

PREFACE

Ecohydraulics is defined as the study of the linkages between physical processes and ecological responses in rivers; estuaries and wetlands (Centre for Ecohydraulics Research, Univ. Idaho, 2006). Since the early 1990s, the science of ecohydraulics has developed at a rapid pace. This was mainly in response to the need to inform Ecological Water Requirement and river rehabilitation studies aimed at predicting and mitigating the impacts of changes in flow and sediment regimes on river ecosystems. Essentially, these studies assess the magnitude and timing of flows necessary to maintain a river ecosystem in a predetermined, environmentally acceptable condition, with ecohydraulics providing a tool to characterise the relationship between discharge and the availability of physical (hydraulic) habitat within the river ecosystem. Based on this relationship and an understanding of the hydraulic conditions that are optimal for different species or communities, ecohydraulic modeling is employed to predict how hydraulic conditions in a river might change under different development scenarios and thus, how the aquatic habitat of specific species or communities could be affected.

Over the past almost twenty years in South Africa, a great deal of knowledge on ecohydraulics, related to both research and application, has been gained through several projects involving the Water Research Commission, the Department of Water Affairs and Forestry and other institutions in South Africa. The realisation that this information and knowledge are fragmented and often inconsistent across various knowledge centres and disciplines, e.g. aquatic ecology, riverine vegetation, sedimentation, fluvial morphology and fundamental hydraulics, prompted this project, the objective of which was to provide a synthesis of existing knowledge on ecohydraulics in South Africa in a logical and accessible format. Not only does this document present theories and techniques related to ecohydraulics, it also provides the ecological context and perspective for the application of ecohydraulics and as such builds capacity amongst both engineers and ecologists and contributes towards the effective management of our aquatic environment. Furthermore, as this document provides an overview of the current state of ecohydraulics research in South Africa, it serves as a useful point of reference for identifying and prioritising future research needs for ecohydraulics in South Africa.