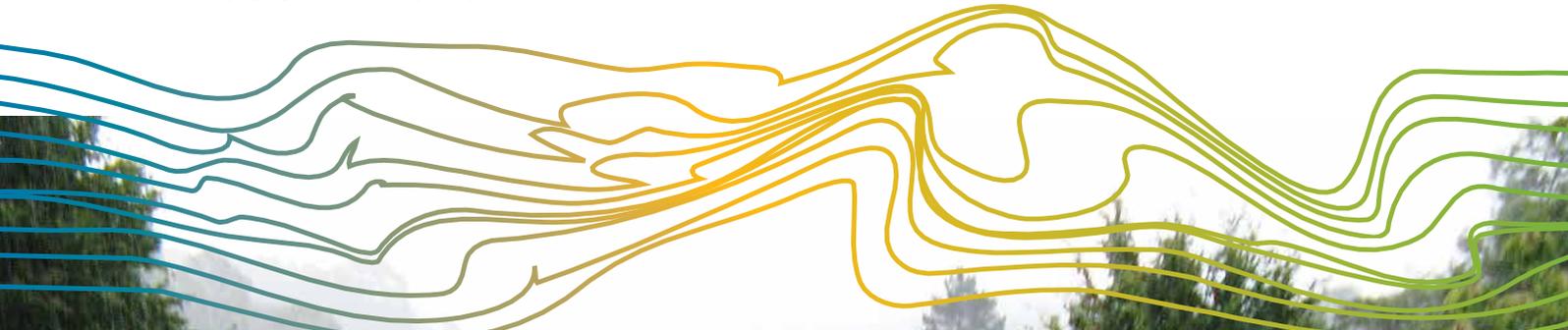


WATERLINES

ISSUE 1 2018



St Marys
TASMANIA

Engaging with flood impacted communities



ANDREW McCOWAN
- Managing Director

Welcome to our first issue of Waterlines for 2018

Flooding associated with extreme rainfall events can have significant impacts on local communities. Engaging with these communities is essential in the development of targeted flood risk management plans and flood mitigation solutions. In this edition of Waterlines, we describe some of the work we have been doing with the community of St Marys in Tasmania. This work has had a strong emphasis on community engagement and has been aimed at helping them understand local flood risks and to assist in the development of a range of suitable mitigation options.

Elsewhere in Australia, and under dry weather conditions, the floodplain of the lower Murray River is a saline environment. Here the close relationship between groundwater and vegetation condition needs to be understood to make best use of environmental water. Water Technology has been undertaking an innovative project in the area aimed at using groundwater engineering to improve the condition of vegetation impacted by salinity. The results of this work could have wide-reaching benefits for how floodplains ecosystems are managed to deliver improved ecological outcomes.

Other articles from across Australia in this edition include:

- Urban waterway works designed for multiple community benefits
- Merri River fish hotel update
- Assessing levees protecting coastal communities
- Opportunity assessments to support integrated water management planning
- Improving operational water management with real-time calibrated radar rainfall data

Thank you for taking the time to read Waterlines. Please do not hesitate to contact either myself or any of the Water Technology team if you are interested in further information.

Urban waterway works designed for multiple community benefits



Redland City is a growing coastal region in South East Queensland, with development progressing to meet housing demands. Maximising land use benefits and balancing the multiple needs of a community within a development site is an important consideration for developments in the region. A rural site with a waterway corridor dissecting it provided an opportunity to link environmental and community open space needs. This required robust flood risk assessments and waterway design due to the size of the catchment and likely rainfall events that would impact the site.

Working with the developer to meet the local council's requirements, Water Technology performed a flood impact assessment of the residential development site and developed a waterway channel design to support safe community waterway connections. The design required a vegetated channel, with the inclusion of a series of rock check dams to minimise the risk of channel erosion and scour, especially in the site establishment period. Designing the position of the low flow channel in the lower reaches of the site enhanced indirect recreational uses within grassed overbank channel areas.



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ENGAGING WITH flood impacted communities

The beautiful town of St Marys in Tasmania is regularly affected by flooding and in recent years three significant events have occurred. Although flooding is a natural occurrence, mitigating risks and optimising outcomes is vital. Working with the Break O'Day Council and the local community, Water Technology is examining the flooding problem and identifying risk mitigation strategies and actions.

The St Marys Rivulet (Tasmania) **Flood Risk Management Project** has had a strong community engagement focus. To engage with the community and to present the study, Water Technology personnel are working with Break O'Day Council to build flood awareness and to obtain community feedback on management options. The project team has gone door to door talking with landholders and business owners, led a walking tour of the floodplain, and recently set up at a community farmers market and invited discussion to ensure a more informed flood study and importantly a better-informed community.

A key point of discussion has been the condition of the rivulet, vegetation and debris, and the role it plays in flood risk. The project team has worked with the community to understand how the rivulet responds to change, and why it needs healthy native vegetation, not only for the local platypus and friendly families of resident ducks, but to stabilise the channel form, preventing further erosion and channel change.

The flood mapping is available [online](#).

Water Technology is developing several mitigation concepts, before taking these back to the community to obtain their feedback.



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Congratulations Glenelg Hopkins Catchment Management Authority in Victoria on a recent initiative aimed at providing fish habitat in the lower reaches of the Merri River through Warrnambool.



Merri River Fish Hotels



Working with the Break O' Day Council and the community, Water Technology is examining the flooding problem and identifying risk mitigation strategies and actions.

Past waterway management in the Merri River has resulted in reduced habitat for fish communities. To address this, the CMA sought sponsorship to install 'Fish Hotels' for Percy the Estuary Perch within the river channel. Water Technology jumped at the chance to sponsor the project and now has a fish hotel installed in our name.

We also assisted the CMA in conducting a risk assessment of the 'Fish Hotels' to ensure that the construction method and placement were undertaken to protect community safety and structure resilience during floods.



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Groundwater management to improve vegetation condition in the Lower Murray Floodplain



The Lower Murray Floodplain is a saline environment. While native vegetation species are salt-tolerant, it is essential that sufficient, appropriate salinity, soil moisture is available to sustain growth and life cycle processes. Low salinity groundwater lenses provide an important source of water and support the ecological function of floodplains in an otherwise dry and saline environment.

Water Technology has been involved in a series of projects examining the relationships between manipulation of groundwater lens development and vegetation responses.

The Bookpurnong Living Murray Pilot Project is the best example to date of the application of groundwater engineering to deliver ecological benefits in the Murray Darling Basin. This project identified that an alternative approach to floodplain management was to reduce the salinity of the water table, without manipulating the depth to water, thereby reducing the salinity of water in the unsaturated zone. This approach opened the door to a range of new groundwater manipulation strategies that could be employed to facilitate the development of low salinity lenses.

The South Australian Riverland Floodplains Integrated Infrastructure Program (SARFIIP) also aims to develop floodplain infrastructure that will address the continuing decline in ecosystem health and deliver improved ecological outcomes for floodplains along the Lower River Murray. Water Technology has been engaged as the Design





Contractor to develop groundwater management infrastructure for SARFIIP. The practice of managing long-term salinity risks is well established, but the management of ecological risk and the enhancement of ecological benefit from a groundwater perspective is a relatively new concept, and SARFIIP is the first instance where it has been actively considered in groundwater management along the River Murray. We have also been working with the MDBA and SA Water to review Salt Interception Scheme (SIS) operations to manage instream salinity and vegetation responses as well as undertaking density dependent modelling of low salinity lens dynamics in response to groundwater pumping and or injection.

The close relationship between groundwater and vegetation condition needs to be understood to make better use of environmental water. There has been considerable investment in improving vegetation along the River Murray floodplain and groundwater management may provide one of the most cost-effective interventions, especially where there is existing infrastructure.

More detail about this project is available [here](#).

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Assessing LEVEES



Protecting Coastal Communities

Can you find the levee?



Look along the crest of the levee.



South Gippsland is a predominantly rural area located around 2.5 hours' drive south-east of Melbourne and is an important beef production and dairying area. Extensive coastal levees have been built to protect both agricultural land and small coastal townships from storm tide inundation. The levee design standards have varied, and many have not been actively maintained since they were constructed. Little was known about their current condition or who was responsible for on-going maintenance works.



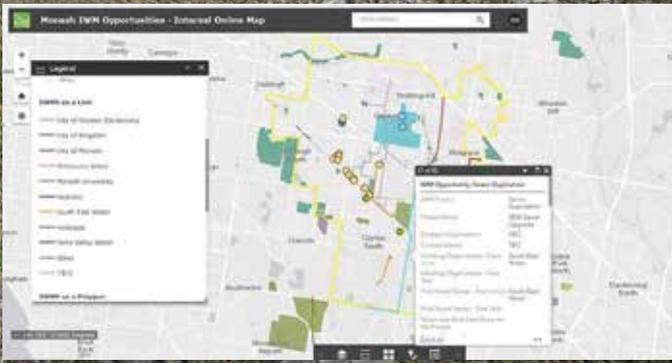
Water Technology assisted South Gippsland Shire Council by undertaking a detailed analysis of the levee structures to ascertain their current condition, the level of storm tide protection they provide, the tenure and likely management responsibility of each levee, and by developing a risk-based prioritisation approach for further assessments or future works.

With approximately 90km of levee to be assessed, we developed a suite of spatial analysis tools to optimise field survey requirements along with undertaking storm tide inundation and risk analyses. Interestingly, wombat holes were a significant point of weakness feature encountered along many of the levees.



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Opportunity assessment to support integrated water management planning

The Monash National Employment Cluster (NEC) is one of seven major centres of health, education and employment identified in Plan Melbourne 2017 – 2050. South East Water and Water Technology embarked on an Integrated Water Management (IWM) Study to provide improved value to the local community by identifying and taking advantage of synergies in water cycle planning and management. The study involved state and local government and research organisations who all collaborated to deliver these outcomes.

The principal product of the study was an online map of potential IWM opportunities. With employment doubling from approximately 75,000 jobs over the next 35 years, an integrated approach is required to manage existing and future water demands in the area. Successful

place-based IWM planning requires all organisations responsible for managing the urban water cycle to be committed to collaboration, sharing data and implementing integrated servicing solutions. Through shared visions and targets for the Monash NEC, organisations were brought together to share opportunities and ideas.

Through initial one-on-one consultations, current plans, projects, objectives and targets were collated across each of the organisations and presented in an online GIS environment to aid collaboration. Clicking on a site revealed relevant reporting, project status, corresponding contacts and, most importantly, identified IWM opportunities. Once spatially displayed, it became easier to identify neighbouring opportunities for collaboration compared with

the traditional alternatives of sifting through reports and exhaustive consultation. Having all the information from every organisation summarised in one spot was a powerful product of the investigation.

A final project workshop was very well attended by all organisations. The workshop aimed to use the online map to find potential opportunities where organisations could work together. It was an outstanding success with many connections made, agreements on working together into the future made and most impressively, early discussions of merging projects from different parts of the water cycle that previously didn't know about each other. A challenge going forward with the system will be maintaining the momentum and ensuring that the online platform remains current and relevant.

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Improving operational water management, and WSUD, with real-time calibrated rainfall data.

The frequent occurrence of excessive rainfall in urbanised areas and river catchments is an important reason for water managers to have access to the best available rainfall data for effective planning, design, operation and maintenance of their water systems and related assets. With climate change, the expected increasing frequency of such excessive rainfall provides even further incentive for water managers to have timely access to such data, which is recognised as a key data source for effective water management.

Various sources of precipitation data, within several studies, were compared to explore the benefits of calibrated radar rainfall data. Water Technology staff concluded that calibrated radar rainfall can be a significantly improved data source for water management activities and models. This approach exceeds rain gauge network density

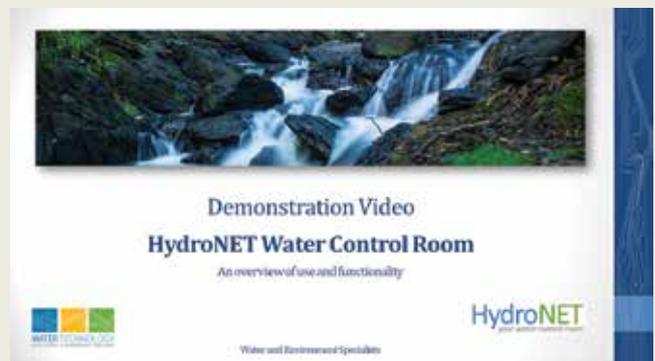
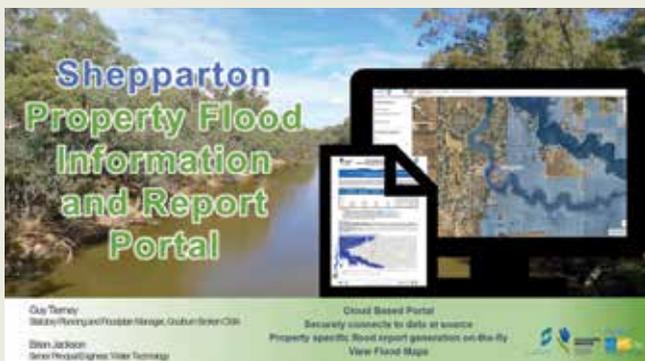


recommendations for all urban water management needs, including WSUD, and is significantly cheaper and more robust to implement than further expanding existing rain gauge networks.

More information about the study and data comparisons is available [here](#).

Contact Brian to discuss how HydroNET method can be used to access calibrated rainfall data.

Webinar Recordings



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Creating Water Sensitive Communities

In February, we had the opportunity to present recent project outcomes and research at the **WSUD 2018 & HYDROPOLIS 2018 Conference**.



Celine Marchaney - *A fully integrated water/sewer/ drainage model – why would you do that? Testing integrated water system planning tools to provide a representation of urban water cycle interactions.*

Michael Di Matteo - *Optimising multi-criteria assessment to achieve equitable stakeholder outcomes in WSUD schemes. Adding an optimisation approach to multi-criteria analysis techniques for water sensitive urban design.*

Brian Jackson - *Real-time calibrated radar rainfall data for improved operational water management and WSUD. Using calibrated rainfall data to improve analysis, planning and design outcomes for water sensitive urban design.*



As the Chair of the National Committee on Water Engineering (Engineers Australia), Andrew McCowan presented the Student Scholarship to Samuel Gorle. Well done Samuel.

International Women's Day



On International Women's Day, a number of events were held across our offices. We invited a group of female engineering students from Monash University to our head office to celebrate the amazing contribution of women in the male dominated world of engineering. Rianda Mills spoke about the challenges and inspiring successes of her career.



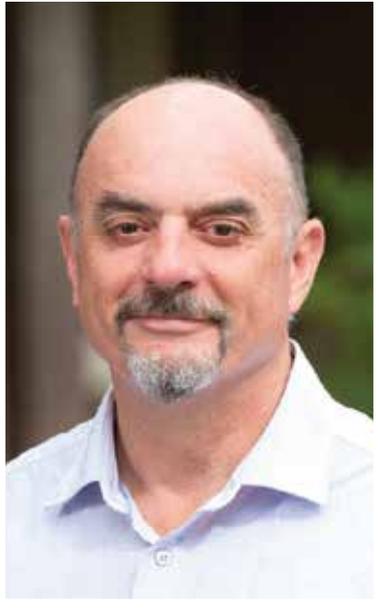
New Staff

This edition we welcome **Hui Min Lee, Kris Latu, Kym Papp** and **Deirdre Kelly** to our team.

Staff Profile

Scott Evans

Principal Hydrogeologist



Scott is a Principal Hydrogeologist with over thirty years' experience in regional groundwater resource assessment, management and reporting within both the State Government and Environmental Consultancy sectors. He has a strong appreciation of how geology and landscape influences aquifer distribution, hydrogeological processes, water quality and yield. Scott has managed small to large scale borefield development and groundwater monitoring networks, including data collection, management, assessment and reporting.

Scott started with Australian Water Environments (AWE) in 2017, when AWE joined Water Technology. He has extensive experience with groundwater resource management; advising development groups of the regulatory and planning policies relating to hydrogeological processes; mentoring and communicating with regulators and communities; assisting in the understanding of how development and management may impact groundwater resources; and connecting stories of life experiences with hydrogeology. He invented the concept of Percent Share Allocations in water allocation planning on Eyre Peninsula. Recently, Scott assisted the Northern Territory Government, as well as mentoring remote communities, with water source protection, yield assessment and supply augmentation.

Scott lives in Adelaide and, having raised four children with his wife, now enjoys woodturning as a hobby, community service when available (or caught) and minor dabbling as a hobby farmer.

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