



UNSW
AUSTRALIA

Water Research Laboratory

Wetland Restoration

Never Stand Still

Faculty of Engineering

School of Civil and Environmental Engineering

The Water Research Laboratory (WRL) is at the cutting edge of the science and engineering of wetland restoration and rehabilitation. Over the past 15 years WRL has undertaken on-ground projects to rehabilitate, repair and restore large wetlands across Australia. This brochure provides an overview of WRL's capabilities relevant to wetland hydrology.

WRL staff can provide a range of services to assess and restore both tidal and riverine wetlands. Our staff understand the environmental issues behind the observable problems and have a track record of developing tailored, on-ground solutions to stimulate functional wetland recovery. While our staff expertise is focused on hydrologic and physical aspects of wetland restoration, WRL often collaborates with a team of flora and fauna experts with complementary skills.



Wetland Restoration Expertise

- Development of site restoration plans
- On-ground restoration works
- Field site design
- Development of monitoring programs
- Expert advice and peer review
- Community consultation
- Flora and fauna surveys
- Wetland design and layout plans
- Water quality testing and sampling
- Groundwater bore installation
- Arc GIS and remote sensing
- Soil survey and geological mapping
- Modification of water structures
- RTK topographic/bathymetric survey
- GIS mapping and characterisation
- Catchment hydrology
- Hydrodynamic inundation modelling and mapping
- Dynamic surface water/groundwater modelling
- Water quality modelling
- Staff training and development
- Analytical laboratory testing
- Priority setting and/or catchment rankings

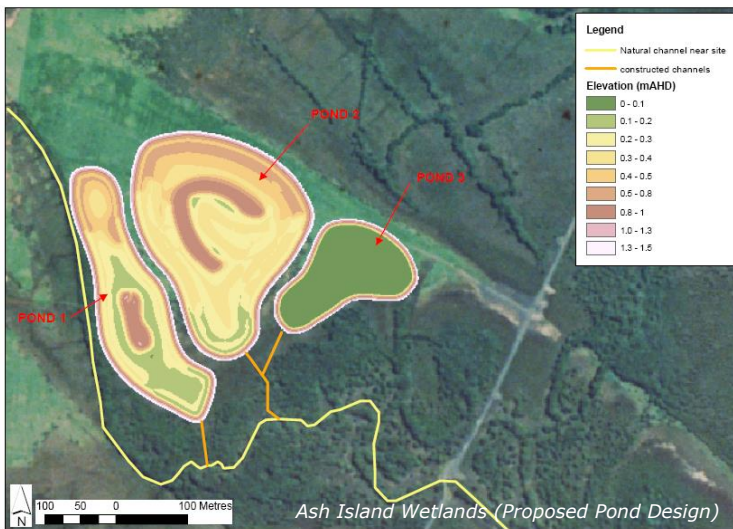


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Selected Wetland Restoration Projects

Yarrahapinni Wetland Restoration Plan: A restoration plan and scope of works were developed to rehabilitate Yarrahapinni Wetlands National Park. A hydrodynamic modelling project was also undertaken to guide onground engineering works and determine the ideal method for restoring tidal flushing onsite.

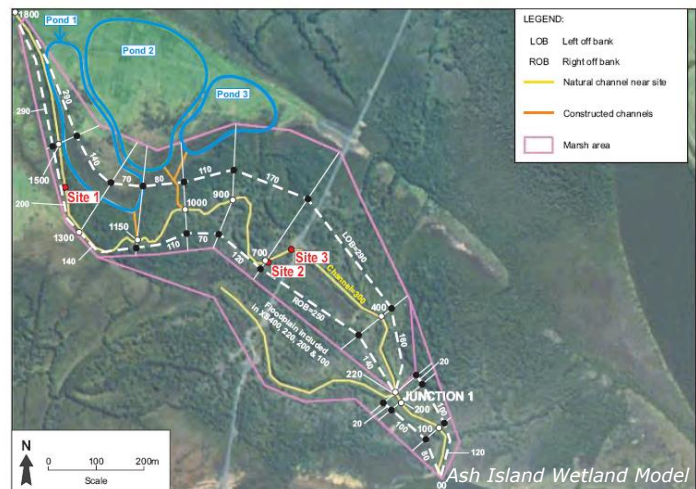


Ash Island Wetland Creation: Undertook a range of investigations to develop and design 3 tidal wetland ponds and feeder channels including soil analysis, RTK surveying (quad bike) and numerical modelling of creek channel. More information on this study can be found at: www.wrl.unsw.edu.au

Mallowa Creek Surface Flow Investigations: WRL examined the characteristics of a large channel (and associated wetlands) of the Mehi River located near Moree, NSW. Field investigations and numerical modelling provided an indication of the volume required to restore the wetland system and maintain ecosystem processes.

Tomago Wetland Restoration: WRL has been involved in all phases (over 9 years) of a large successful wetland restoration program including soil analysis, SmartGate design/construction, levee and culvert design, earthworks, advanced monitoring, modelling, etc. Further information on this study can be found at: www.wrl.unsw.edu.au.

Shoalhaven Hotspots Program: WRL staff examined a range of potential tidal restoration sites and installed modified automated gates at 5 sites. The restored sites had significantly improved water quality. Additional prioritising of the entire floodplain for remediation is ongoing.



Budgewoi Wetlands: WRL undertook field studies of subsurface flow, and numerical modelling to assess potential impacts of groundwater pumping on coastal salt marsh and freshwater wetlands. State-of-the-art mini-piezometers were deployed to identify vertical flow gradients.

Living Murray Program - Chowilla Floodplain, Koondrook Perricoota Forest: WRL staff assisted detailed planning and undertook model assessment of a range of works aimed at enhancing inundation of high value floodplain forest and wetland areas.

Tweed River Acid Sulphate Soil Assessment: WRL staff assessed the source of acidic pollutants within a large contaminated site to assess optimal restoration strategies. Study involved detailed monitoring of various sub-catchments during flow events and quantifying pollutant loads.

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NSW Wetland Recovery Program - Macquarie Marshes: WRL staff have examined the data available to restore flows to the large inland system and assessed the requirements for conducting numerical modelling of flow hydrodynamics. Staff are also assisting NSW DECC with umbrella review of modelling undertaken for the wetland recovery program.

Anna Bay Tidal Restoration: Located near Port Stephens, this study assessed the impact of restoring tidal flows and installing water control structures to a series of flood mitigation drains contaminated with acid sulphate soils using field data and numerical modelling techniques. Additional work is ongoing.

Expert Advice to Federal Government on Ramsar Wetlands: WRL staff have an on-going role of providing high-level expert advice to the Federal Department of the Environment and the Murray Darling Basin Authority concerning developments near Ramsar Wetlands. WRL's advice has largely been concerned with the hydrological impact to surface and groundwater of large developments near Ramsar Wetlands including nearly every state and territory in Australia.

Additional recent projects include:

- Big Swamp Hydrological Study and Long Term Monitoring
- Gumma Gumma Swamp Hydrological Modelling and Onsite Measurements
- Arndilly Wetlands Hydrological Assessment and Rehabilitation Study
- Shoalhaven Floodplain Priority Assessment and Ranking
- Upland Peat Swamp Hydrology and Water Balance Assessment
- Training Course, "Wetland Hydrology; Restoring the Basics"
- Lake Innes Rehabilitation Assessment and Ecological Assessment
- Impacts of Coal Seam Gas and Coal Mining on Wetland Hydrology
- Saltmarsh Rehabilitation and Influence of Salt Dosing (Wyong Shire Council)

Key WRL Personnel



Dr William Glamore – Principal Research Fellow

Will has been working in the field of wetland restoration for over 16 years. His PhD was the first long-term study to investigate the impact of restoring tidal flows to combat acid sulphate soils. Since then he has managed many wetland restoration projects throughout Australia including the large coastal wetland projects at Tomago, Yarrahapinni and Big Swamp. In 2005 Will was awarded a Churchill Fellowship on "International Practices for Restoring Tidal Wetlands". His experience covers many areas of wetland restoration including wetland design, surface/groundwater dynamics, monitoring, on-ground construction, water quality and numerical modelling. Will sits on the Intl ASCE Committee for Wetland Restoration, is course director of 'Wetland Hydrology; Restoring the Basics',

provides expert wetland advice to federal/state and local governments, developed the SmartGate infrastructure and is currently working on many large wetland restoration projects. In 2013 was awarded both the National Trust of Australia's Conservation Award as part of a team working at Tomago Wetlands and a Peter Cullen Leadership Fellow.



Grantley Smith – Manager and Principal Engineer

Grantley has developed considerable experience in the investigation of wetland recovery on inland rivers through his involvement in the Living Murray program and the NSW Rivers Environmental Restoration Program. Grantley has a sound knowledge of wetland surface/groundwater flow processes and their associated environmental responses. His hands-on involvement has been through project management and development of modelling tools for quantification of flow requirements to meet wetland recovery objectives for several icon sites including the Chowilla Floodplain, Koondrook-Perricoota Forest, Gunbower Forest and the Macquarie Marshes. He has developed a solid understanding of environmental issues facing inland wetlands having worked closely with a range of professionals including terrestrial ecologists, forests and fisheries personnel on projects and through participation in numerous multi-disciplinary, inter-governmental workshops.

Additional staff include (but not limited to) **Mr Doug Anderson** (groundwater principal), **Mr Duncan Rayner** (field and numerical investigations) and **Mr Jamie Ruprecht** (field and numerical investigations)

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