Department of Conservation and Land Management

Research Division

CONSIDERATION OF POSSIBLE DUCK SHOOTING SEASONS IN WESTERN AUSTRALIA IN 1990

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TO: DR B. WILSON, DIRECTOR OF NATURE CONSERVATION.

RE: CONSIDERATION OF POSSIBLE DUCK SHOOTING SEASONS IN WESTERN AUSTRALIA IN 1990.

1. INTRODUCTION

The purpose of this report is to provide technical advice on whether or not duck shooting seasons in a) the South West and Eucla land divisions, and b) the Kimberley, North West and Eastern land divisions, would be acceptable from a biological viewpoint, in 1990.

In accordance with past procedure this report provides an assessment of conditions for waterfowl breeding in the South West and Eucla land divisions during 1989.

This assessment is based upon a consideration of rainfall statistics and water levels of a sample of south west wetlands. These two parameters provide the best available measure of the extent of breeding habitat available (i.e. the number of wetlands containing water, and their depth) during the 1989 spring breeding season.

The number of wetlands containing water varies considerably from one year to the next and is the most important primary determinant of year to year variation in waterfowl breeding activity and success. Waterfowl refuge areas aside, breeding activity and success are the most important determinants of the ability of duck populations to withstand losses caused by hunting.

The report also makes reference to the limited information that is available on total duck numbers in the south west.

A recommendation concerning the Kimberley, North West and Eastern land divisions is provided at page 7.

2. SOUTH WEST AND EUCLA LAND DIVISIONS

2.1 RAINFALL

Rainfalls in the five meteorological districts of the southwest during the period Jan-Oct 1989 ranged from 7% below normal in the South Coastal district to 25% below normal in the North Coastal and Central Coastal districts (Figure 1).

Viewing each district on a monthly basis (see Figure 2) the most notable features of 1989 rainfall were:

* the high falls recorded at the onset of winter (i.e. in May), and the generally low falls recorded during the

latter part of winter, in the North Coastal, Central Coastal and South Central districts;
* the very low falls recorded in June in the Central Coastal and South Coastal districts;
* the near average to above average falls recorded in all districts in October.

A more detailed analysis of rainfall statistics for the Jan-Oct 1989 period reveals that rainfalls were below average (3rd decile) to much below average (2nd decile) over a substantial area of the southwest from Northampton in the north to Manjimup in the south and east to Wubin, Meckering and Narrogin (Figure 3). Falls were also low in several smaller areas around Dumbleyung, Jerramungup and Salmon Gums.

On the other hand, above average (8th decile) to very much above average (10th decile) falls were recorded in a narrow strip along the south coast from Albany to east of Esperance, and in an area centering on Bencubbin.

Elsewhere in the south west rainfalls were average (4th-7th deciles).

2.2 WETLAND WATER LEVELS

The median water depth of the 79 south-west wetlands monitored in September 1989 was 1.10m, i.e., 50% of monitored wetlands were less than 1.10m deep. This figure is comparable with that of 1984/85 when a full shooting season was declared, and marginally above that of 1981/82 when a restricted season was declared (Table 1 and Figure 4). Statistical analysis (paired t-tests) indicate that water depths in September 1989 were, in fact, not significantly different from those of Sep 1984 or 1981 ($p<0.90$ and $p<0.19$ respectively).

Similar relationships exist between depths recorded in Novembers of each year.

Mean (arithmetic average) depths are also provided in Table 1. These, however, are less meaningful than median depths as the distribution of wetland depths is strongly skewed to the right, i.e. there are a small number of very deep wetlands (4-9m) which have a disproportionate affect on the average.

Notable features in 1989 were (see Figure 5):
* the very high water levels recorded in wetlands on the south coast from Hopetoun to Esperance (there was major flooding in this area during winter),
* the higher than average levels of some wetlands between Lake Muir (east of Manjimup) and Bremer Bay and in parts

of the eastern wheatbelt.

* the very low water levels around Narrogin and from Gingin to Coorow.

Elsewhere in the south-west water levels of monitored wetlands were generally average or near average, largely due to good rains last year (Figure 1).

Table 1. Median and mean depths of monitored lakes in September of each year, and their relationship to the type of duck shooting seasons (Nil, Restricted or Full) declared since 1980.

Season Type	Year	Median Depth (metres)	Mean Depth (metres)	No. of Lakes
NIL	80/81	0.25	0.60	60
	87/88	0.50	0.89	79
RESTRICTED	81/82	0.95	1.07	67
	82/83	0.85	1.01	74
	85/86	0.65	0.83	75
	86/87	0.85	1.18	79
FULL	83/84	1.55	1.53	73
	84/85	1.10	1.26	74
	(88/89)*	1.25	1.58	78
CURRENT YEAR	89/90	1.10	1.41	79

* a shooting season was not declared in 88/89 due to the two-year moratorium announced in 1987.

The following lakes showed significant to substantial increases in water levels from 1988 to 1989.

* Eastern wheatbelt: Mt. Marshall Res.26687 (0.08m-0.81m from Sep88 to Sep89), Campion (0.50-1.62), Corrigin (0.86-1.37), Gounter (0.34-1.97),
* Central wheatbelt: Beverley (1.08-1.87), Mears (0.44-1.25), Noonying (0.42-1.28),
* South coast: Jerdacuttup (3.76-4.32), Shaster (0.78-1.10), Esperance Res.26410 (0.90-2.35), Gore (1.53-1.89), Warden (0.64-2.90), Shark (2.05-2.47).

Of the above, the water levels of Mt. Marshall (9yrs data), Campion (11yrs), Gounter (10yrs), Jerdacuttup (10yrs), Esperance Res.26410 (8yrs) and Warden (10yrs) were the

highest recorded since commencement of the departmental wetland monitoring program.

Water levels in many other lakes showed a significant decrease from 1988 to 1989 due to low rainfall this year. Of these, however, the following were still average or near average due to high rainfalls last year.

* Northern: Eganu (2.59 to 1.76 from Sep88 to Sep89), Ninan (2.10-1.10), Eneminga (2.71-1.39),
* Central: Bryde (1.97-1.16m), Dumbleyung (3.33-2.47), Coblinine (3.94-3.08), Gundaring (2.15-1.56), Parkeyerring (2.02-1.29), Flagstaff (1.36-0.71), Coyrecup (2.44-1.78),
* Southern: Anderson (1.83-1.39), Yaalup (3.08-2.22), Yellilup (4.30-4.01),

2.3 DUCK NUMBERS

Annual counts of duck numbers of a sample of southwest wetlands and farm dams were instituted in 1986. These counts are conducted in March each year, towards the end of the dry season and at a time when waterbirds are generally congregated in a relatively small number of "permanent" wetlands.

The intention is that these counts will be used to monitor long term changes in the abundance of each of the eight game species of ducks. The specifications of full, restricted and nil seasons may then be modified periodically in the light of long term population trends, if this is considered necessary.

The March counts are a joint project involving CALM and the Royal Australasian Ornithologists Union (RAOU) under contract to CALM. The RAOU coordinates ground surveys undertaken by a large team of volunteer observers. CALM research staff (2) conduct several days of aerial surveys, primarily of south west estuaries and some large inland lakes. Data are collated by the RAOU and passed to CALM for analysis. This process normally takes several months.

The first three years of the project were developmental. The number of waterbodies to be surveyed was not fixed (observers were encouraged to seek new important sites each year) and grew from 872 in 1986 to 1 398 in 1988. Different waterbodies were also surveyed each year, i.e., some waterbodies surveyed in 1986 and 1987 were not surveyed in subsequent years.

In 1989 the first three years' results were reviewed and a fixed set of wetlands to be counted each year was adopted. The first count based on this fixed set was conducted in March 1989 and the second will be in March 1990.

It is apparent from the above that the data gathered to date need to be viewed cautiously. Because of the varying sample taken each year it would be premature to assert that changes in numbers counted truly reflect changes in total population sizes.

What can be stated with confidence, however, is that the number counted is only a proportion of the total population. Thus in March 1989 the total number of game birds (ducks) in the south west was in excess of 270 000 (Table 2). The total population size can only be guessed at due to the lack of an inventory of wetlands of this region. In the opinion of the CALM and RAOU officers coordinating the counts, the true population at the time of survey was at least 2x greater than the number counted, i.e. it is thought to have been in excess of half a million birds.

Table 2. Number of waterbirds (ducks, swans and coots) counted, and waterbodies surveyed, during southwest surveys from 1986 to 1989 inclusive.

Date of Survey	No. of Birds Counted		No. Waterbodies Surveyed		
	Game	Non-Game	Wetlands	Farm Dams	Total
March 1986	82 775	43 023	373	499	872
March 1987	195 812	54 513	459	742	1 201
March 1988	179 146	50 175	580	818	1 398
Nov * 1988	126 150	21 607	592	421	1 013
March 1989	271 361	83 430	653	456	1 109

November counts were instituted in 1988 and this year's November survey was concluded last week. It will be several weeks before all count data is received from all participants and the collated data is not expected to be received from the RAOU before the new year.

The November counts are being conducted with the intention of using the data so gained to identify important breeding sites and to quantify the relationship between conditions

for breeding (i.e. water levels) and actual breeding activity and success.

The November counts are expected to be less useful than March counts for monitoring annual and longer-term changes in waterfowl abundance and are not intended for that purpose. This is because a smaller proportion of available habitat is surveyed in November than in March (the standard set is biased towards dry season habitats) and there is greater annual variation in the area and distribution of wetland habitat (i.e. water) in November than in March.

2.4 CONCLUSIONS

From the data presented above it is concluded that wetland water levels and duck numbers are adequate to allow a duck shooting season to be permitted in the South West and Eucla land divisions in 1990.

Under the standardised system of season determination adopted in 1980, two types of shooting season may be declared - Restricted or Full. Each has standard specifications with respect to opening day and time (6.00am Sunday 14th or 6.00pm Saturday 13th January respectively), season duration (4 or 10 weeks) and daily bag limits (5 or 10 birds).

The situation this year is borderline between a restricted or full season.

Conditions are at the lower end of those judged to be adequate for a full season. Much of the south west has received below average rainfall in 1989. If it were not for the fact that the preceeding year was relatively wet and that many of the more-permanent wetlands therefore have higher water levels this year than would otherwise have been the case, a restricted season would have been indicated.

The many people, both shooters and non-shooters, who look mainly to current-year rainfall figures to form their opinion on the type of season which should be declared would no doubt be expecting a **restricted** season.

My view is that, taking into account the data presented above, and the fact that conditions were very favourable for waterfowl last year (note that this was not the case in 1981, which was preceeded by a very dry year), and the fact that the whole system is backed up by a "safety net" of waterfowl refuge areas and other waters where no shooting is permitted, duck populations could withstand a full season this year. I would not, however, urge for a full season to be declared.

3. KIMBERLEY, NORTH WEST AND EASTERN LAND DIVISIONS

Twelve month open seasons for the taking of game species of ducks have been declared for the Kimberley, North West and Eastern Land Divisions each year from 1957 to 1987.

During that time it was not considered necessary or practicable to declare annual or occasional closed periods (as occur in the South West and Eucla land divisions) due to the vastness of the area concerned, the small number of inhabitants, the difficulty of access to breeding areas following rain and the unpredictability of rains over most of the area concerned.

In view of the above, and taking into account

* the small number of licensed shooters in the region (184 in 1979/80 and 81 in 1980/81),
* the huge numbers of waterfowl on some lakes (e.g. 183 000 on Lakes Argyle and Gregory in 1986),

I recommend that, if the two year moratorium on duck shooting is lifted, a season be declared in the Kimberley, North West and Eucla land divisions, as in past years.

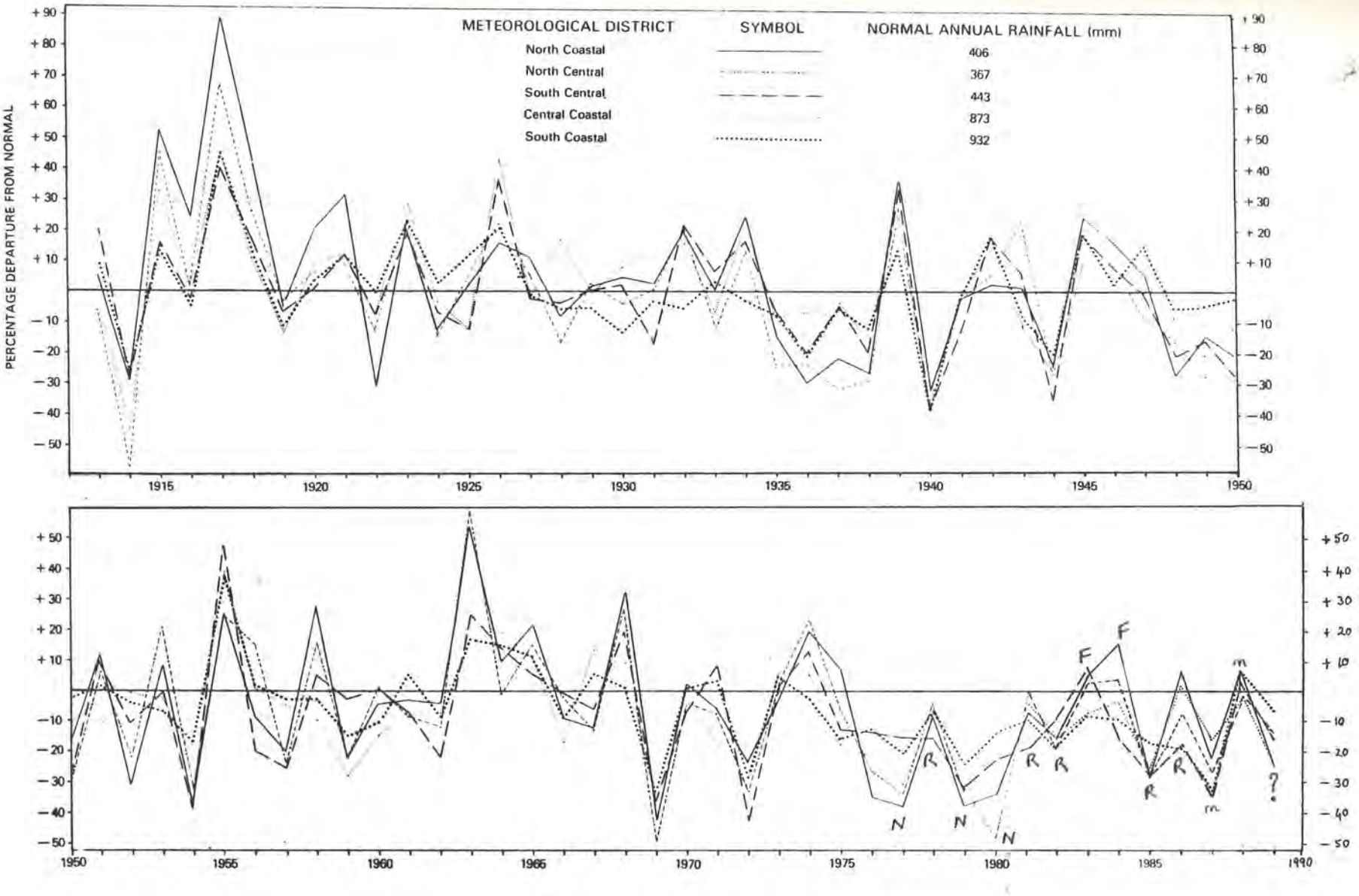

FIGURE 1. Rainfall recorded annually in each of the Meteorological Districts of the south-west, from 1913 to 1989 expressed as percentage departures from normal.

Percentage departures from normal for 1989 are based on January-October rainfall. Normal rainfalls for this period are 93-96% of annual totals.

N = NIL Season
R = RESTRICTED
F = FULL
(m = Moratorium)

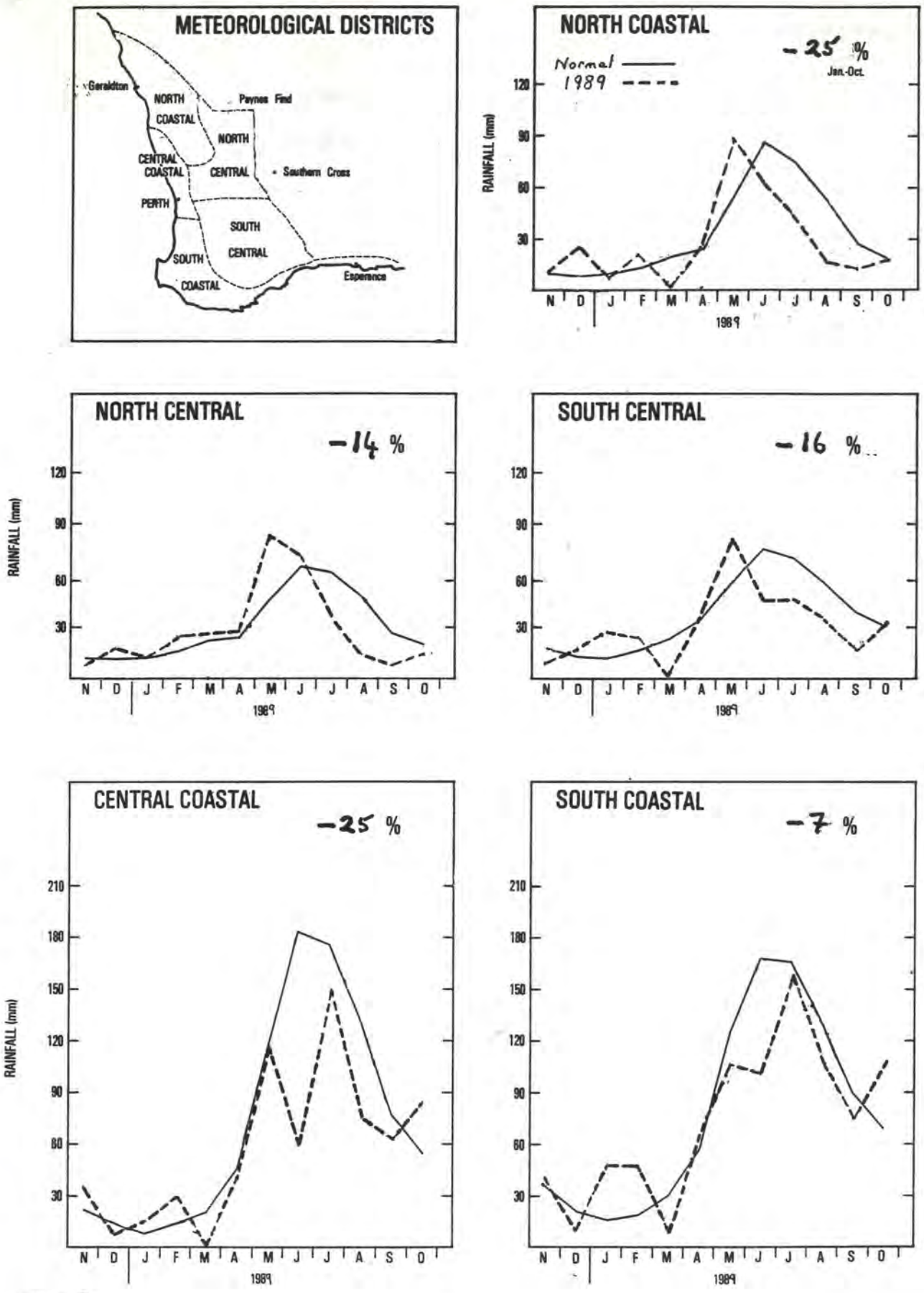

FIGURE 2

Rainfall recorded monthly in each of the five Meteorological Districts of the south-west, November 1988 to October 1989 and November to October Normal. Percentage departures from Normal (Jan.-Oct.) for each Meteorological District are also shown.

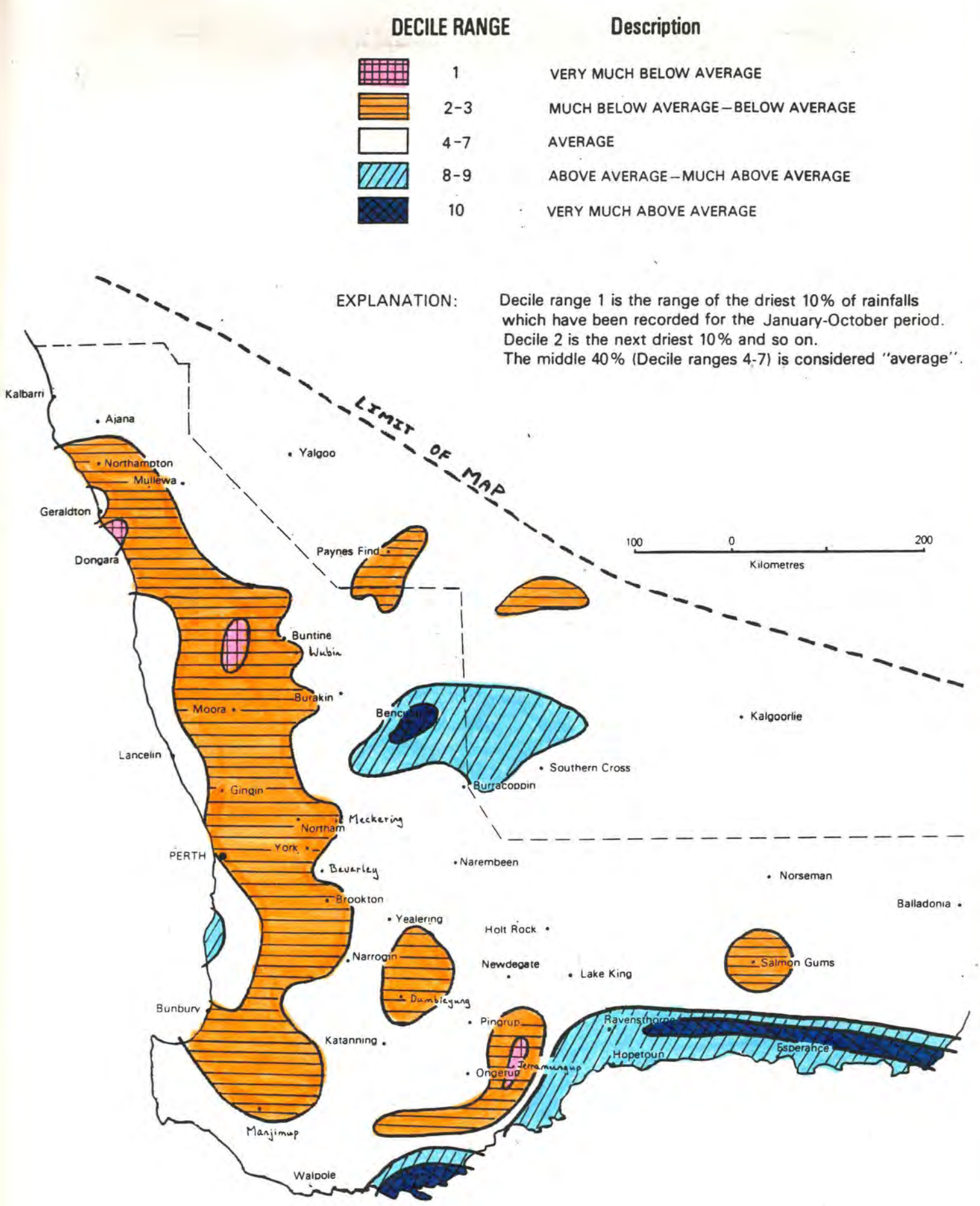

FIGURE 3. Distribution of Decile Range numbers of rainfall, Jan -Oct 1989

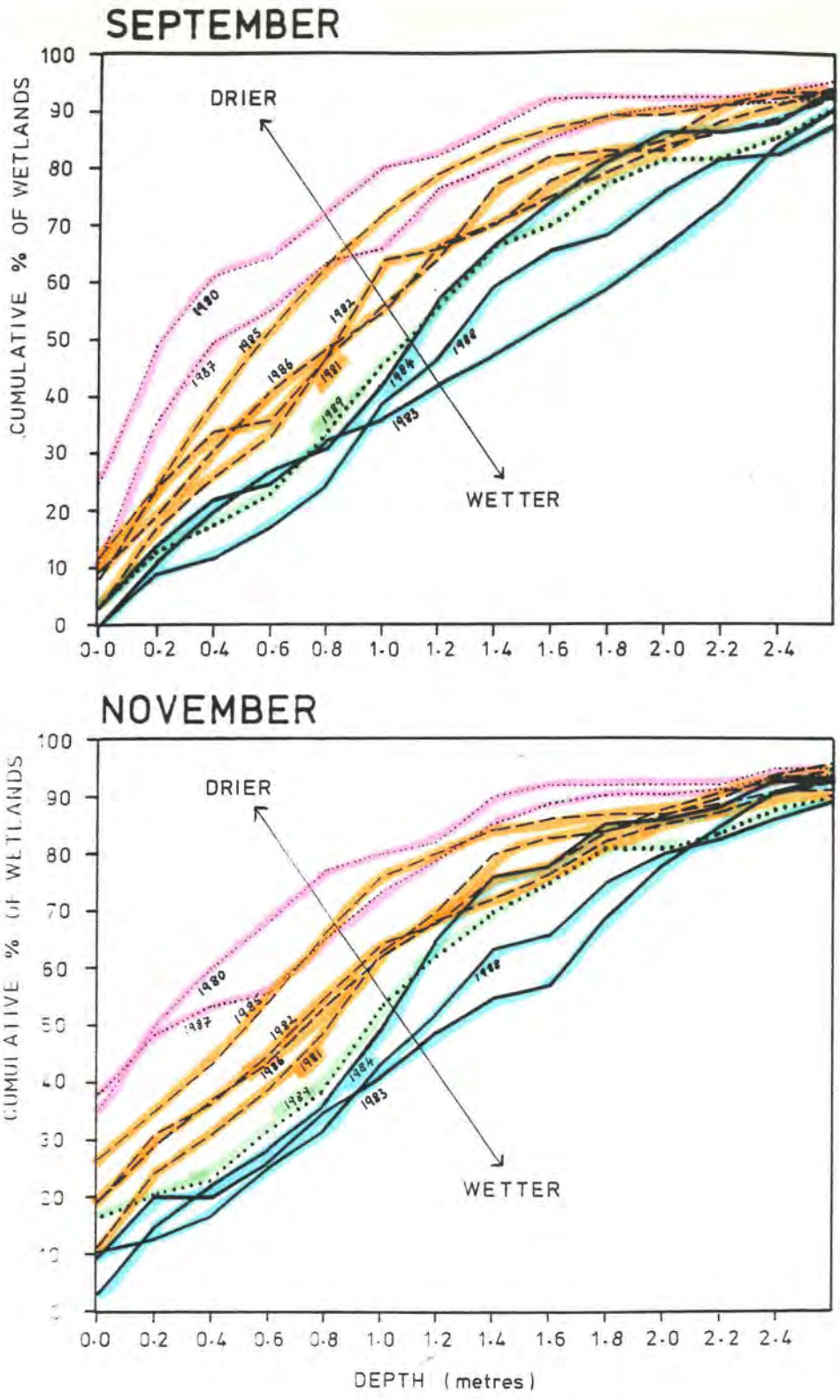

FIGURE 4. CUMULATIVE PERCENTAGES OF WETLAND DEPTHS.

Water levels of a sample of wetlands in south-western Australia have been measured in September and November each year (i.e. during the duck breeding season) since 1980.

The graphs above show that water levels in September and November 1989 (·····) were comparable with those of 1984 when a Full (——) shooting season was declared (84/85), and marginally above those of 1981 when a Restricted (— — —) season was declared.

Statistical tests (paired t-tests) show that 1989 water levels were not significantly different from those of 1984 or 1981.

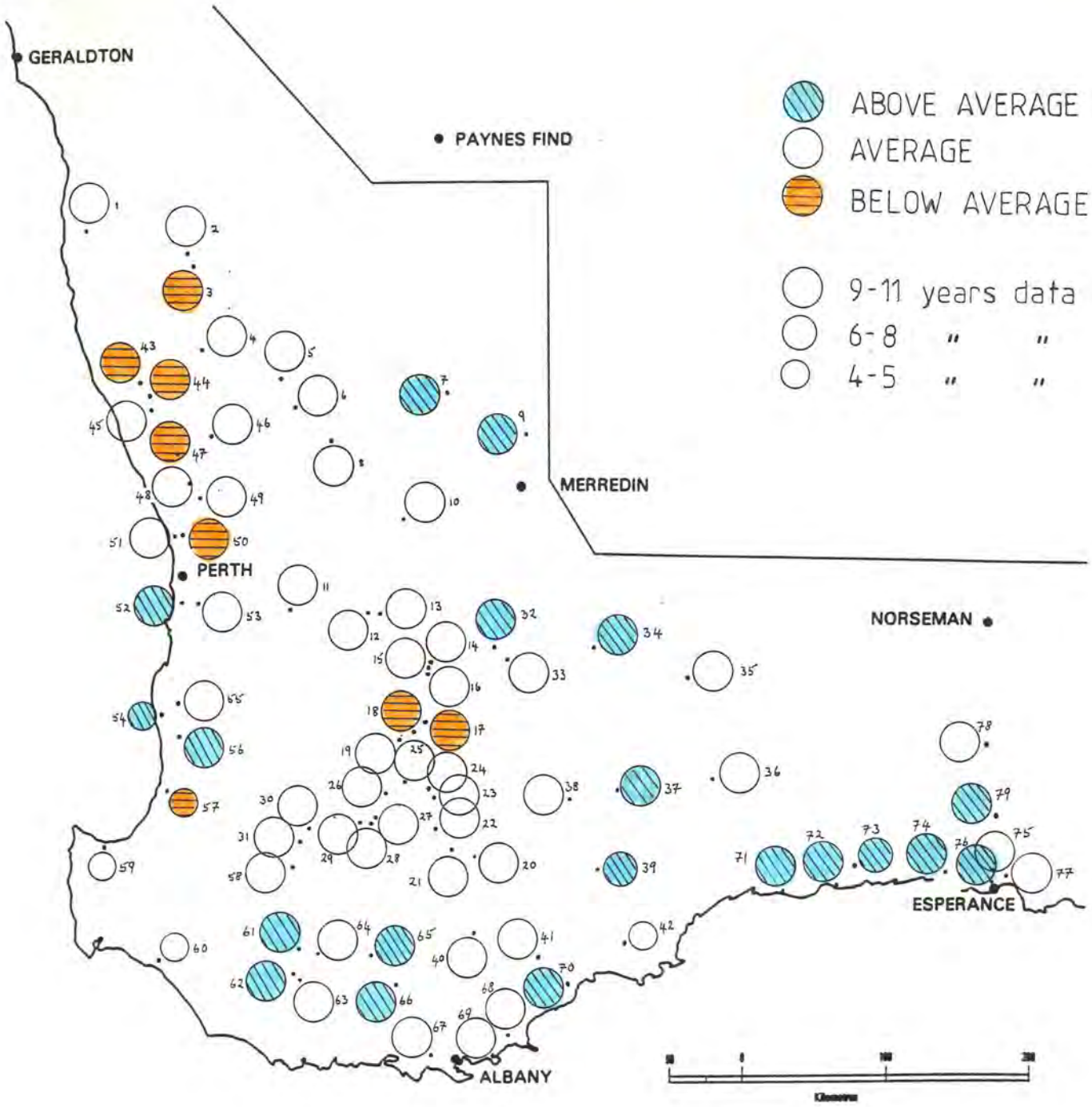

FIGURE 5. WATER LEVELS OF A SAMPLE OF SOUTH WEST WETLANDS IN SEPTEMBER 1989.

For the purposes of the above illustration "average" has been defined as the middle 50% (i.e. 25%-75% inclusive) of recorded values. Actual depths are not indicated.

Numerals refer to wetland names. These are provided in Appendix 1, together with depths.

APPENDIX I : NOVEMBER DEPTHS OF MONITORED WETLANDS; 1980-89.

Unnamed Wetlands are referred to by Shire and Reserve Number (eg. Wetland No. 7 : Mt Marshall 26687).

WET-LAND No.	WETLAND NAME	DEPTH (metres) NOV 1980	NOV 1981	NOV 1982	NOV 1983	NOV 1984	NOV 1985	NOV 1986	NOV 1987	NOV 1988	NOV 1989	PROBABLE DEPTH JAN 1990*
1	LOGUE	DRY	1.55	0.48	2.00	1.24	DRY	0.24	DRY	1.72	0.45	DRY
2	EGANU	DRY	2.28	2.00	2.33	2.24	0.89	2.30	0.82	2.26	1.52	1.00
3	PINJARREGA	DRY	2.14	0.85	2.13	2.06	0.82	0.99	DRY	0.76	DRY	DRY
4	STREETS	DRY	1.21	0.12	1.23	1.22	0.03	0.92	0.93	1.27	0.09	DRY
5	HINDS	DRY	1.00	<0.20	1.34	1.10	0.32	0.75	0.22	1.05	0.31	DRY
6	NINAN	DRY	1.96	0.78	2.13	1.72	0.60	1.73	0.94	1.95	0.85	0.25
7	MT MARSHALL 26687	-	0.03	DRY	DRY	DRY	DRY	DRY	DRY	DRY	0.54	0.05
8	WALYORMOURING	DRY	0.51	<0.08	0.63	0.51	0.06	0.42	DRY	0 57	0.16	DRY
9	CAMPION	DRY	0.65	0.21	DRY	0.63	DRY	DRY	DRY	0.27	1.27	0.70
10	NOONYING	DRY	1.18	0.48	1.19	1.13	DRY	1.15	0.29	0.27	1.08	0.60
11	DOBADERRY	DRY	0.49	0.14	0.58	0.48	DRY	0.52	0.31	0.87	DRY	DRY
12	BEVERLEY	0.24	1.70	1.24	1.63	1.68	0.56	1.68	0.71	0.91	1.59	1.10
13	MEARS	DRY	1.00	0.66	2.03	1.58	0.24	1.02	DRY	0.29	1.00	0.45
14	WHITE WATER	-	1.08	DRY	1.70	0.66	DRY	DRY	DRY	DRY	DRY	DRY
15	BROWN	DRY	1.46	0.65	1.75	1.08	DRY	DRY	DRY	0.42	0.75	0.25
16	YEALERING	0.32	1.94	1.61	2.15	1.08	0.78	1.02	1.08	1.79	1.59	1.05
17	TOOLIBIN	DRY	1.35	1.05	1.93	1.11	DRY	DRY	DRY	0.60	DRY	DRY
18	TAARBLIN	DRY	<0.08	DRY	2.00	1.12	0.15	DRY	DRY	DRY	DRY	DRY
19	LITTLE WHITE	0.47	0.81	0.81	1.30	0.69	0.41	0.16	0.63	0.83	0.20	DRY
20	KWOBRUP	DRY	DRY	0.71	1.06	0.33	DRY	DRY	DRY	1.07	0.35	DRY
21	COYRECUP	<0.13	0.35	1.89	2.24	1.69	1.13	0.21	DRY	2.20	1.65	1.30
22	CASUARINA	<0.49	0.90	0.60	0.94	0.95	1.05	0.94	DRY	0.96	0.95	0.50
23	COBLININE	1.27	1.21	2.60	5.06	4.11	3.22	2.25	1.23	3.82	2.94	2.55
24	DUMBLEYUNG	0.13	0.25	2.00	4.45	3.51	2.62	1.60	0.54	3.19	2.32	1.90
25	GUNDARING	0.67	0.95	1.65	2.12	1.34	1.54	0.79	0.88	1.88	1.40	0.90
26	PARKEYERRING	<0.10	0.60	1.28	1.84	1.06	1.25	0.33	0.09	1.76	1.15	0.70
27	FLAGSTAFF	0.14	0.26	1.64	1.62	0.90	0.71	0.10	0.02	1.24	0.58	0.20
28	WARDERING	0.66	0.99	0.70	1.02	1.03	1.04	0.45	DRY	1.04	1.04	0.65
29	MARTINUP	0.24	0.33	1.34	1.72	1.28	1.32	0.42	DRY	1.22	0.88	0.50
30	WEST ARTHUR 5456	DRY	0.80	0.51	0.82	0.85	0.85	DRY	DRY	0.84	0.52	0.15
31	TOWERINNING	0.54	1.10	3.14	3.40	3.17	3.32	2.57	1.56	2.30	2.20	1.70
32	CORRIGIN 12900	-	-	0.19	1.20	0.59	DRY	0.75	DRY	0.52	1.11	0.50
33	KONDININ	DRY	0.62	0.25	1.99	0.87	<0.18	0.16	0.15	DRY	0.48	0.05
34	GOUNTER	DRY	0.10	0.10	0.18	0.18	DRY	0.33	DRY	0.14	1.72	-
35	VARLEY		DRY	DRY	DRY	0.04	DRY	DRY	DRY	DRY	DRY	DRY
36	PALLARUP	DRY	<0.07	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
37	BRYDE	DRY	DRY	DRY	1.54	0.81	DRY	DRY	DRY	1.78	0.97	0.45
38	ALTHAM	-	DRY	DRY	1.07	0.21	DRY	DRY	DRY	1.05	DRY	DRY
39	YAALUP	-	-	1.28	1.69	1.33	0.59	DRY	DRY	2.91	2.09	1.75

* Probable depth (rounded to nearest 0.05 m) at commencement of 1989 Duck Shooting Season (i.e. 13 or 14 January 1990), if declared.

APPENDIX I - cont'd...

WET-LAND No.	WETLAND NAME	DEPTH (metres) NOV 1980	NOV 1981	NOV 1982	NOV 1983	NOV 1984	NOV 1985	NOV 1986	NOV 1987	NOV 1988	NOV 1989	PROBABLE DEPTH JAN 1990*
40	ANDERSON	-	0.20	2.12	1.61	1.00	0.53	0.61	0.14	1.64	1.25	0.90
41	GNOWANGERUP 26264	0.07	DRY	0.84	0.10	<0.06	DRY	<0.05	DRY	0.75	DRY	DRY
42	YELLILUP	-	-	-	-	-	0.75	1.73	1.14	4.15	3.92	-
43	ENEMINGA	DRY	2.42	1.39	2.52	1.35	0.19	2.11	2.46	2.52	1.25	0.70
44	GURAGA	-	-	2.14	2.40	1.80	0.70	1.81	1.52	1.81	0.69	0.25
45	CRACKERS	DRY	0.05	DRY	0.96	0.96	0.96	1.00	0.97	1.05	1.00	0.65
46	WANNAMAL	1.24	1.23	1.30	1.32	1.28	0.92	1.32	1.28	1.34	1.30	0.85
47	YURINE	0.66	2.20	1.42	1.75	1.50	0.32	1.58	1.66	1.76	0.89	0.30
48	BAMBUN	2.31	2.32	2.26	2.35	2.25	2.30	2.46	2.20	2.38	2.36	1.85
49	CHANDALA	0.82	0.70	0.81	0.79	0.73	0.76	0.76	0.78	0.88	0.76	0.30
50	JANDABUP	1.22	1.27	1.15	1.12	1.11	0.98	1.35	1.23	1.25	1.08	0.65
51	JOONDALUP	2.88	2.92	3.03	3.02	3.02	2.78	3.11	3.08	3.14	3.03	2.70
52	THOMSONS	0.86	0.90	0.92	0.78	1.03	0.78	1.24	1.10	1.53	1.32	0.90
53	FORRESTDALE	0.79	0.93	0.64	0.76	0.78	0.55	1.08	0.66	1.35	0.86	0.40
54	CLIFTON	-	-	-	-	-	4.35	4.37	4.09	4.44	4.54	-
55	NINE MILE		1.37	1.77	1.96	1.83	1.61	1.45	1.08	1.46	1.63	1.25
56	HARVEY 12632	1.16	1.08	1.47	1.38	1.05	1.22	1.11	0.66	1.64	1.60	1.05
57	EGRET	-	-	-	-	-	0.44	0.39	DRY	0.55	DRY	DRY
58	BOYUP BROOK 18239	<0.05	DRY	DRY	0.65	0.13	DRY	DRY	DRY	0.12	DRY	DRY
59	BROADWATER	-	-	-	-	-	0.84	0.68	0.52	0.76	0.78	-
60	JASPER	-	-	-	-	-	9.40	9.58	9.14	9.56	9.60	-
61	UNICUP	0.60	0.64	0.19	0.94	0.70	0.34	0.17	0.06	2.12	1.70	1.35
62	MUIR	0.17	0.52	<0.02	0.42	0.26	0.20	0.05	0.20	1.31	1.02	0.60
63	TORDIT-GARRUP	2.75	2.88	2.65	2.49	2.54	2.29	1.94	1.29	2.72	2.57	2.30
64	YARNUP	0.80	0.94	0.80	0.94	0.95	0.97	0.96	0.67	1.00	0.98	0.75
65	WARRINUP	0.21	0.12	DRY	0.14	0.19	DRY	0.13	DRY	0.12	0.58	0.35
66	KWORNICUP	0.26	0.39	<0.09	0.14	0.51	0.14	0.36	0.07	1.27	0.89	0.55
67	POWELL	-	0.96	0.94	0.69	1.00	0.71	0.84	0.86	0.95	0.45	0.20
68	PLEASANT VIEW	1.52	1.15	0.79	0.46	0.39	0.48	0.72	0.08	1.08	0.88	0.50
69	MOATES	4.51	4.32	4.22	4.26	4.34	4.38	4.38	4.32	4.36	4.38	3.90
70	METTLER	-	-	0.44	0.11	0.15	0.25	0.47	0.13	1.14	0.75	0.55
71	JERDACUTTUP	1.30	0.62	<0.45	0.78	1.11	0.54	3.15	2.64	3.50	4.13	3.75
72	SHASTER	0.17	0.20	DRY	0.20	0.40	0.36	1.00	0.34	0.62	1.03	0.65
73	ESPERANCE 26410	-	DRY	DRY	DRY	0.14	DRY	1.97	1.33	0.69	2.24	2.10
74	GORE	1.35	1.32	1.04	0.58	1.67	1.50	1.68	1.55	1.34	1 73	1.35
75	SHARK	2.25	2.29	2.22	1.66	2.34	2.13	2.36	2.25	1.93	2.41	2.10
76	WARDEN	<0.84	0.66	0.40	<0.19	1.34	0.63	1.65	0.98	0.46	2.70	2.30
77	MULLET	0.57	0.53	0.58	0.05	0.56	0.66	0.64	0.65	0.53	0.67	0.25
78	DUNDAS 33113	<0.32	<0.24	DRY	DRY	<0.34	DRY	DRY	DRY	DRY	DRY	DRY
79	ESPERANCE 27985	-	DRY	DRY	DRY	<0.02	DRY	0.08	DRY	DRY	DRY	DRY

Attachment 1. Recommended measures for "tightening up" on duck shooting in 1990

1. Closure of selected game reserves

The following game reserves are recommended for closure:

* Yarnup Swamp (Reserve No. 29601, 62 hectares, vested in NPNCA, situated in Cranbrook Shire). Surveys have shown this reserve to be very important for nesting by the Little Bittern.
* Lake Pleasant View (Reserve 15107, 267 ha, vested in NPNCA, situated in Albany Shire). Surveys have shown this to be an important Bittern habitat.
* Lake Dumbleyung (Reserves 5999 and 26664, 4 193 ha, vested in NPNCA, situated in Dumbleyung and Wagin Shires). Surveys have shown this lake to be an important dry season habitat for waterbirds, including 10 000+ ducks)

2. Declaration of additional Waterfowl Refuge Areas

* The whole of Peel and Harvey Estuaries could be declared a Waterfowl Refuge Area. Most of the shoreline is already closed (see pages 10-11 of Duck Shooters' Guide 1987). Total closure would be a largely symbolic gesture, but significant nonetheless. These estuaries support tens of thousands of ducks during summer.

3. Shortening of Full Seasons

* If a Full season is declared, I would recommend that it be shortened from 10 to 8 weeks. This would be of marginal significance biologically. However, it would be "tidier", since a restricted season is only 4 weeks in duration.
