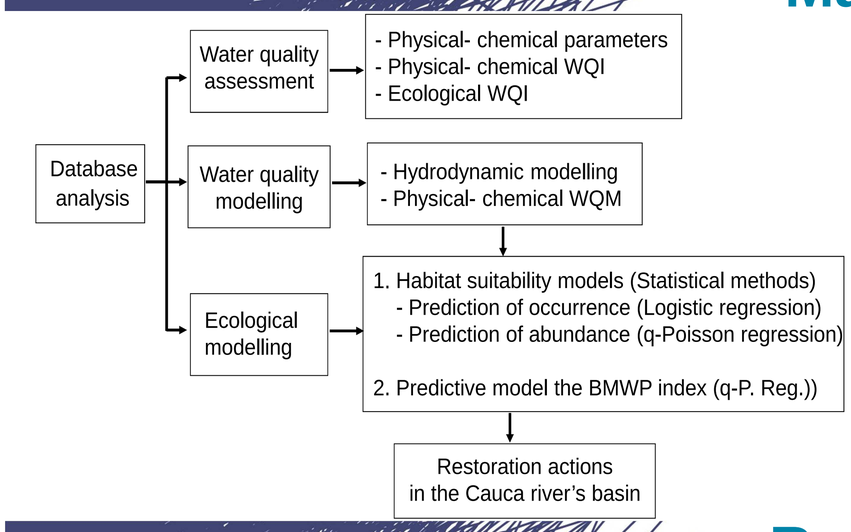
[1] Laboratory of Environmental Toxicology and Aquatic Ecology
Jozef Plateaustraat 22, B-9000 Ghent
javierernesto.holguingonzalez@ugent.be

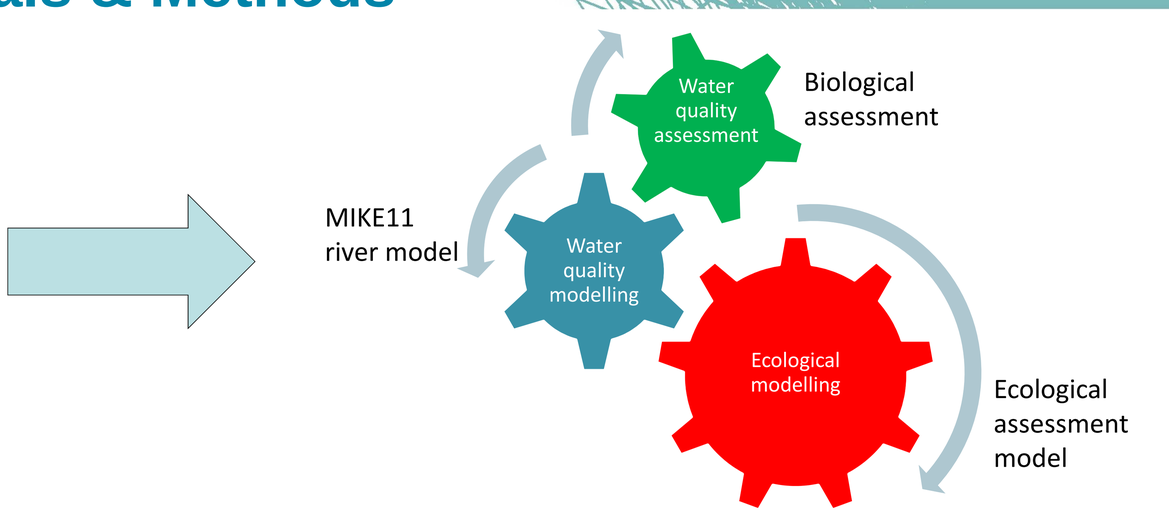
Introduction



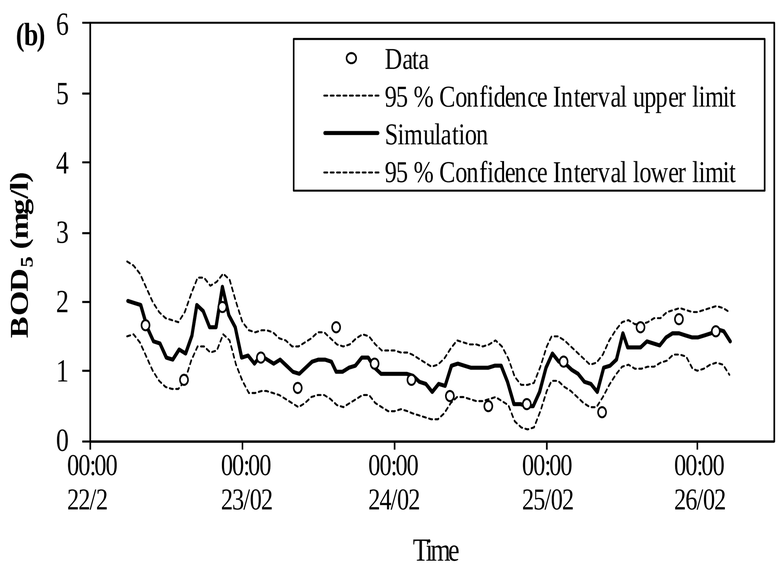
The Cauca river is one of most severe cases of pollution for domestic and industrial wastewater discharges in Colombia. In this research an integration of habitat suitability models with the hydrodynamic and physical-chemical water quality model MIKE11 was performed. The main objective of this research was to contribute to the integrated water quality management of the Cauca river, developing a mathematical model to investigate the ecological quality of this river under actual conditions as well as after different restoration actions.

Materials & Methods





Results & Conclusion



The integrated ecological model proposed in this research is a powerful operational tool, which allows to assess and to predict the ecological impact of wastewater discharges into the Cauca river and to calculate the needed reductions in wastewater discharges of organic matter to meet biological quality criteria in this river.

A total of three (3) macroinvertebrate taxa, were selected for constructing the ecological models, Ephemeroptera and Trichoptera taxa (pollution sensitive benthos) and Haplotaxida taxa (pollution tolerant benthos). The assessment of the MLRMs reliability showed that the models correctly discriminates between occupied (presence) and unoccupied (absence) sites in the dataset. Regarding the predictive validation procedure for QPRMs, it was found that in general the models reproduce with good precision the tendencies and the maximum and minimum values of abundance data for each macroinvertebrate and the BMWP index.