WATER AND SALT YIELD VARIATIONS IN THE SOUTH DANDALUP AND YARRAGIL CATCHMENTS

E.J. Herbert and S.R. Shea

Water and salt yield measurements in the South Dandalup and Yarragil Catchments are continuing for the third successive year. It is now possible to make some preliminary contrasts between the data obtained for the years 1975 and 1976.

The rainfall recorded at Dwellingup for 1975 was 1036.8 mm, and 1064.3 mm in 1976. Rainfall recorded by the Metropolitan Water Board at the South Dandalup Dam wall for 1975 and 1976 was 1372.9 mm, and 963.9 mm respectively). Although the difference in rainfall is small, the factor which controls rainfall caused runoff, that is, rainfall distribution through time, varied significantly between the two years. In 1975, 56% of the total rainfall fell in the winter months of June, July and August whilst only 35% of the total rainfall fell in the corresponding period during 1976. A similar amount (34% of total rainfall) in 1976 fell during the dry summer/autumn period which extends from November through to May, whilst only 9% of total rainfall fell during this period in 1975. It is this difference in rainfall distribution through time which is thought to contribute to the observed variations in streamflow and salt yield.

In both catchments there was a decrease in water and salt yield during 1976. Salt yields, however, were relatively larger than corresponding water yields in most micro-catchments (see attached graph) when expressed as a percentage of 1975 data. Thus, it was observed that when water yields decrease, the weighted average salinity increases due to lack of dilution from direct runoff. To paraphrase, during years of low winter rainfall the proportion of groundwater to total streamflow is increased.

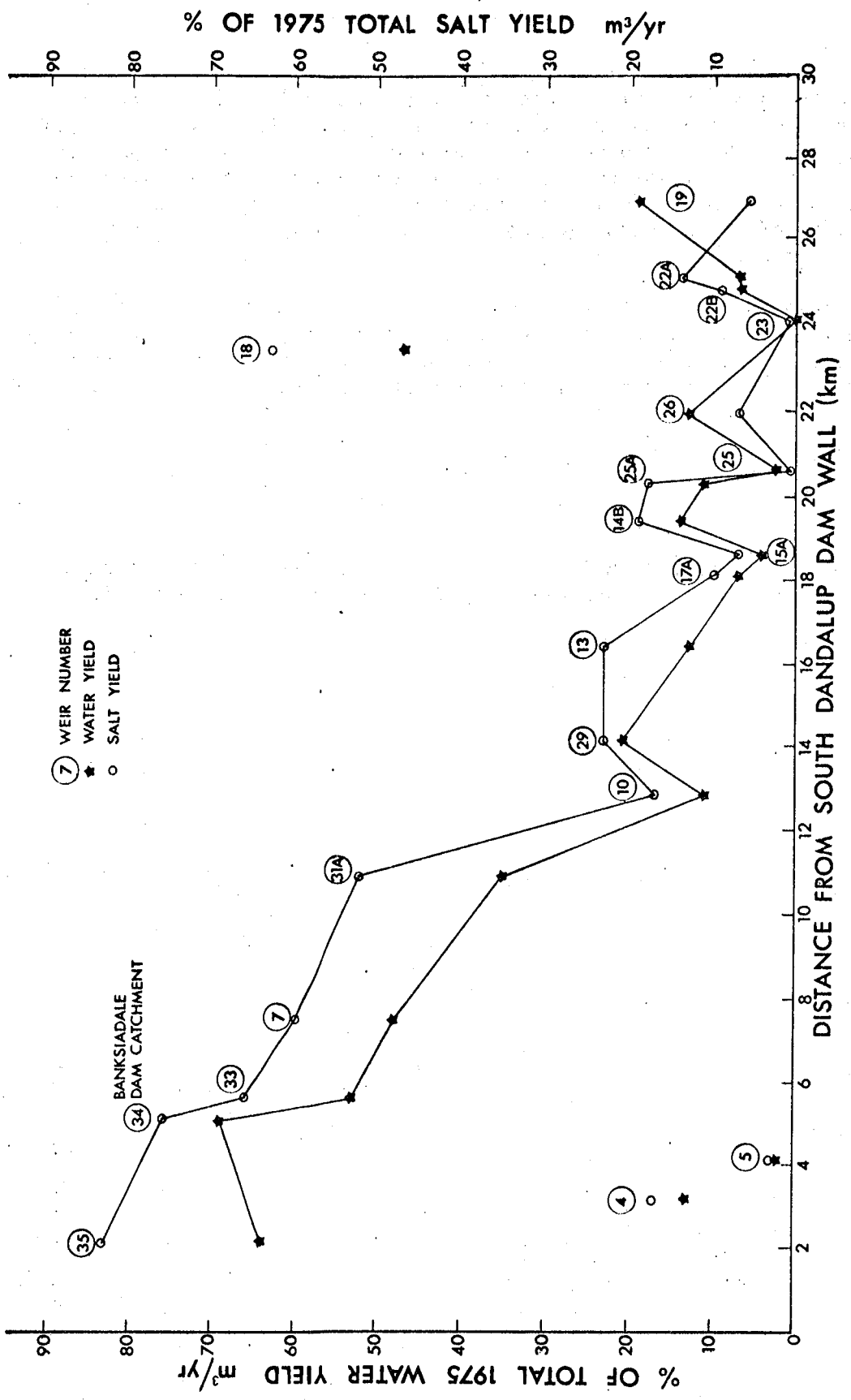
In general, water yields of most micro-catchments were 20% of those obtained in 1975. In the South Dandalup catchment a sharp decline in both water and salt yield occurred at approximately 13 km east of the dam wall. This decline is also associated with a sharp reduction in percentage yield, an increase in weighted average salinity and baseflow salinity (Shea & Herbert, in press). It seems feasible to suggest that at this point in space the rainfall excess threshold has not been reached, that is, there has not been sufficient rainfall to recharge

groundwater aquifers nor to generate large quantities of overland flow. This phenomena is demonstrated in the Yarragil catchment where analysis of long term P.W.D. data obtained from their weir on the Yarragil Brook showed that significant run-off did not occur in those years receiving less than 1000 mm rainfall. Rainfall above this amount caused the run-off/rainfall curve to increase in a sigmoidal pattern (Herbert, unpublished data).

It can be hypothesized that as you proceed eastwards in the northern jarrah forest the above situation becomes the norm, that is, in most years there is little rainfall excess and hence little run-off, which over time has led to the formation of salt profiles in the catchment soils.

REFERENCE

SHEA, S.R. and HERBERT, E.J. (in press). The potential to increase water yield in the northern jarrah forest of Western Australia.


% OF 1975 TOTAL SALT YIELD m³/yr
% OF TOTAL 1975 WATER YIELD m³/yr
DISTANCE FROM SOUTH DANDALUP DAM WALL (km)
WEIR NUMBER
WATER YIELD
SALT YIELD
BANKSIADALE DAM CATCHMENT