

# Capability Statement

## Ecological Hydraulics and Analysis of Floodplains and Wetlands



### Overview

Floodplains and wetlands are an integral component of our catchments and rivers. They play an important role in shaping the hydrological flow regime of our waterways. They are the natural filters of the system, providing water quality benefits. Floodplains and wetlands also provide a unique and rich habitat, supporting a great diversity of flora and fauna. Australians, particularly those with an indigenous heritage, have strong cultural links to our floodplains and wetlands. It is without question that floodplains and wetlands are important features of our landscape that require understanding and care.

The Australian environment, including ecology and physical form, has developed and adapted to cope with high climatic variability. A recent feature of our occupation of the land is a significant reduction in the variability of stream flow due to river regulation. River regulation has led to a reduction in the magnitude, duration and frequency of flooding along our major river systems. The flood-dependent ecosystems within our floodplains and wetlands require this variability in flow to remain healthy. The past decade of drought has amplified the impacts of regulation and resulted in an alarming decline in the general health of our floodplain wetlands. This requires immediate action.

Over the past four years Water Technology has established itself as a leader in environmental hydraulics, working on a range of challenging floodplain wetland projects. In recognition of the specific technical requirements of these investigations, Water Technology has established a specialist Eco-Hydraulics Team, within our broader Water Group. The Eco-Hydraulics Team are specialists in all aspects of environmental hydraulics, with extensive experience using detailed hydraulic modelling software, advanced data analysis and GIS mapping techniques, to solve complex water-related environmental problems.

It is imperative to the success of these studies that a tailored methodology be adopted specifically targeting the outcomes required by the client. The Eco-Hydraulics team has extensive experience in these studies, working on many



of the Icon Sites of The Living Murray program. Through these studies the Eco-Hydraulics team has greatly assisted our clients to understand and manage these highly complex environments.

With a growing awareness of the complex issues facing our environment, and an increasing desire from our clients to preserve and restore its condition, the Eco-Hydraulics team at Water Technology can play a significant role in the future management of our environment by applying technical excellence to solving these critical environmental issues.

### Capabilities

- State-of-the-art hydrodynamic modelling of floodplain wetland environments
- Detailed understanding of the hydraulics of the existing environment
- Environmental water management options assessment, concept and detailed design
- Wetland water balance assessments
- Regulating structures design
- Fish passage structures design
- Evaluating ecological objectives
- Developing survey scopes for floodplain wetlands
- Design of physical and ecological monitoring programs
- Water quality monitoring, modeling and analysis
- Sediment transport modeling and analysis



### Selected Projects

#### The Living Murray—Hydrodynamic Modelling

Clients : Goulburn Broken, North Central and Mallee Catchment Management Authorities, South Australian Murray-Darling Basin Natural Resources Management Board  
Locations: Barmah and Gunbower forests, Lindsay, Mulcra and Wallpolla Islands and Chowilla Anabranch System

Water Technology has undertaken numerous hydrodynamic modelling projects under The Living Murray program. The principal objective of these projects was to create modelling tools capable of testing complex water management scenarios with detailed assessments of environmental performance.

Hydrodynamic 1D-2D coupled MIKE FLOOD models were developed along with specialist post-processing tools. The models were fully calibrated to a range of historic flooding events. The hydrodynamic models allowed water management options to be modelled and assessed against environmental objectives. This allowed managers to gain a detailed understanding of their current ability to manage their asset and further optimise future water management events. It also assisted managers in building business cases for further infrastructure to deliver increased environmental benefits.



#### Pike River and Katfish Demonstration Reach Hydrodynamic Modelling

Client : South Australian Murray-Darling Basin Natural Resource Management Board, Department for Environment and Heritage

Detailed hydraulic modelling assessments of the existing hydrodynamics of two floodplain systems, calibrating to two large historic floods and one minor flood. Assessment of various water management scenarios, focussed around major environmental regulators to promote widespread flooding with minor Murray River flows.

#### Aire River Estuary Floodplain Mapping

Client : Corangamite CMA

Hydrodynamic modelling and mapping of the Aire River Estuary downstream of the Great Ocean Road. This included modelling of two historic flooding events, one with a natural scouring of the estuary opening. This project allowed for a better understanding of the filling and draining mechanisms of the highly modified estuary floodplain.

