



4. Model Calibration

The purpose of calibration was to verify the derived inflows, demands and operating rules are all working within the model. The model was calibrated using historic demands from January 1975 to December 2007. The calibration involved a comparison between the gauged and modelled streamflow at the outlet of each sub-catchment. The periods of calibration and the location of plots showing the comparison between gauged and modelled streamflow for each sub-catchment are presented in Table 4.1.

The end of system (WY CK 7) daily flow series and flow duration curve under historic conditions is shown in Figure 4.15 and Figure 4.16 respectively.

The Woori Yallock Creek REALM model simulates all gauged streamflows well. All the time-series plots show a good calibration between modelled and gauged streamflows. The gauged flow presented in Figure 4.7 and Figure 4.8, Woori Yallock Creek at Monbulk (229694), has been factored up by catchment area the same as the natural flow in the REALM model. The time-series and flow duration curves at this site show a very good calibration. The time-series plots for Woori Yallock Creek at Woori Yallock (229215) and Yellingbo (229679), Figure 4.9 and Figure 4.13, show that the model slightly underestimates some of the larger events at these sites. This is most likely the result of inflow derivation for these two sub-catchments. Gauged flow cannot be substituted for the inflow series because Yellingbo (229679) is an interstation gauge and Woori Yallock (229215) is a downstream gauge. The calibration at these two gauges has been markedly improved due to the time spent deriving a revised inflow series for this model.

The flow duration curves all show reasonable calibration fits. Some of the modelled curves do not exactly match the gauged curves at the low flow end (95th to 100th percentile range). This can be partially explained by the rounding of decimals but is also the result of the following observation within the model:

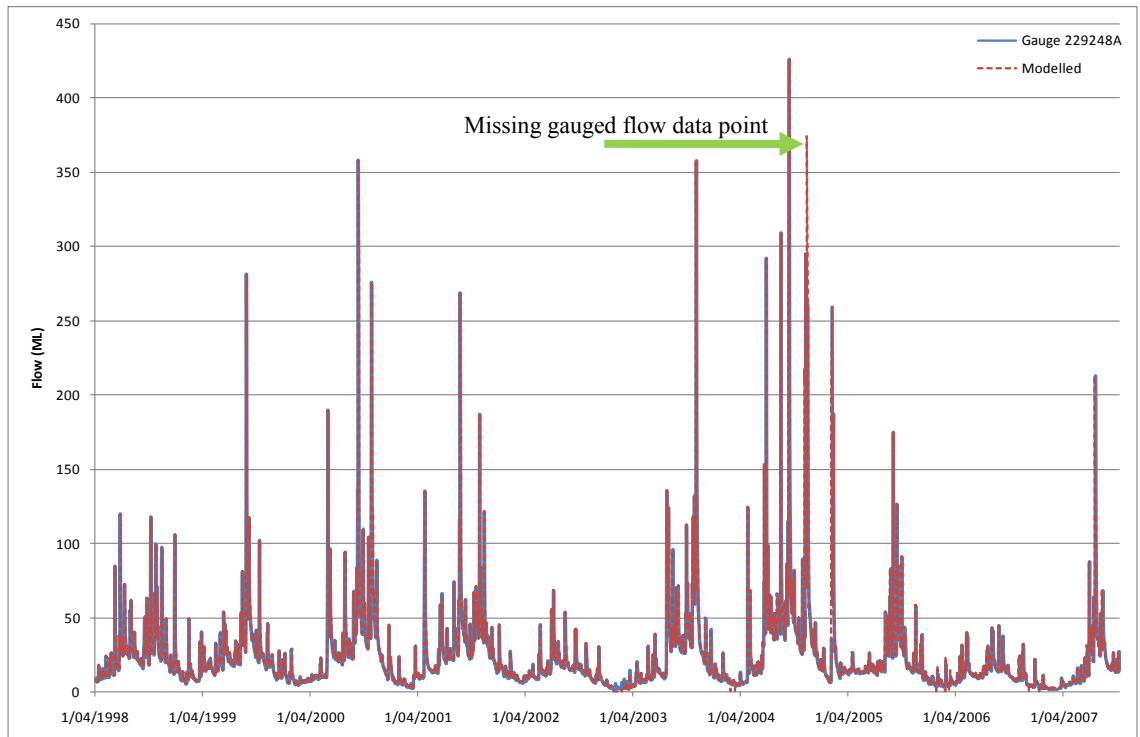
During low flow periods (as illustrated in the flow duration curves), modelled ban periods (triggered by Melbourne Water's restriction policy) do not replicate historic ban periods. Melbourne Water's diversion team uses daily flow data that has not yet been quality checked to determine whether licensed diverters are restricted or banned from diverting water (Steve Hosking (MW), pers. comm. 29 October 2008). This enables Melbourne Water to respond immediately to changing flow conditions in the catchment. The flow data that was used in the development of the Woori Yallock Creek REALM model has been quality checked by Melbourne Water. In some cases, quality checking resulted in adjustments to the flow record (e.g. through rating table changes) (Phil Mitchell (MW), pers. comm. 4 September 2008). As a result, Melbourne Water may have applied bans that are not replicated in the model, or vice versa. It is not possible to replicate historic bans in these instances. This is considered to have negligible impact on the model because demands in the Woori Yallock catchment are significantly less than the flow.



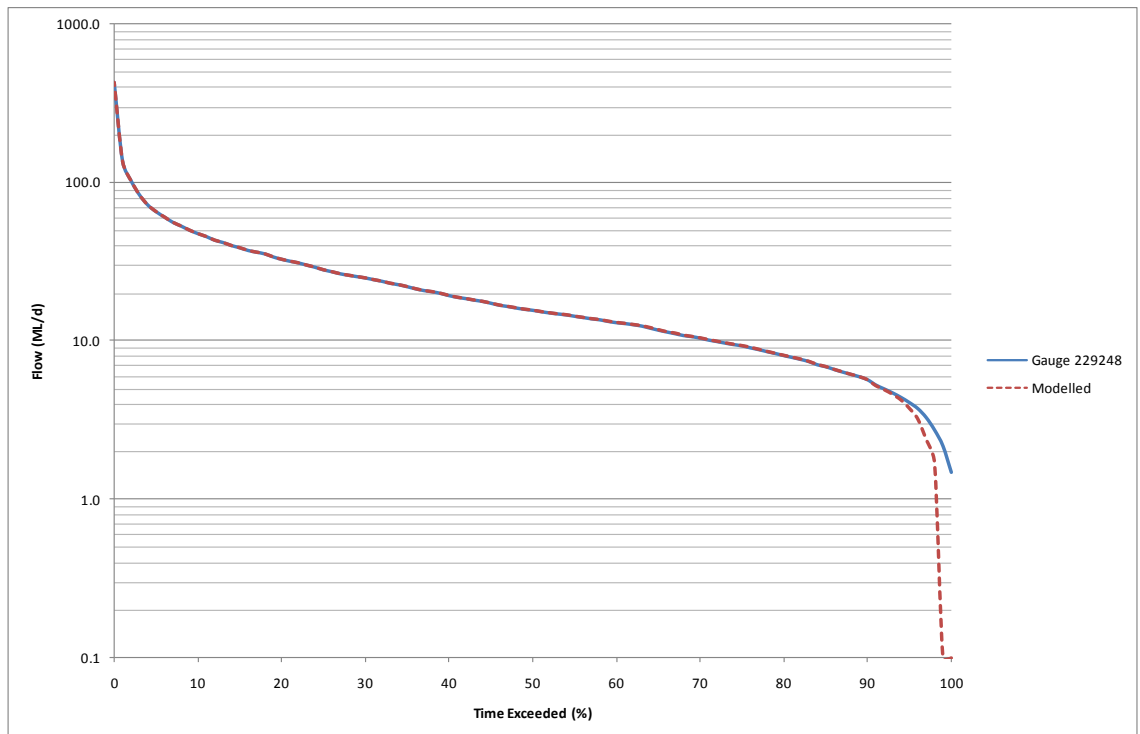
Visual discrepancies exist in the daily time series plots between Figure 4.1 and Figure 4.13 as it appears that modelled flow is larger than gauged flow. This is in fact a result of missing data point(s) in the gauged flow record. Examples of some of these missing data points have been displayed on time series plots between Figure 4.1 and Figure 4.13.

■ **Table 4.1: Sub-catchment calibration gauges**

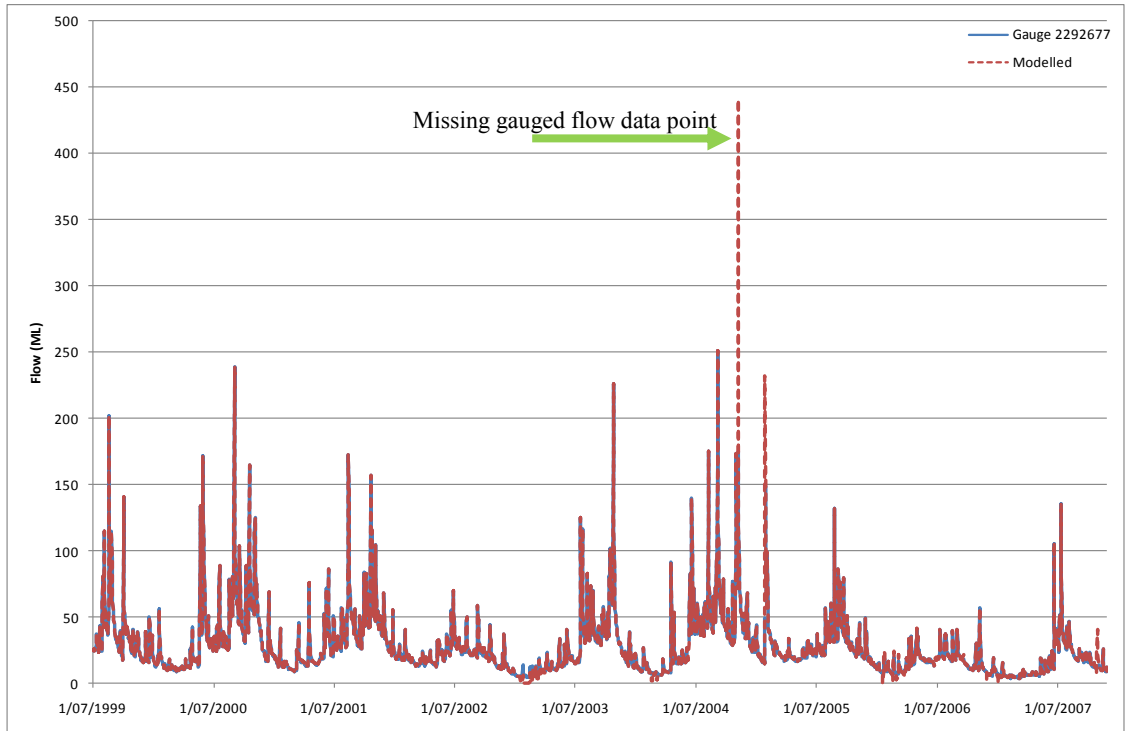
Sub-Catchment	Calibration Gauge	Location	Calibration Period	Figures	
				Time Series	Flow Duration Curve
A	229248A	Cockatoo Creek at Nangana	04/04/1998 to 08/10/2007	Figure 4.1	Figure 4.2
B	2292667B	Shepherd Creek at Nangana	10/07/1999 to 04/12/2007	Figure 4.3	Figure 4.4
C	229687A	McCrae Creek at Yellingbo	10/07/1999 to 09/010/2007	Figure 4.5	Figure 4.6
D	229694B	Woori Yallock Creek at Monbulk	01/07/1975 to 31/12/2007	Figure 4.7	Figure 4.8
E	229215B	Woori Yallock Creek at Woori Yallock	01/01/1975 to 31/12/2007	Figure 4.9	Figure 4.10
F	229681B	Wandin Yallock Creek at Seville East	09/07/1999 to 29/04/2007	Figure 4.11	Figure 4.12
G	229679B	Woori Yallock Creek at Yellingbo	09/07/1999 to 26/11/2007	Figure 4.13	Figure 4.14



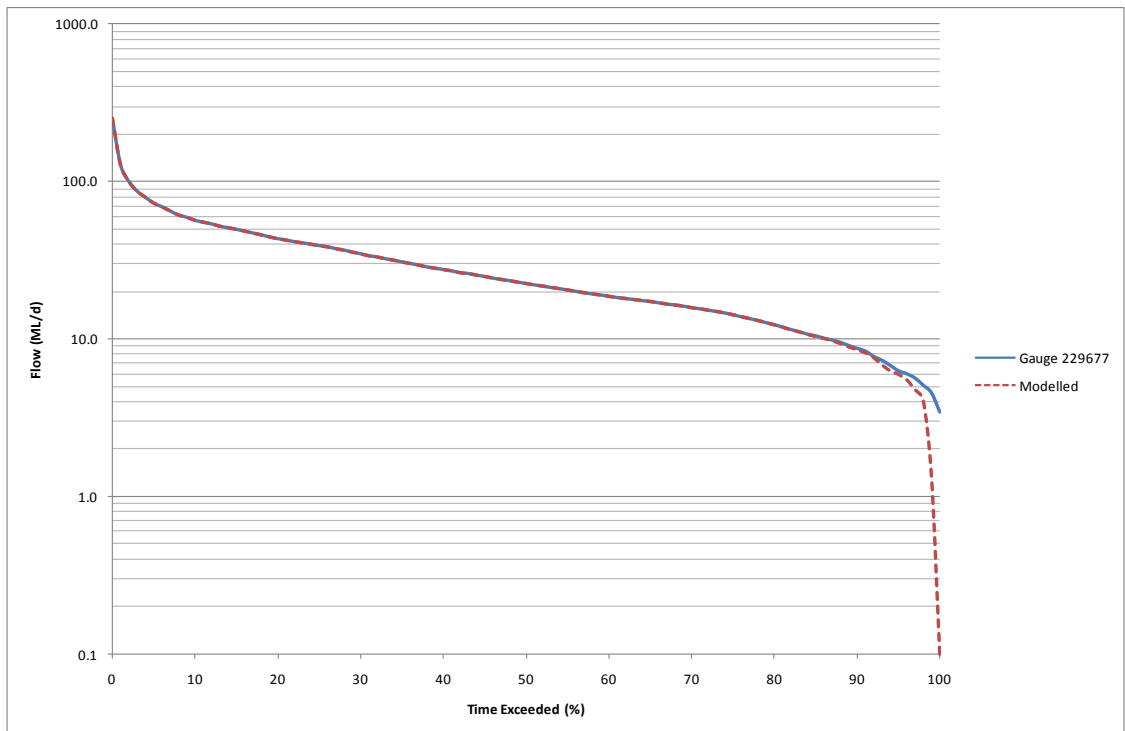
■ **Figure 4.1: Daily time series plot showing the comparison between gauged and modelled flow in Cockatoo Creek at Nangana (229248) from 04/04/1998 to 08/10/2007**



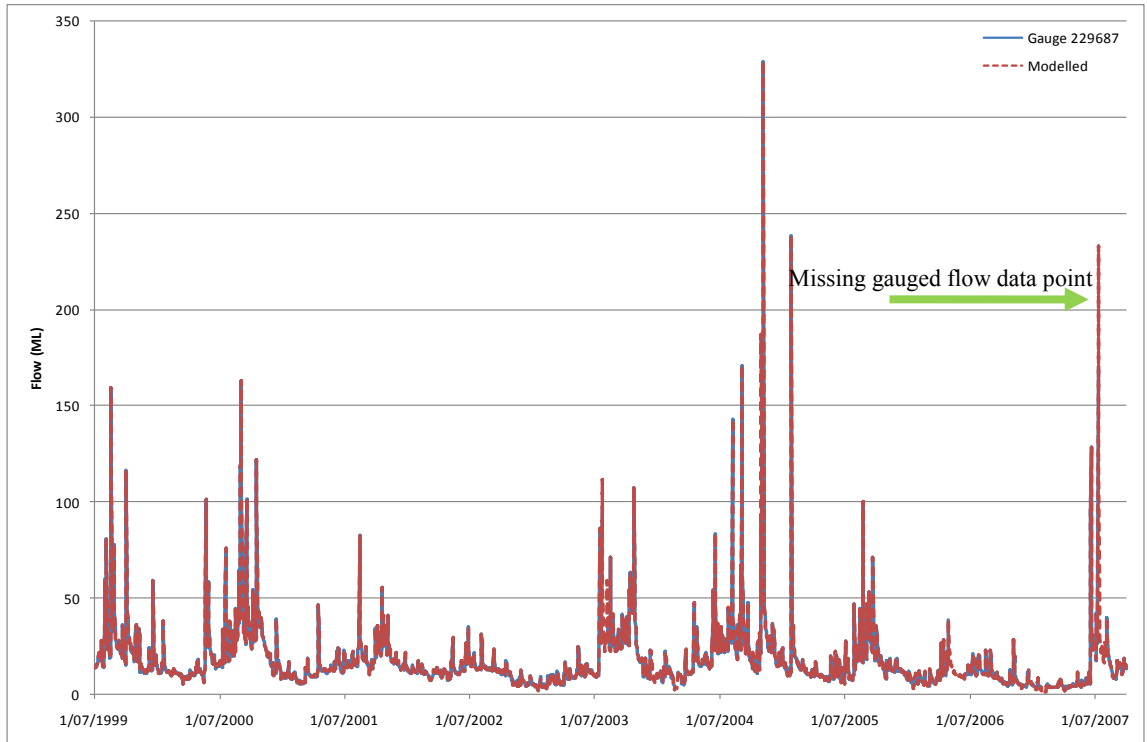
■ **Figure 4.2: Flow duration curve showing the comparison between gauged and modelled flow in Cockatoo Creek at Nangana (229248) from 04/04/1998 to 08/10/2007**



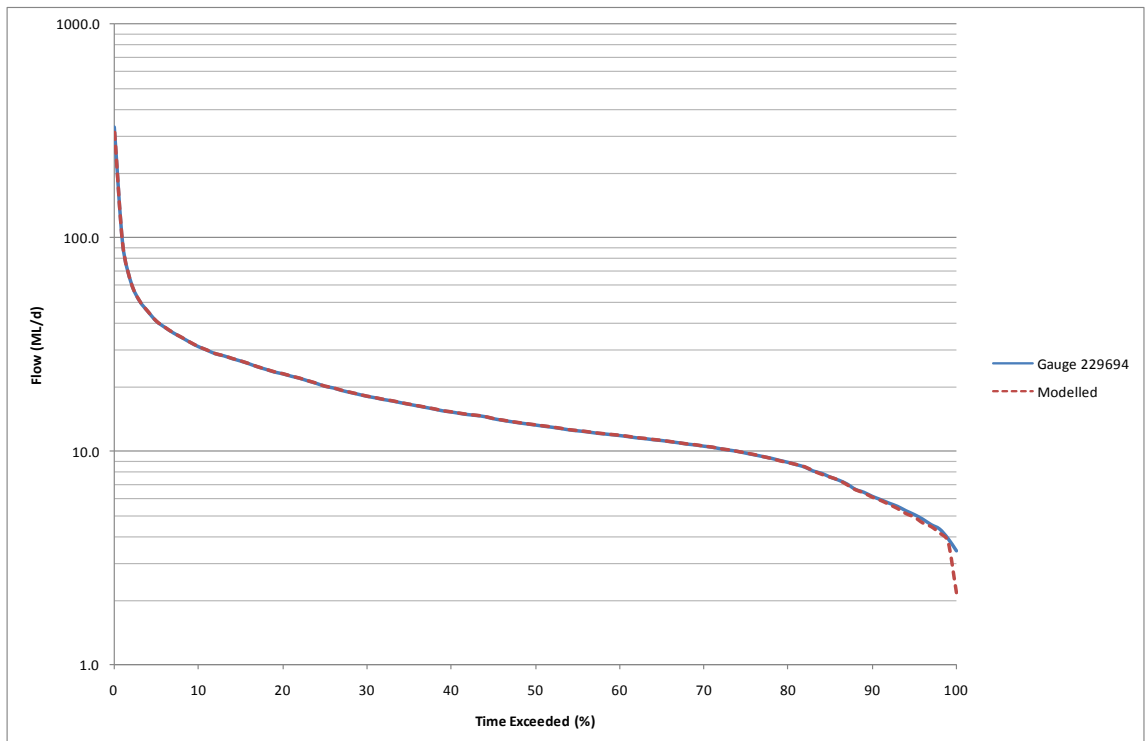
■ **Figure 4.3: Daily time series plot showing the comparison between gauged and modelled flow in Shepherd Creek at Nangana (229677) from 10/07/1999 to 04/12/2007**



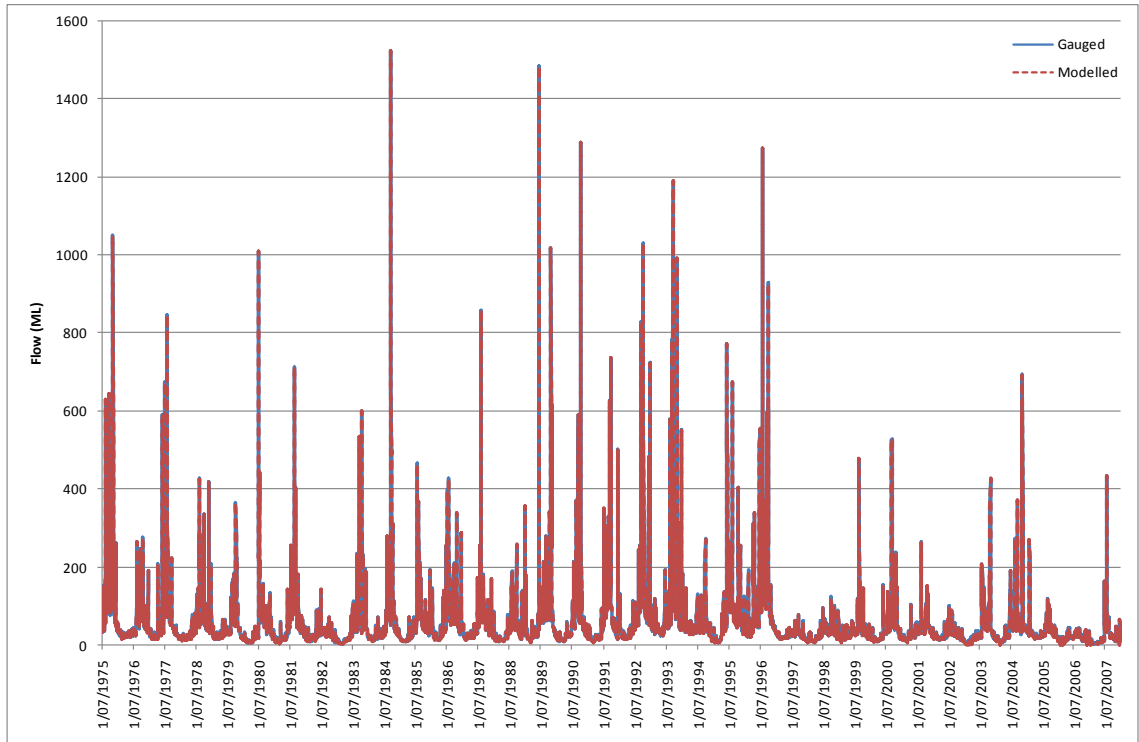
■ **Figure 4.4: Flow duration curve showing the comparison between gauged and modelled flow in Shepherd Creek at Nangana (229677) from 10/07/1999 to 04/12/2007**



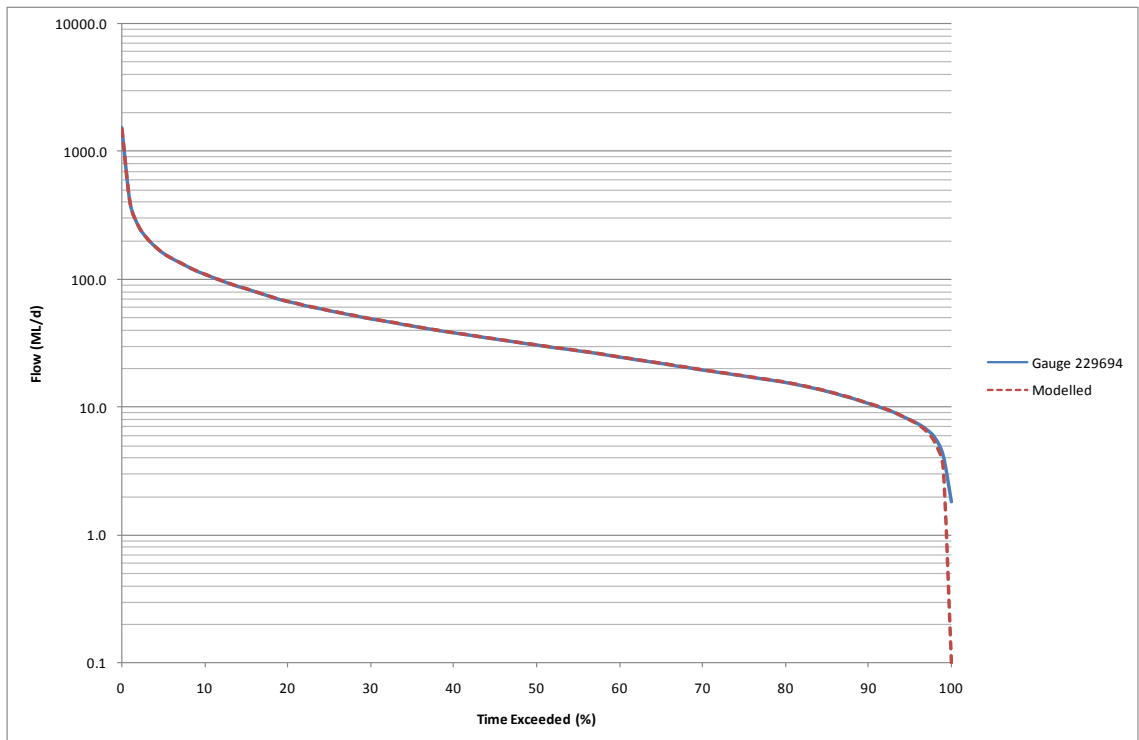
■ Figure 4.5: Daily time series plot showing the comparison between gauged and modelled flow in McCrae Creek at Yellingbo (229678) from 10/07/1999 to 09/10/2007



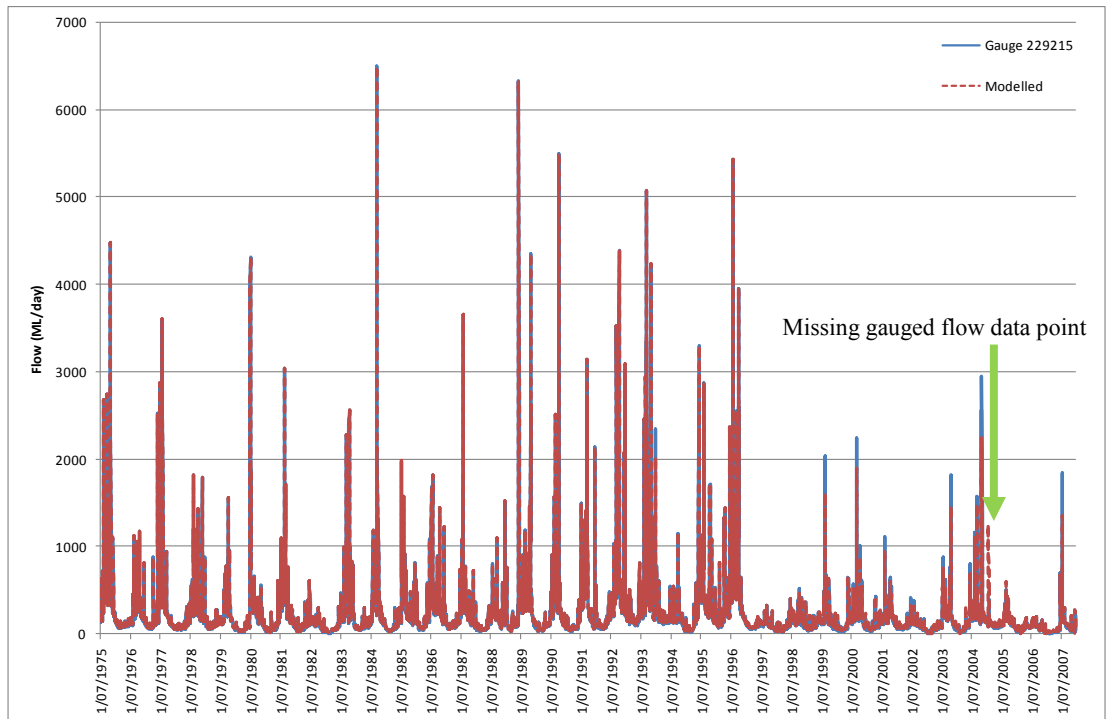
■ Figure 4.6: Flow duration curve showing the comparison between gauged and modelled flow in McCrae Creek at Yellingbo (229678) from 10/07/1999 to 09/10/2007



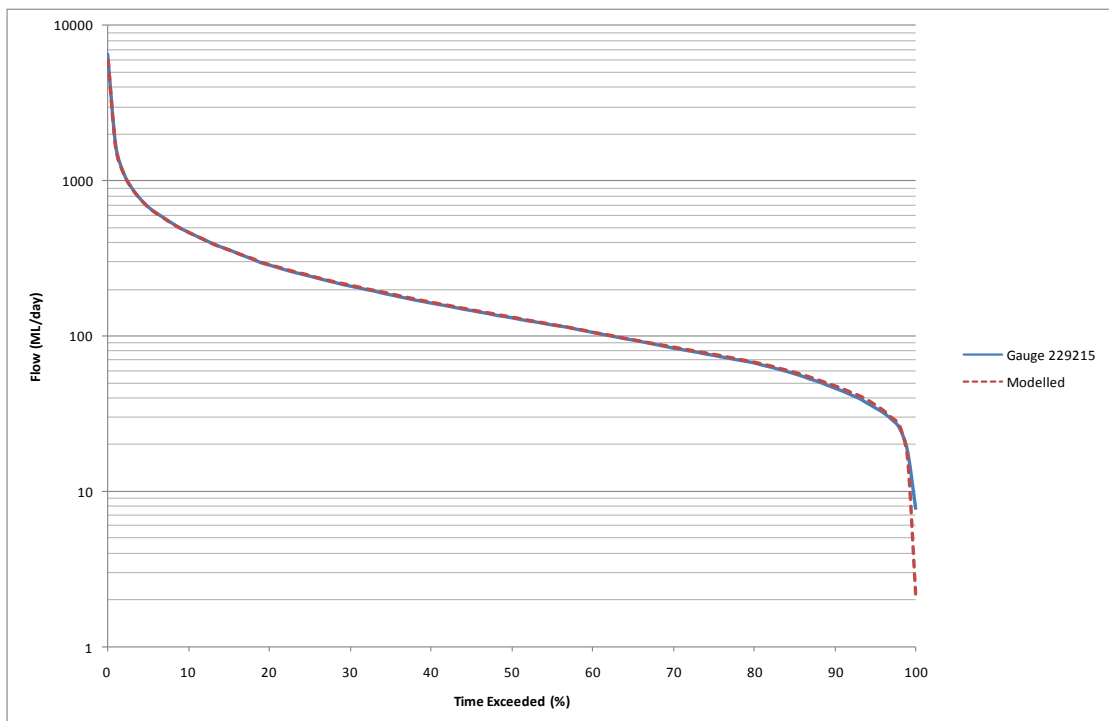
■ **Figure 4.7: Daily time series plot showing the comparison between gauged (factored by catchment area) and modelled flow in Woori Yallock Creek at Monbulk (229694) from 01/07/1975 to 31/12/2007**



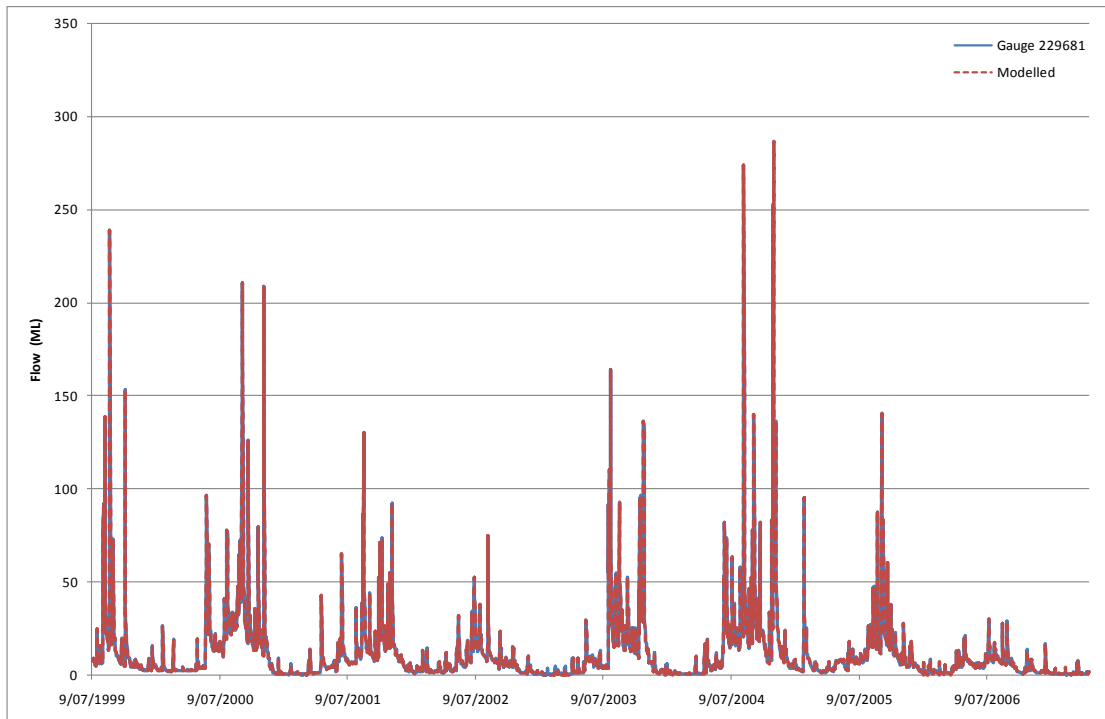
■ **Figure 4.8: Flow duration curve showing the comparison between gauged (factored by catchment area) and modelled flow in Woori Yallock Creek at Monbulk (229694) from 01/07/1975 to 31/12/2007**



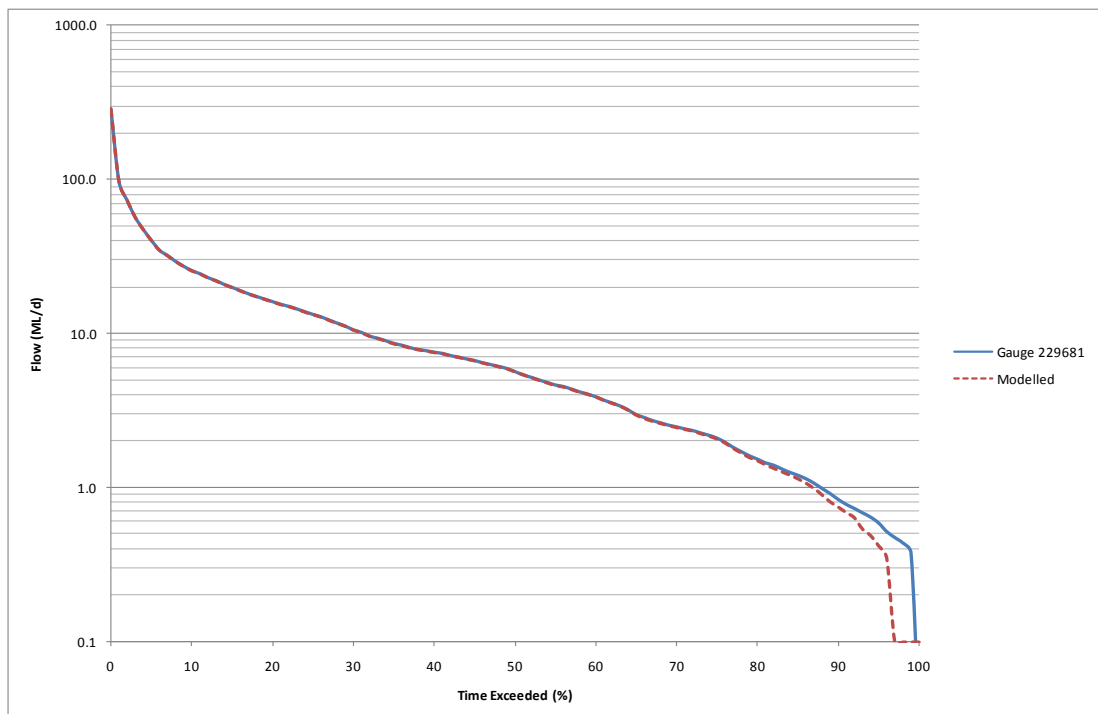
■ **Figure 4.9: Daily time series plot showing the comparison between gauged and modelled flow in Woori Yallock Creek at Woori Yallock (229215) from 01/07/1975 to 31/12/2007**



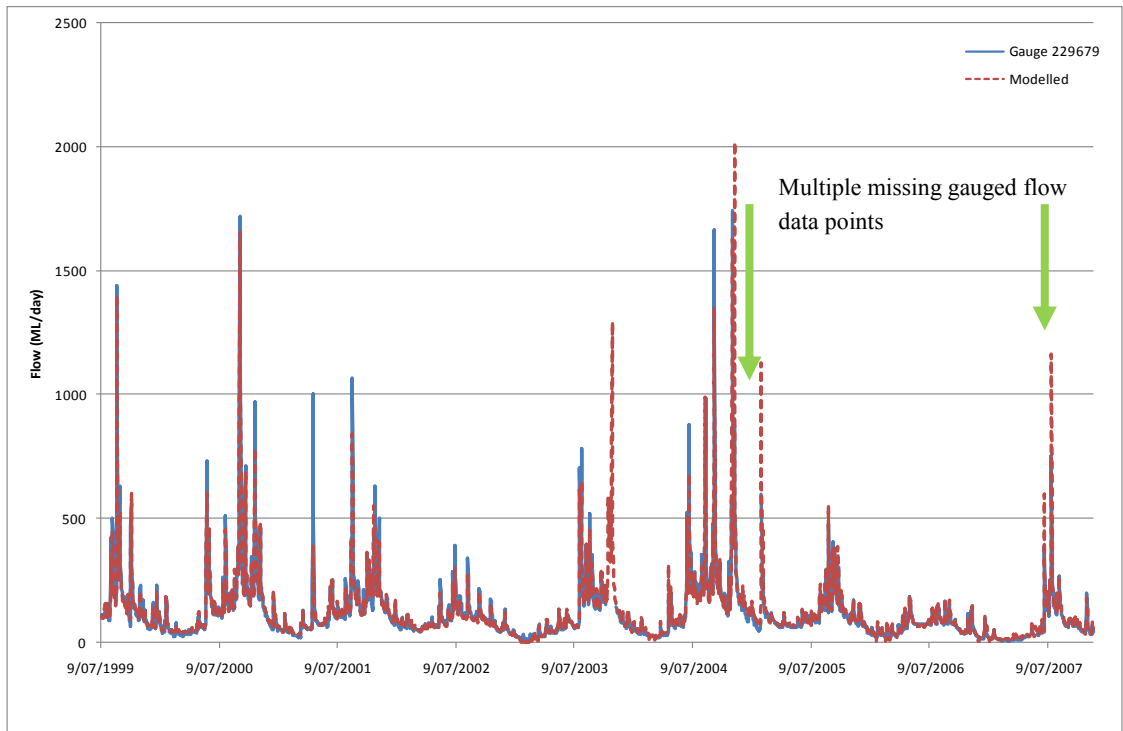
■ **Figure 4.10: Flow duration curve showing the comparison between gauged and modelled flow in Woori Yallock Creek at Woori Yallock (229215) from 01/07/1975 to 31/12/2007**



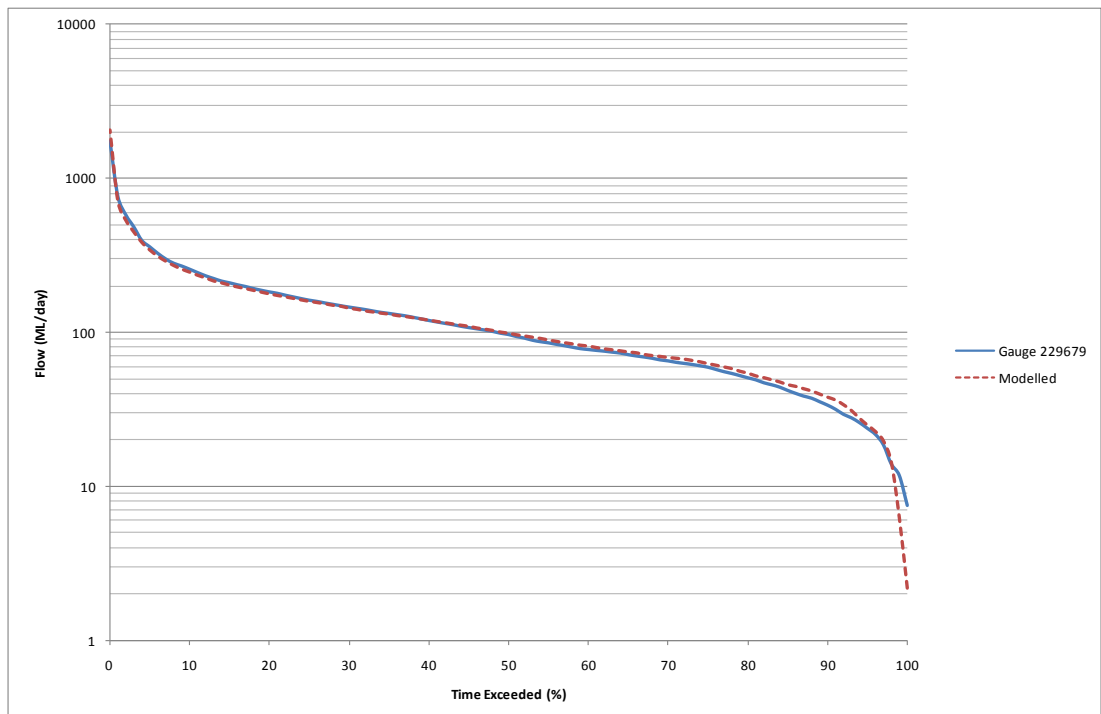
■ **Figure 4.11: Daily time series plot showing the comparison between gauged and modelled flow in Wandin Yallock Creek at Seville East (229681) from 09/07/1999 to 29/04/2007**



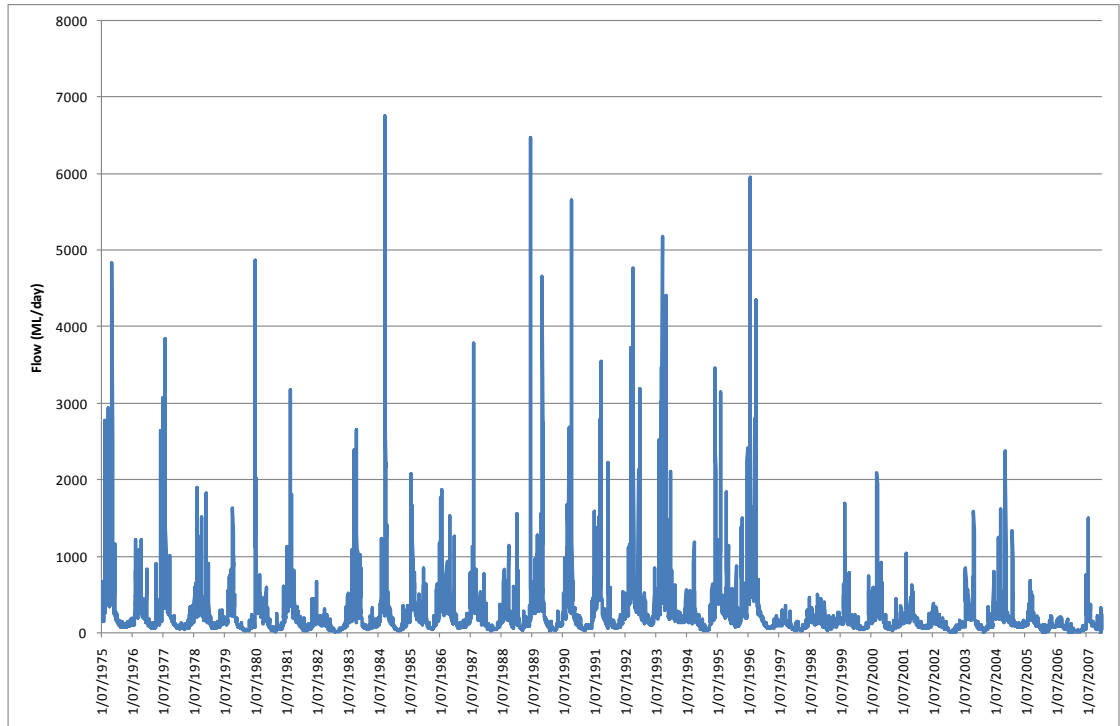
■ **Figure 4.12: Flow duration curve showing the comparison between gauged and modelled flow in Wandin Yallock Creek at Seville East (229681) from 09/07/1999 to 29/04/2007**



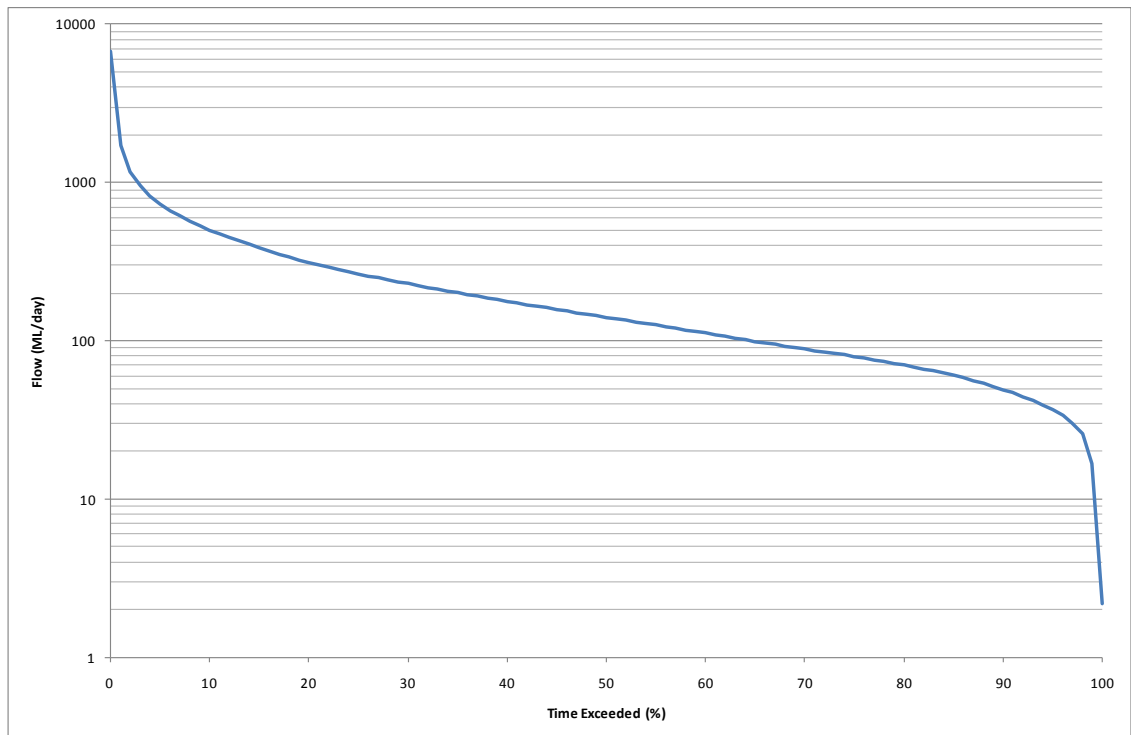
■ **Figure 4.13: Daily time series plot showing the comparison between gauged and modelled flow in Woori Yallock Creek at Yellingbo (229679) from 09/07/1999 to 26/11/2007**



■ **Figure 4.14: Flow duration curve showing the comparison between gauged and modelled flow in Woori Yallock Creek at Yellingbo (229679) from 09/07/1999 to 26/11/2007**



■ Figure 4.15: End of system daily flow series under historic conditions from 01/07/1975 to 31/12/2007



■ Figure 4.16: End of system flow duration curve under historic conditions from 01/07/1975 to 31/12/2007