





Improvements in River Operations Forecasting using Source

Goulburn River Case Study

Kym Wilson Goulburn-Murray Water



Outline

- Background on Goulburn River system
- Overview of River Operations
- Use of Source for river operations
- Advantages of Source
- Forecasting using Source



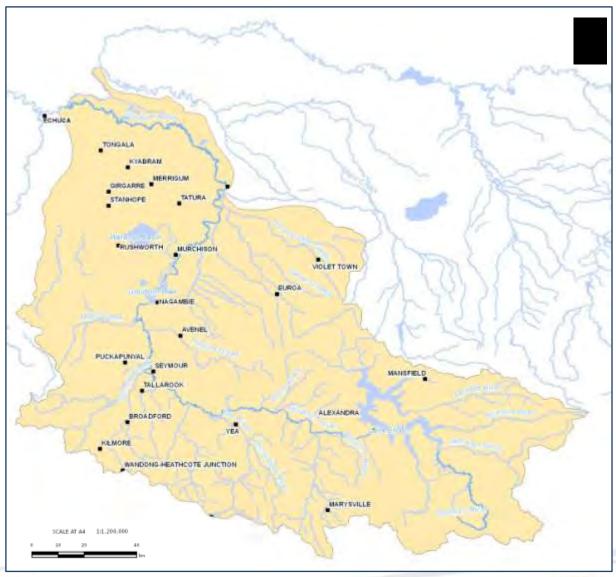




Goulburn River System





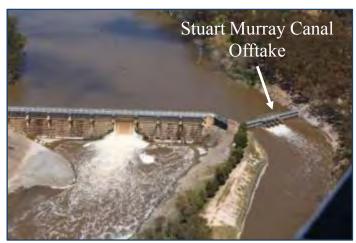








What do River Operations involve?



Goulburn Weir & Stuart Murray Canal Offtake (TPP, 2010)



Stuart Murray and Cattanach Canals with Waranga Basin in the distance (TPP, 2010)

- Management of water stored in and released from dams
- Regulation of water through the river system
- Management of bulk diversions from the river for consumptive use
- Forecasting and planning







Used in Goulburn River system for

- Planning and forecasting of regulated river operations, including:
 - River flows
 - Tributary inflows
 - Storage levels
 - Environmental flows



Lake Eildon – Goulburn River's main storage (G-MW, 2004)







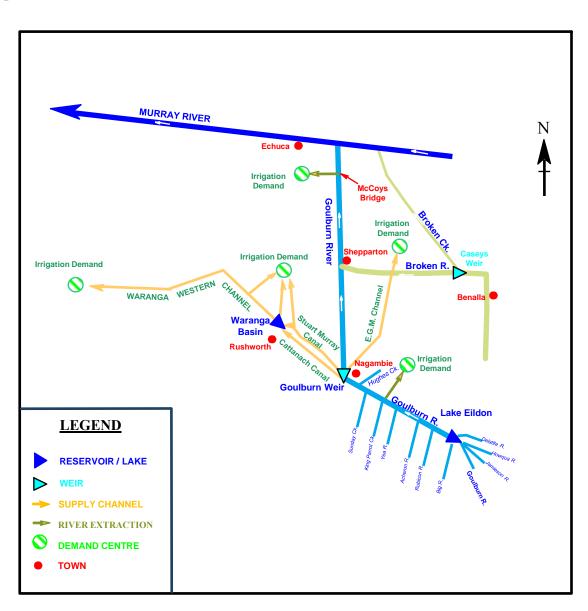
Goulburn River Schematic



Goulburn Weir (G-MW, 2005)



Waranga Basin Drought Pumping (G-MW, 2005)

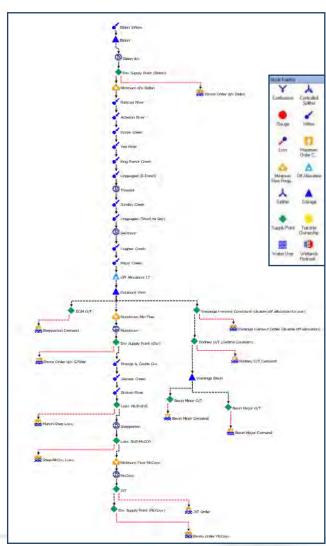


Advantages of Source: Interface

- Schematic overview
- Tabular Editor to view model output data

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Tabular view of Goulburn River Model outputs



Schematic view of Goulburn River Model





Advantages of Source: Planning Functionality

 Ability to incorporate all planning and forecasting requirements into a single model

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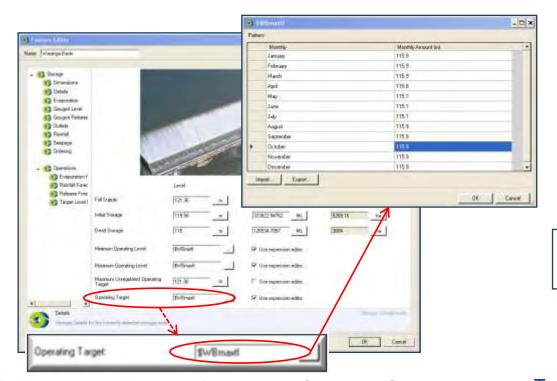






Advantages of Source: Use of Logic

 Source provides improved ease of incorporating logic into a model



Month as Number	Month	Operating Target (mAHD)
1	January	115.9
2	February	115.9
3	March	115.9
4	April	115.8
5	May	115.1
6	June	115.1
7	July	115.1
8	August	115.9
9	September	115.9
10	October	115.9
11	November	115.9

plus

=IF(D237<=VLOOKUP(A237,\$AK\$225:\$AM\$236,3,FALSE),K238+L238-(G237-(MAX(0,linint(VLOOKUP(A237,\$AK\$225:\$AM\$236,3,FALSE), Rating!\$K\$13:\$L\$146,2)))),0)

...and some other data

Target Level configuration in Source IMS

Target Level Configuration in Spreadsheet Model

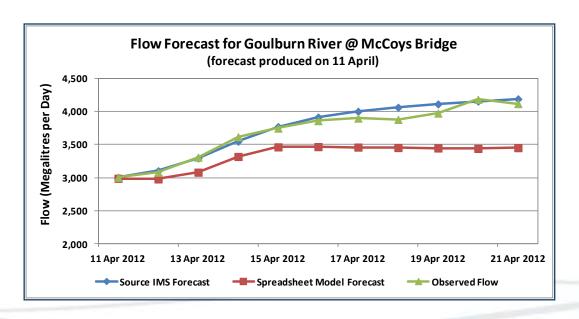






Forecasting River Flow

- Produces more accurate river flow forecasts with less user input
- Reduces reliance on user to directly control variables such as travel time and attenuation









Forecasting Releases from Storage

- Source uses information on system travel times, river losses, tributary inflows and demand inputs to determine the volume of water to be released from storages.
- Forecasting incorporating all of the above was not achievable with a spreadsheet model

Model Uses

Demand Data River Loss Tributary Inflow

Then

Incorporates
River Travel Time

To Determine

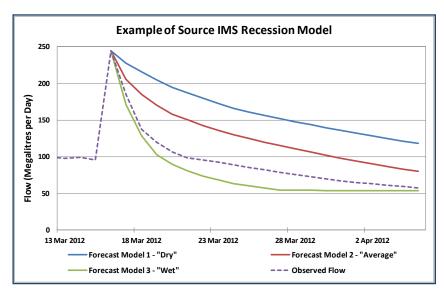
Release required from storage to meet demands and operational requirements

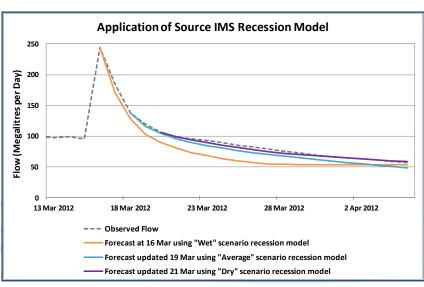






Forecasting with Recession Models





- Recession models configured for all tributaries in the Goulburn River model
- These represent 3 parts of recession curve
- Can improve efficiency of river operations and increase water harvesting ability





Summary

Source for River Operations

- Improved interface
- Better planning functionality than existing models
- Easier to incorporate logic into model
- Improved river flow forecasts
- New ability to forecast storage release requirements







Thank you

Contact Details

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Lake Eildon at 9% of capacity (G-MW, 2003)



Lake Eildon at 99% of capacity (G-MW, 2011)









Source 2012



www.ewater.com.au