WATER ACCOUNTING IN THE OROUA RIVER CATCHMENT

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ABSTRACT

With growing population and limited water resources, there is an increasing need worldwide for better management of water resources. This is especially true when all–or nearly all–water resources are allocated to various uses. Effective strategies for obtaining more productivity while maintaining or improving the environment must be formulated. This can be achieved only after the water quantity, quality and uses have been understood and evaluated. One tool to analyse the situation in order to gain a deeper understanding and possibly identify opportunities for better water management is the recently–proposed methodology of water accounting, which considers components of the water balance and classifies them according to uses and productivity of these uses. Identified changes in quantity and quality of water can provide important clues on increasing water productivity.

The water accounting methodology was tried in the Oroua River Catchment to evaluate its use as a way of assessing water availability, and to identify opportunities for water savings in the catchment. The use of the methodology in a basin-wide water assessment was not successful due to insufficient rainfall data–especially at the State Forest Park where most of the streamflow (approximately 80%) comes from during low flows. In addition, the monthly climatic water balance model used failed to produce a reliable estimate of streamflow. The volume of estimated streamflow was greatly underestimated as compared to the actual recorded streamflow. Streamflow water accounting was able to assess the water availability in the lower portion of the Oroua River for the indicators gave a clear picture of the existing state of the river during the summer months. Water depletions from instream uses, which include waste assimilation, environmental maintenance, and free-water evaporation, comprised the largest part of the total streamflow depletions in the lower Oroua River. In some instances, combined depletion from waste assimilation and free-water evaporation was more than 3 times the available water. Depletions from offstream uses, including municipal and industrial, and irrigation abstractions

comprised only a small portion of the total streamflow depletion. However, one limitation of the approach is that it did not account for the other return flows from irrigation and M&I diversions. Despite the limitations of the study, the use of the indicators helped in understanding the situation since the Depleted Fraction ($DF_{available}$) indicator clearly showed how much further abstraction is allowed, and the use of the Process Fraction ($PF_{depleted}$) readily shows an opportunity for better use of water.

It is recommended that the pollution effect also be included in the original water accounting methodology of Molden (1997). The pollution effect of different contaminants could be quantified by their dilution factor i.e., the physical amount of water lost to pollution from the discharge of effluents is measured by the amount of upstream water which would be required to dilute it back down to the maximum allowed concentration of pollutants.

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