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**A QUALITATIVE ECOLOGICAL RISK ASSESSMENT OF THE
INVASIVE NILE TILAPIA, OREOCHROMIS NILOTICUS IN A SUB-
TROPICAL AFRICAN RIVER SYSTEM (LIMPOPO RIVER, SOUTH
AFRICA)**

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ABSTRACT

1. This study outlines the development of a qualitative risk assessment method and its application as a screening tool for determining the risk of establishment and spread of the invasive Nile tilapia, *Oreochromis niloticus* (Linnaeus, 1758), within the central sub-catchment of the Limpopo River basin in northern South Africa.
2. The assessment used known physiological tolerance limits of *O. niloticus* in relation to minimum water temperature, presence or absence of dams, seasonality of river flows, and the presence of indigenous fish species of concern to identify river systems that would be suitable for *O. niloticus* establishment.
3. River sections along the Limpopo main river channel and the immediate reaches of its associated tributaries east of the Limpopo/Lephalala river confluence along the Botswana–South Africa–Zimbabwe border were identified as being highly vulnerable to *O. niloticus* invasion. Rivers in the upper Bushveld catchment (Upper Limpopo, Mogalakwena,

Lephalala, Mokolo, Matlabas and Crocodile rivers) were categorized as of medium ecological risk, while headwater streams were considered to be of low ecological risk.

The decrease in vulnerability between lowveld and highveld river sections was mainly a function of low water temperatures (8–12_C) associated with increasing altitude.

4. *Oreochromis niloticus* is already established in the lower catchment of the Limpopo River basin where indigenous congeners are at an extinction risk through hybridization and competition exclusion. *Oreochromis niloticus*, therefore, poses an ecologically unacceptable risk to river systems in the upper catchment where it is yet to establish. The current risk assessment model provides a useful preliminary framework for the identification of river systems that are vulnerable to an *O. niloticus* invasion where conservation measures should be directed and implemented to prevent its introduction and spread within the Limpopo river system.

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