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G J. Luke

C G. Denby

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Disclaimer

The contents of this report were based on the best available information at the time of publication. It is based in part on various assumptions and predictions. Conditions may change over time and conclusions should be interpreted in the light of the latest information available.

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Tables

1. Storage Life of Farm Dams

The attached tables predict the number of dry sheep equivalents (D.S.E.) which can be watered continuously on farm dams throughout the agricultural areas of Western Australia. The tables apply to dams which have no improved catchments such as a roaded catchment or flat batters.

They replace similar tables published by D.J. Carder (W.A. J. Agric., 1970, pp. 117-123) and contained in the “Water Conservation Handbook” (1971), by D.J. Carder and G.W. Spencer.

A number of assumptions were made while preparing the tables:-

I. No inflow into the darn after August 31st for the periods considered.

II. No seepage from the dam.

III. Batter slopes of 3:1.

IV. Minimum floor length of dam is 5.0 m.

The water budgeting calculations used to determine the carrying capacity involved subtracting the amounts evaporated and used by the sheep on a monthly basis. The estimates of evaporation and drinking rates and how they were derived, are presented in:-

D.R.M. Technical Reports

60 Consumption of Water by Livestock

and 65 Evaporation Data for Western Australia

In the original “Carder-Spencer” tables the State was subdivided into five zones, based on evaporation. This was possible because it was assumed that:

* sheep drink the same amount regardless of location in the S.W., and

* the ratio of darn evaporation to Class A pan evaporation is constant throughout the State.

D.R.M. Technical Reports 60 and 65 clearly show that these assumptions are not correct. Tables have been prepared for the 16 centres, shown on the Map.

For other centres the data can either be extrapolated from the tables, or individual calculations made.

The “Damsup” programme used to prepare the tables was written by C.G. Denby and is available to any district office. The programme will enable new storage life tables to be calculated for any centre in the State, using the data on evaporation and sheep drinking rates in D.R.M. technical reports 60 and 65.

The “Damsup” programme also allows the operator to vary the length and starting time of the dry period, and to change the seepage rate, batter slope and minimum floor length of the dam.

Tables 1—16 indicate the number of D.S.E.s which can be watered continuously for the combinations of time, water depth and dam volume.

Table 1. Manjimup

Dam Volume (cu.m)	Minimum depth of water at the end of August (m)					
	10 months supply			22 months supply		
	3	4	5	3	4	5
1000	770	-	-	-	-	-
1500	1250	1340	-	260	-	-
2000	1730	1890	-	380	-	-
3000	2700	2990	3090	670	780	-
4000	3680	4110	4290	960	1150	1220
6000	5650	6370	6700	1540	1900	2060

Key- = floor length would be less than 5 m
0 = Zero carrying capacity for the time required.

Table 2. Cranbrook

Dam Volume (cu.m)	Minimum depth of water at the end of August (m)					
	10 months supply			22 months supply		
	3	4	5	3	4	5
1000	660	-	-	-	-	-
1500	1090	1200	-	160	-	-
2000	1540	1710	-	270	-	-
3000	2420	2750	2860	500	640	-
4000	3310	3810	4000	740	960	1020
6000	5120	5940	6320	1190	1600	1790

Table 3. Jerramungup

Dam Volume (cu.m)	Minimum depth of water at the end of August (m)					
	10 months supply			22 months supply		
	3	4	5	3	4	5
1000	600	-	-	-	-	-
1500	990	1100	-	130	-	-
2000	1390	1570	-	220	-	-
3000	2200	2530	2640	420	560	-
4000	3020	3500	3700	610	850	910
6000	4670	5470	5860	1010	1420	1620

Table 4. Katanning

Dam Volume (cu.m)	Minimum depth of water at the end of August (m)					
	10 months supply			22 months supply		
	3	4	5	3	4	5
1000	580	-	-	-	-	-
1500	960	1060	-	130	-	-
2000	1340	1520	-	220	-	-
3000	2130	2460	2580	400	530	-
4000	2930	3410	3600	590	820	880
6000	4530	5330	5710	960	1380	1570

Table 5. Esperance

Dam Volume (cu.m)	Minimum depth of water at the end of August (m)					
	10 months supply			22 months supply		
	3	4	5	3	4	5
1000	510	-	-	-	-	-
1500	860	990	-	50	-	-
2000	1230	1440	-	110	-	-
3000	1960	2350	2500	240	400	-
4000	2700	3280	3520	350	640	740
6000	4190	5150	5600	610	1120	1340

Table 6. Narrogin

Dam Volume (cu.m)	Minimum depth of water at the end of August (m)					
	10 months supply			22 months supply		
	3	4	5	3	4	5
1000	500	-	-	-	-	-
1500	870	980	-	80	-	-
2000	1230	1420	-	160	-	-
3000	1960	2300	2420	300	450	-
4000	2700	3210	3420	460	700	780
6000	4190	5030	5430	770	1220	1410

Table 7. Salmon Gums

Dam Volume (cu.m)	Minimum depth of water at the end of August (m)					
	10 months supply			22 months supply		
	3	4	5	3	4	5
1000	480	-	-	-	-	-
1500	810	930	-	50	-	-
2000	1150	1340	-	100	-	-
3000	1820	2210	2340	220	380	-
4000	2520	3070	3300	340	590	690
6000	3920	4830	5260	560	1040	1260

Table 8. Lake Grace

Dam Volume (cu.m)	Minimum depth of water at the end of August (m)					
	10 months supply			22 months supply		
	3	4	5	3	4	5
1000	480	-	-	-	-	-
1500	800	910	-	60	-	-
2000	1140	1330	-	130	-	-
3000	1820	2160	2290	260	400	-
4000	2510	3020	3230	380	620	700
6000	3900	4740	5140	660	1090	1300

Table 9. Corrigin

Dam Volume (cu.m)	Minimum depth of water at the end of August (m)					
	10 months supply			22 months supply		
	3	4	5	3	4	5
1000	400	-	-	-	-	-
1500	740	850	-	30	-	-
2000	1050	1250	-	80	-	-
3000	1680	2050	2170	190	350	-
4000	2330	2860	3070	290	540	640
6000	3630	4510	4930	510	980	1180

Table 10. Holt Rock

Dam Volume (cu.m)	Minimum depth of water at the end of August (m)					
	10 months supply			22 months supply		
	3	4	5	3	4	5
1000	420	-	-	-	-	-
1500	720	830	-	20	-	-
2000	1020	1220	-	60	-	-
3000	1630	2000	2130	160	320	-
4000	2260	2790	3020	260	510	610
6000	3510	4400	4820	450	910	1120

Table 11. Northam

Dam Volume (cu.m)	Minimum depth of water at the end of August (m)					
	10 months supply			22 months supply		
	3	4	5	3	4	5
1000	400	-	-	-	-	-
1500	690	800	-	20	-	-
2000	980	1170	-	60	-	-
3000	1570	1920	2030	160	320	-
4000	2170	2670	2890	260	510	590
6000	3380	4220	4620	450	900	1100

Table 12. Wongan Hills

Dam Volume (cu.m)	Minimum depth of water at the end of August (m)					
	10 months supply			22 months supply		
	3	4	5	3	4	5
1000	340	-	-	-	-	-
1500	590	720	-	0	-	-
2000	860	1060	-	0	-	-
3000	1390	1760	1900	60	220	-
4000	1920	2480	2700	110	380	480
6000	3020	3930	4370	220	700	930

Table 13. Merredin

Dam Volume (cu.m)	Minimum depth of water at the end of August (m)					
	10 months supply			22 months supply		
	3	4	5	3	4	5
1000	300	-	-	-	-	-
1500	540	670	-	0	-	-
2000	780	990	-	0	-	-
3000	1260	1670	1820	0	180	-
4000	1770	2370	2610	20	300	420
6000	2780	3760	4220	50	580	820

Table 14. Geraldton

Dam Volume (cu.m)	Minimum depth of water at the end of August (m)					
	10 months supply			22 months supply		
	3	4	5	3	4	5
1000	240	-	-	-	-	-
1500	430	590	-	0	-	-
2000	640	900	-	0	-	-
3000	1060	1530	1700	0	80	-
4000	1490	2180	2450	0	160	290
6000	2370	3480	4020	0	340	620

Table 15. Three Springs

Dam Volume (cu.m)	Minimum depth of water at the end of August (m)					
	10 months supply			22 months supply		
	3	4	5	3	4	5
1000	260	-	-	-	-	-
1500	460	590	-	0	-	-
2000	670	880	-	0	-	-
3000	1090	1470	1620	0	130	-
4000	1520	2080	2320	0	220	320
6000	2380	3320	3770	0	450	690

Table 16. Wialki

Dam Volume (cu.m)	Minimum depth of water at the end of August (m)					
	10 months supply			22 months supply		
	3	4	5	3	4	5
1000	240	-	-	-	-	-
1500	430	580	-	0	-	-
2000	640	870	-	0	-	-
3000	1060	1490	1630	0	100	-
4000	1490	2100	2370	0	190	300
6000	2350	3380	3860	0	380	640

When the data in Tables 1-16 are being used several possible sources of error should be considered:

1. The data relates to hypothetical dry periods of 10 or 22 months during which no runoff will occur. It has become accepted that in order to drought-proof a property allowance for a 22 month runoff—free period should be made.

   If the dam has a roaded—catchment the “Damcat” curve for the district is the appropriate design tool to be used.

2. The potential stock numbers will be decreased if a darn leaks. A. McCrea (1986 pers. comm.) measured average seepage rates of 0.5 mm per day from dams during a N.E. Wheatbelt dam survey.

   Tables 17 and 18 show the effect of increasing seepage rates on the carrying capacity of dams at Katanning and Wialki over a 10 month period.

Table 17. Effect of seepage on the carrying capacity of a 3 m deep dam over 10 months at Katanning

Dam volume (cu m)	0	1	2	3	4
1500	960	750	560	370	180
2000	1340	1070	800	540	270
3000	2130	1710	1300	880	460
4000	2930	2370	1800	1230	660

Table 18. Effect of seepage on the carrying capacity of a 3 m deep dam over 10 months at Wialki

Dam volume (cu m)	0	1	2	3	4
1500	430	290	130	0	0
2000	640	430	220	0	0
3000	1060	720	380	30	0
4000	1490	1020	560	80	0

3. If a dam has batters flatter than 1.3 then evaporation will remove a greater volume of water than allowed for in these tables and stocking rates will be reduced.

4. These tables apply on to dams which have the appropriate volume and depth of water at the end of August. That volume and depth may be either at the point of overflow, or at any other measured level. The “Daxnsup” programme can also be used to vary the starting date of the dry period.

Map 1: S.W Agricultural area of W.A