Demand-Integrated
Network Control Solution

RUBICON™

Shepparton recovers water for the environment and improves agricultural productivity

Situation

Over-extraction of water from the Murray River has led to the degradation of many areas of significant environmental value along the river's 2,500km. The river basin is also home to an agricultural area that produces over one-third of Australia's food supply.

The Living Murray program was established to restore health to key areas of the river system through environmental water recovery, while balancing this with the competing need for sustainable agricultural production. A key focus of the program was the modernisation of inefficient irrigation infrastructure.

The Shepparton Irrigation Area, typical of many areas in the basin, lost 30% of the water it diverted from the river during transmission. It also provided a poor service to irrigators, which resulted in inefficient on-farm water use. The main problems included:

- Conservative (generous) manual channel regulation resulted in water in excess of farmers' needs being spilt
- These practices caused oscillating channel water levels resulting in inconsistent flows through farm service points which led to water wastage on-farm
- The requirement to order water four days in advance meant farmers could not precisely meet crop water demand
- Infrequent and inaccurate flow measurement made good channel management impossible
- Inaccurate metering and leakage at farm service points led to inequitable distribution
- Difficulty in identifying leaky sections of channel.

Solution

The Living Murray funded the modernisation of the Shepparton Irrigation Area in return for a portion of the water recovered. The core of the project involved implementing a Demand-Integrated Network Control Solution throughout the majority of the district, as well as rationalisation of underutilised assets, channel remediation and some pipelining. The solution involved:

- Autonomously controlling channel regulation using NeuroFlo® and SCADAConnect® software
- Automating customer-facing operations including water ordering, entitlement checking, delivery scheduling and usage accrual
- Replacing manually operated regulators with FlumeGates®
- Replacing manually operated service points with FlumeGates and SlipGates®
- Expansion of the radio telemetry network.

> " Automation of water delivery has provided better control, monitoring, improved efficiency and improved service to customers. "
>
> Goulburn-Murray Water

Australia
Shepparton, Victoria
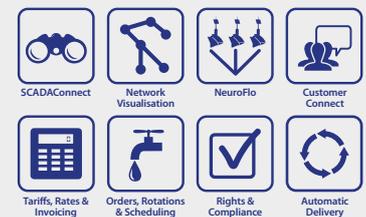
Customer profile

Goulburn-Murray Water (G-MW)

Shepparton is one of six gravity districts managed by Goulburn-Murray Water. The district has over 700km of channels, serves 2,500 customers and diverts up to 150 gigalitres of water annually.

The Living Murray

The Living Murray environmental program aims to transfer 500 gigalitres of water from consumptive use to six internationally significant wetlands, lakes and floodplains along Australia's Murray River.

Solution components

Software

SCADAConnect	Network Visualisation	NeuroFlo	Customer Connect
Tariffs, Rates & Invoicing	Orders, Rotations & Scheduling	Rights & Compliance	Automatic Delivery

Software

FlumeGate	SlipGate	Radio Network

- FlumeGate regulators x760
- FlumeGate farm service points x27
- SlipGate farm service points x865
- Radio nodes x11

A radio node and FlumeGates regulating the East Goulburn Main channel

An automated SlipGate service point

Case Study

Two key components included the automation of channel regulation and the automation of Shepparton's customer-facing operations.

Automating customer-facing operations

Rubicon's software enables customers to place water orders via internet or phone 24 hours a day. On receipt of an order, the software automatically manages planning and scheduling, from verifying that the customer is entitled to the water, through to instructing the customer's turnout to open and close at the allotted time. Water use is automatically recorded and made available on the internet and phone to help customers better manage their irrigation.

Autonomous channel regulation

Using a radio telemetry network, FlumeGates constantly communicate with adjoining FlumeGates and with a central server, sharing their measurements of channel water levels and flows in real time.

NeuroFlo software uses this information and mathematical models of hydraulic behaviour to coordinate all FlumeGates in the network. Only the exact amount of water required to meet downstream needs is released from the dam. By matching delivery with demand, spills are eliminated and water level fluctuations are minimised resulting in consistent, high flows for farmers.

Results

The two-year project was completed in 2009 and has resulted in major improvements:

- Delivery efficiency improved from 70% in the 2007/08 season to 90% in the 2010/11 season
- Improved management control and planning with rich, real-time information
- Compliance with new government metering and reporting requirements
- Farmers benefitting from a reliable system with delivery almost on-demand, which means they can now maximise the productive output of every litre of water used
- Greater water use accountability, transparency and distribution equity for all stakeholders.

The improvement in delivery efficiency has resulted in 39 gigalitres of water recovered annually. Of this, 29 gigalitres has been permanently transferred to the Living Murray program. This water is retained in storage and is periodically released to benefit wetlands and lakes.

Irrigator survey

Of 25 Shepparton irrigators surveyed after modernisation:*

- 100% agreed that they got more constant flows through their farm service point
- 100% agreed that upgrading to automated service points benefitted their business
- 92% agreed that reduced order times benefitted their business
- 100% agreed that instant confirmation of orders benefitted their business

* Goulburn-Murray Irrigation District 2008 Modernisation Works Post Implementation Review, Government of Victoria

" Customers who have had automated meters installed have provided consistently positive feedback on the impact of this functionality on their irrigation practices. When combined with the channel automation technology and expanded radio telemetry network, the new meters offer a significantly improved level of service to irrigators and an immensely enhanced operational capability for G-MW. "
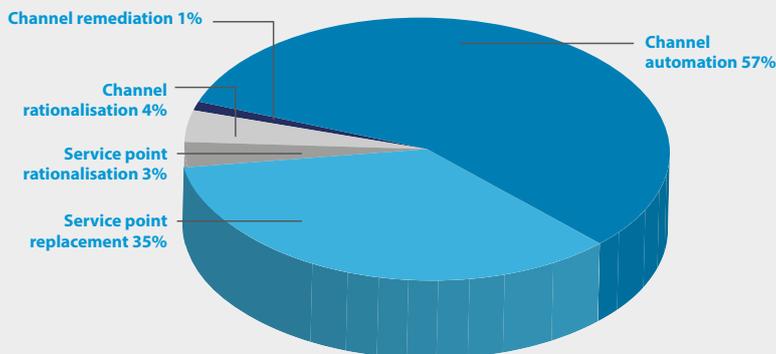
Goulburn-Murray Water 2010 Annual Report

" Our channel has been automated and we are at the bottom of the Shepparton Irrigation Area. The flow rate during autumn watering didn't vary for the first time in 14 years. It can only be put down to the FlumeGates installed in the channel. "

Shepparton Irrigator

About Rubicon Water

Rubicon Water delivers advanced technology that optimises gravity-fed irrigation, providing unprecedented levels of operational efficiency and control, increasing water availability and improving farmers' lives.

Founded in 1995, Rubicon has more than 30,000 gates and meters installed in TCC systems in 15 countries.

Source of recovered water

The majority of the water recovered was as a result of Rubicon's Network Control and automated service points.

Channel remediation 1%
Channel rationalisation 4%
Service point rationalisation 3%
Service point replacement 35%
Channel automation 57%

Source: Audit of Water Savings, Shepparton and Central Goulburn 1-4, Cardno November 2011. Note: Water recovered is calculated using long-term average (long-term cap equivalent)