CHAPTER SEVEN

CONCLUSIONS AND RECOMMENDATIONS

7.1 CONCLUSIONS

7.1.1 Annual Streamflow Generation

From the results of annual flow models as described in the previous chapters, it can be concluded as follows.

(1) For short memory models, the AR(1) model can preserve the mean, standard deviation, skewness and lag-one autocorrelation coefficient better than the ARMA(1,1) model. The short memory models can also preserve the Hurst coefficient provided that the value of the coefficient is less than 0.7.

(2) For the long memory models, it has been found that the Broken Line (BL) model, with both high and low frequency terms modified, can preserve the mean, standard deviation, skewness, lag-one autocorrelation coefficient better that other models used in this study.

(3) Modifications to preserve skewness by Wilson-Hilferty, logarithmic and Beard's procedure yield practically the same results on the 10 rivers used in this study.

(4) The number of generated zero-flow values resulting from rounding up the negative flows is less than 5% of the total generated values.

7.1.2 Monthly Streamflow Generation

The results of monthly streamflow models lead to the following conclusions.

(1) The Thomas-Fiering model can preserve the seasonal monthly parameters (mean, standard deviation, skewness and lag-one

autocorrelation) better than all other models used in this study.

(2) The Two-Tier, method of fragments and disaggregation models are models designed to preserve both the seasonal monthly and annual parameters. The results show that their abilities to preserve the seasonal monthly parameters are disappointing. Modifications to the models do not produce any improvement. However, it has been found that the Two-Tier model and the method of fragments give better results than the disaggregation model.

(3) The First and Second Spolia-Chander models can preserve the mean, standard deviation and skewness but not the lag-one autocorrelation coefficients. Therefore they have little value in application.

(4) Even though the Sen model can preserve the flow parameters comparable to the Thomas-Fiering model, it is more difficult to apply due to complicated computation and large number of model parameters.

7.2 RECOMMENDATION FOR MODEL APPLICATION

The followings are recommendations regarding the application of models used in this study.

(1) For annual streamflows with the Hurst coefficient less than 0.7 the AR(1) model is recommended. The Broken Line model with both high and low frequency terms modified should be used when the Hurst coefficient is greater than 0.7 .

(2) The Thomas-Fiering model with Wilson-Hilferty transformation should be used for monthly streamflow generation. For stream with a large number of zero flows, logarithmic transformation should be used instead of Wilson-Hilferty transformation.

(3) Matalas moment transformation equations are the simplest method for obtaining parameters in logarithmic domain.

7.3 RECOMMENDATION FOR FURTHER STUDIES

(1) More robust estimatation of model parameters such as the maximum likelihood method should be investigated.

(2) The models should be extended to cover multi-site generation.

(3) Studies should be made on models designed for time interval shorter than a month.