

Environmental Flows: The State of the Science, at Home and Abroad

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Flow is the ‘master variable’ or ‘maestro’ that orchestrates ecological conditions of rivers and a naturally dynamic flow regime plays a critical role in sustaining ecosystem structure and function. However, human activities have altered natural flow regimes of rivers worldwide with impacts on physical, chemical and biological attributes of these ecosystems. This is often considered the most serious and continuing threat to the ecological sustainability of rivers and associated floodplain wetlands. To manage these impacts, environmental flows are an important management tool to sustain river ecosystems and the services they provide.

The use of environmental flows as a management tool first appeared in the United States in the 1940s with methods designed to quantify a minimum flow to sustain fish. It is now recognised that solely applying minimum flows are inadequate to sustain or restore river ecosystems that depend on flow variability to dictate structure and function. Consequently, best practice dictates that environmental flows need to mimic natural flow variability with consideration given to the magnitude, frequency, timing, duration, rate of change and predictability of flow events.

More than 250 methods for the assessment of environmental flows are currently used worldwide and can be grouped into four categories: hydrological rules, hydraulic rating methods, habitat simulation methods, and holistic methodologies. There is no single ‘best’ method and the most appropriate depends on several factors including available data, resources, spatial scale, research questions, management context, and socioeconomic and political settings.

This presentation will briefly review the development of environmental flow assessment methods in the management of riverine ecosystems. Ultimately, a holistic approach will be demonstrated using project examples that utilised the Australian FLOWS method; a process for developing flow- dependent environmental objectives and the flow regime required to meet these objectives and maintain them at a low level of risk.

Biography

Peter Lind has been part of the GHD Aquatic Sciences Group in Melbourne, Australia for almost 10 years working as an aquatic ecologist. Much of his work involves applied monitoring of the effects of environmental flows and impacts due to flow regulation. Other projects he currently works on include ecological risk assessment and management plans, fish and macroinvertebrate surveys, and long-term trends in ecological condition. Prior to GHD, he worked on a range of research projects at Deakin University. His PhD thesis investigated the ecological benefits of environmental flows in two lowland rivers.