Review of Water Extraction Impacts on Flows in Barwon Darling River (Preliminary Report)

October 2019
Introduction

WaterNSW was requested by the Natural Resource Commission in August 2019 to undertake modelling of flows along the Barwon Darling river system to assess the impact of extractions on flows downstream of Bourke during the current drought (2016-2019).

WaterNSW has been developing an Operational Model of the Barwon Darling utilising Source modelling software. The model extends from the top of the Barwon River at Mungindi to Wilcannia in the south. The model incorporates the water access management rules that are defined in the 2012 Barwon-Darling Water Sharing Plan and the water users water account management rules. The Model accounts for all licences for all classes and associated rules of diversions.

Some limitations of the model include:

- The model is calibrated for **operational use** for flow translation and to some extent account for water losses. Weir pools along the Barwon Darling river system are currently being surveyed. This information will improve the accounting for system losses. The weir pools have an impact on low flows along the river as large volumes of water can be used to fill these pools during low flow and cease to flow periods. WaterNSW is currently undertaking survey work along the Barwon Darling to identify the weir pool volumes to incorporate into the model. This work is expected to be completed in late 2019 or early 2020, at which point the model will be completed and peer reviewed.

- Domestic and Stock, town water supply and Basic Landholder Rights extractions are not included in the model.

While the Model will be further developed, in its current iteration it is able to demonstrate flow movements along the river system in a natural state (without the impact of impoundments). It is also able to show the impact of extraction on the natural flow movements. The Model is therefore capable of showing a difference to actual flows for the purpose of the request from the Natural Resource Commission (of showing the impact the extractions have had on the flows in the system).
**Scenarios**

WaterNSW modeled two scenarios for flows along the Barwon Darling river system from June 2016:

1. Flows without extractions
2. Flows with extractions

**Representation of Diversions**

The actual diversions are not recorded daily. Most of the diversions are recorded twice a year and in some cases only once a year. The extraction data therefore needed to be dis-aggregated to daily format so that they can be used in Operations model.

The recorded annual diversions are dis-aggregated to daily diversions based on model estimated daily diversions. Estimated daily diversions are then used in the Model, in which is

**Other Information**

1. The difference between the observed flows and the model run is associated with the losses associated with the weir pool volume and holes in the river. The Model needs to be re-calibrated with weirs, natural river pools volumes and Town Water Supply/Stock & Domestic extractions.

2. The pulsing of modelled flow in the graphs is due to pump on/off effect when the flow is just above the cease to pump thresholds for the access classes (A, B or C).
1. Comparing Flow at Collarenebri - 1/7/2016 to 30/06/2019

![Graph showing flow at Collarenebri](image)

2. Comparing Flow at Walgett - 1/7/2016 to 30/06/2019

![Graph showing flow at Walgett](image)
3. Comparing Flow at Brewarrina - 1/7/2016 to 30/06/2019

4. Comparing Flow at Bourke - 1/7/2016 to 30/06/2019
5. Comparing Flow at Louth - 1/7/2016 to 30/06/2019

![Graph showing flow comparison at Louth](image1)

6. Comparing Flow at Wilcannia - 1/7/2016 to 30/06/2019

![Graph showing flow comparison at Wilcannia](image2)