

Predicting the potential distribution of invasive silver carp *Hypophthalmichthys molitrix* in South Africa

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Abstract

Predicting the potential geographical distribution and spread of non-native species is of major concern to ecologists. Silver carp *Hypophthalmichthys molitrix*, ranked as one of the world's 100 worst invasive species, were introduced into South Africa in 1975, but the potential spread of this invader has not yet been addressed, despite recent studies indicating its potential ecological impacts in South Africa. The potential range of silver carp in South Africa was identified based on ecological niche modelling (ENM) using the maximum entropy method. Models were constructed using occurrence records and a defined background, and calibrated using a *k*-fold method. The area under the receiver operating characteristics curve (AUC) was used to evaluate model performance. Both the native and introduced range model accurately predicted species occurrences (AUC 0.98 and 0.94, respectively). Most of the north-eastern part of South Africa, including the Limpopo River Basin, where the presence of silver carp has been recorded, was correctly predicted as climatically suitable for silver carp. Other areas with suitable climatic conditions for silver carp but with no known introductions were also identified. The model demonstrated the potential use of ENM to predict the potential range of silver carp in South Africa.