

Department of Fisheries and Wildlife  
Western Australia

ANNUAL RAINFALL AND WETLAND REVIEW

NOVEMBER 1981

Compiled by Research Officer J.A.K. Lane  
and Technical Officer D.R. Munro, for  
submission to the W.A.W.A. Bird  
Committee on 30 November 1981.

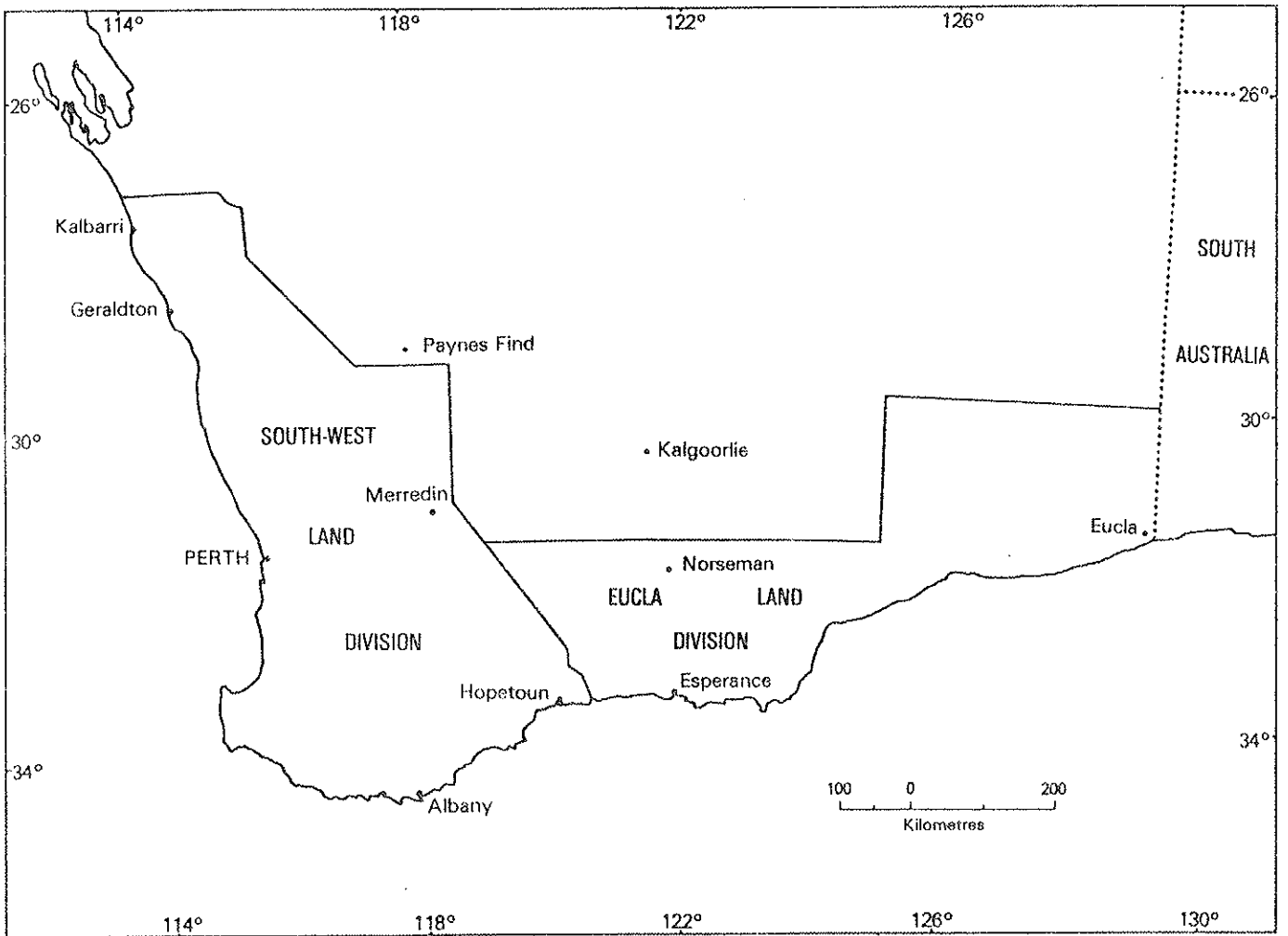
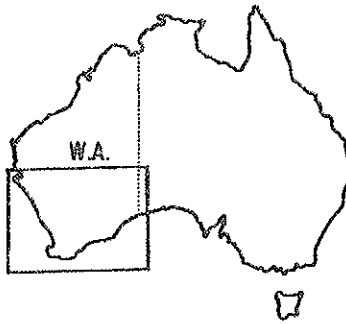


FIGURE 1. Boundaries of the South-West and Eucla Land Divisions.

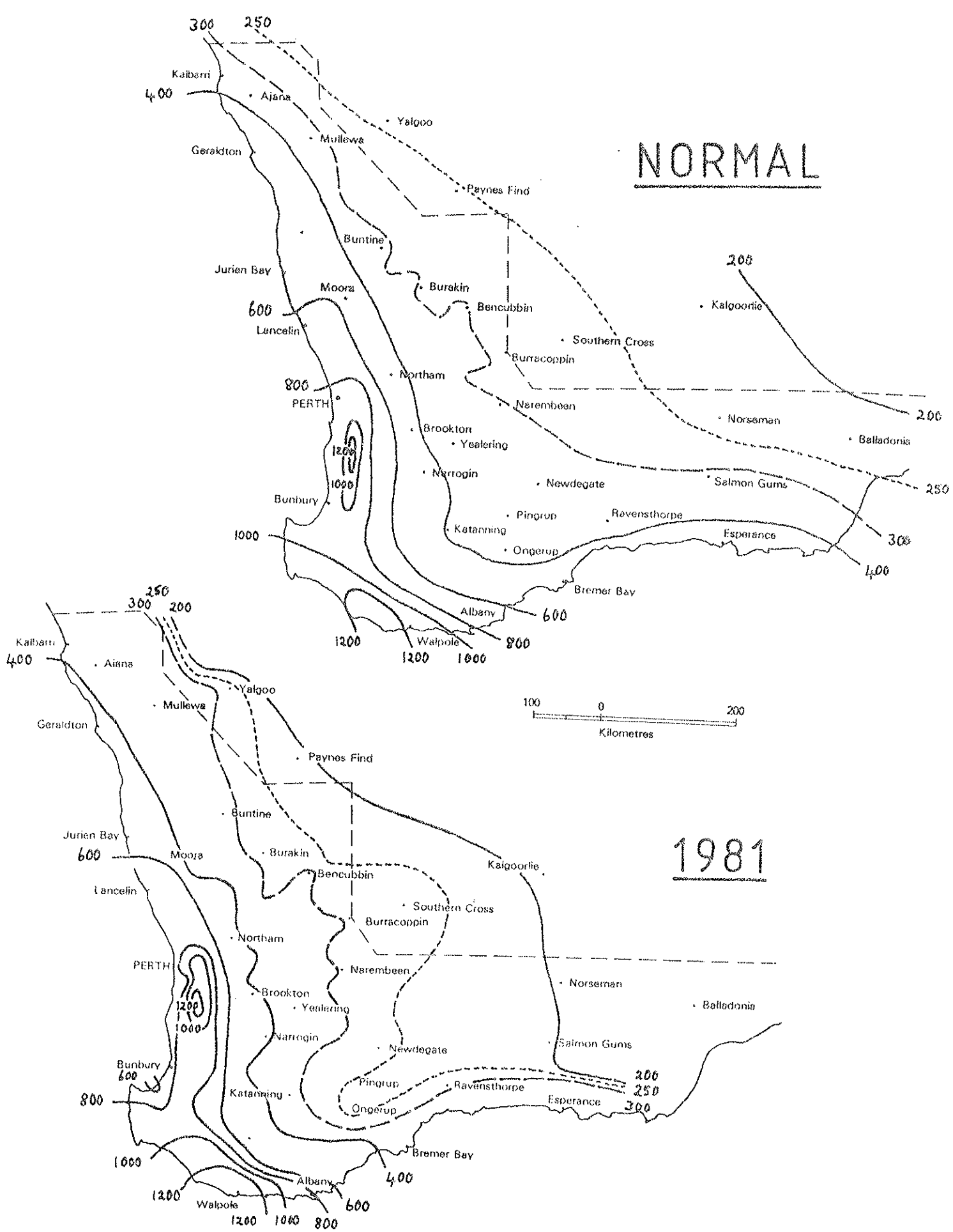
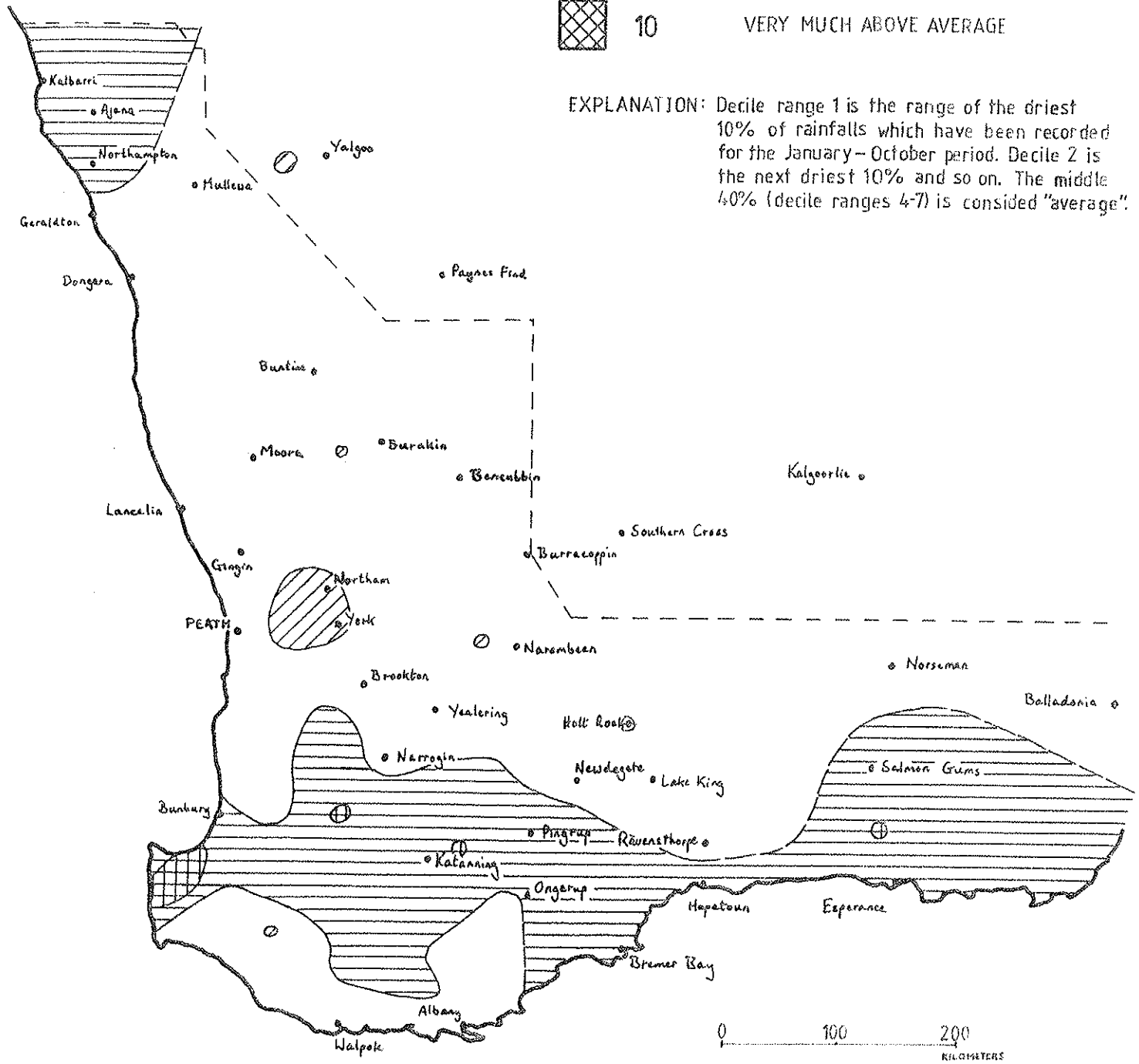


FIGURE 2. Rainfall recorded (mm): Jan-Oct 1981 and Jan-Oct Normal.

DECILE RANGE	DESCRIPTION
1	VERY MUCH BELOW AVERAGE
2-3	MUCH BELOW AVERAGE - BELOW AVERAGE
4-7	AVERAGE
8-9	ABOVE AVERAGE - MUCH ABOVE AVERAGE
10	VERY MUCH ABOVE AVERAGE



EXPLANATION: Decile range 1 is the range of the driest 10% of rainfalls which have been recorded for the January - October period. Decile 2 is the next driest 10% and so on. The middle 40% (decile ranges 4-7) is considered "average".

FIGURE 3. Distribution of Decile Range Numbers of Rainfall: January to October, 1981.

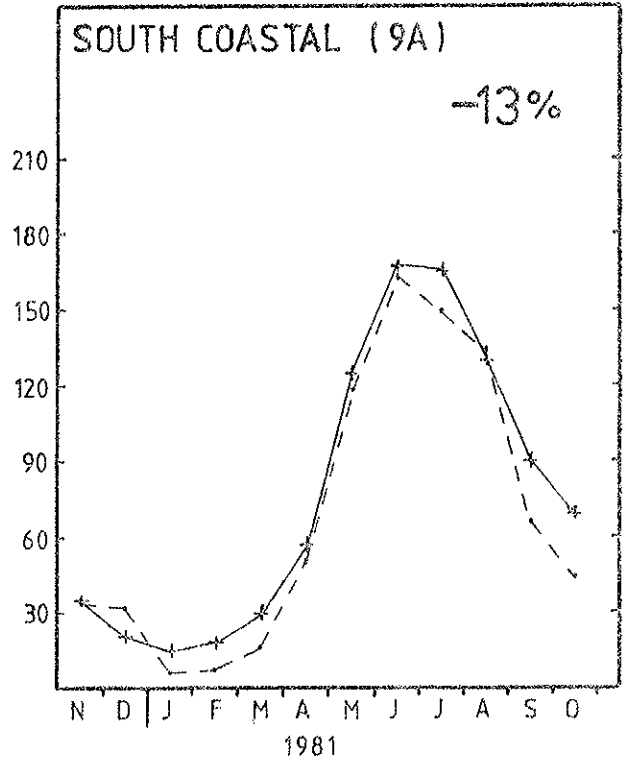
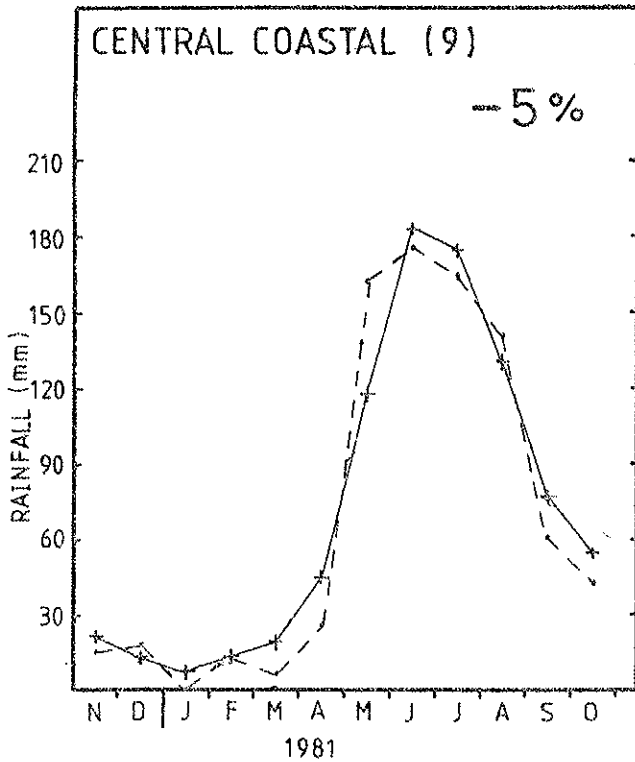
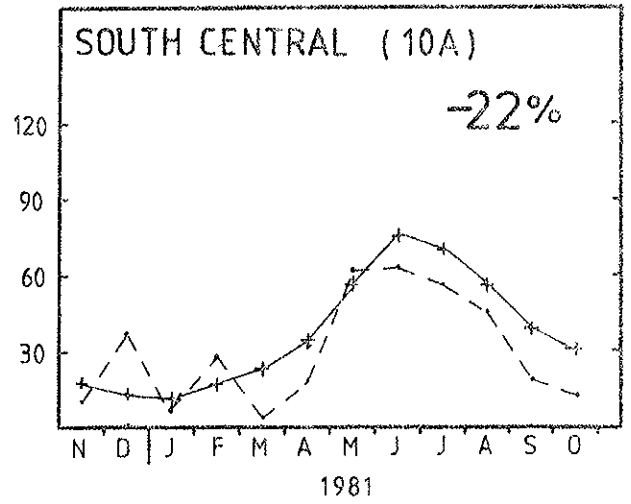
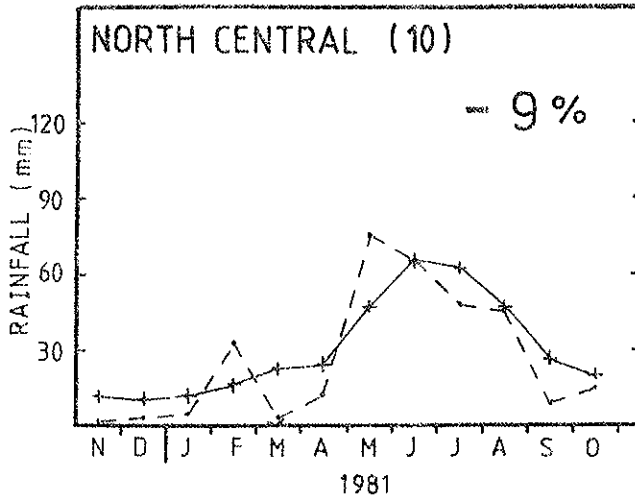
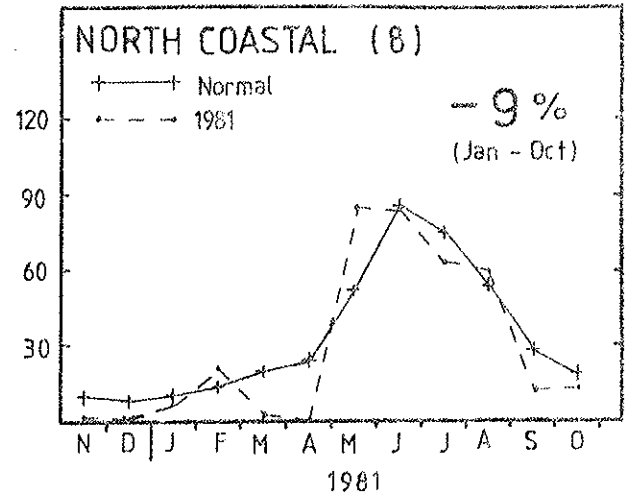
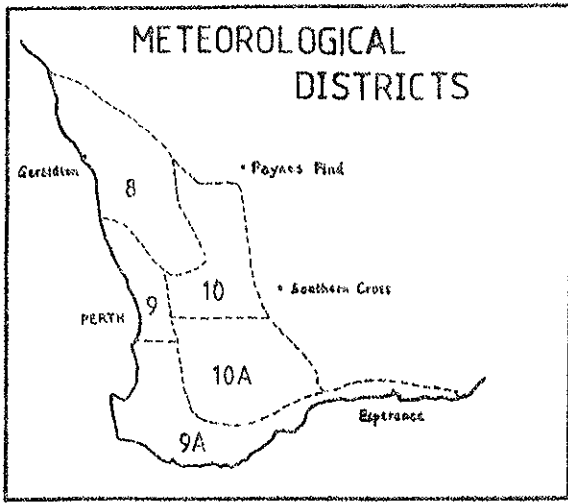


FIGURE 4. Monthly Rainfall Patterns: November 1980 to October 1981

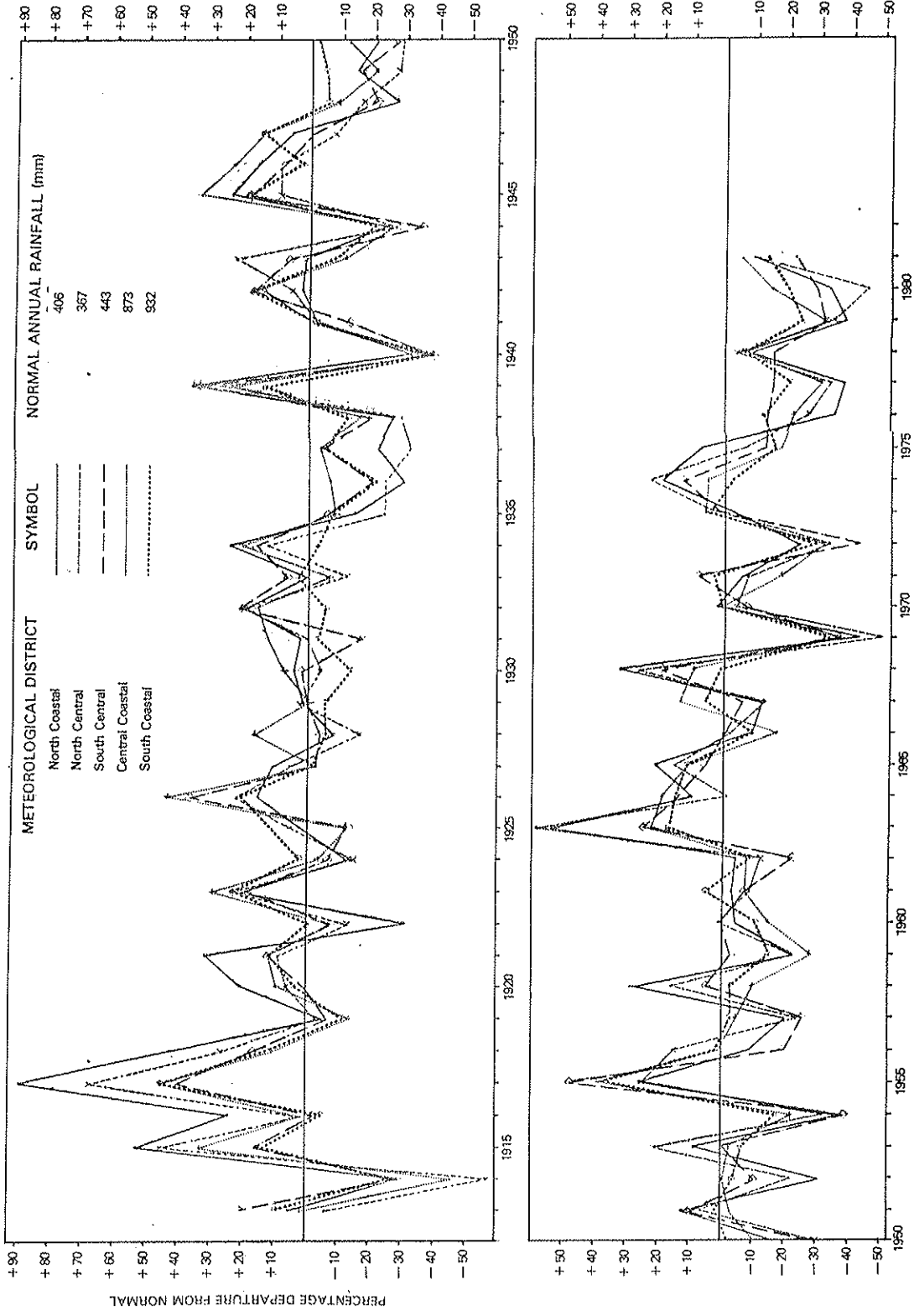


FIGURE 5 Rainfall recorded annually in each of the Meteorological Districts of the south-west, from 1913 to 1981, expressed as percentage departures from normal.

Percentage departures from normal for 1981 are based on January-October rainfall. Normal rainfalls for this period are 93.96% of annual totals.

WETLAND No.	WETLAND NAME	DEPTH (metres)				MAXIMUM RECORDED NOV-JAN DEPTH DECREASE (metres)
		NOV 1978	NOV 1979	NOV 1980	NOV 1981	
1	LOGUE		DRY	DRY	1.55	-
2	CAPAMAURA			DRY	0.70	-
3	EGANU	1.78	0.20	DRY	2.28	0.43
4	PINJARREGA		1.10	DRY	2.14	-
5	STREETS	0.04	DRY	DRY	1.21	-
6	HINDS		DRY	DRY	1.00	-
7	NINAN	0.25	0.23	DRY	1.96	-
8	MOLLERIN			DRY	<0.01	-
9	WALYORMOURING	0.03	0.03	DRY	0.51	-
10	CAMPION		DRY	DRY	0.65	-
11	NOONYING		0.85	DRY	1.18	0.38
12	DOBADERRY			DRY	0.49	-
13	BEVERLEY	1.65	0.63	0.24	1.70	0.50
14	MEARS	1.74	0.72	DRY	1.00	0.54
15	NONALLING		DRY	0.88	0.75	0.43
16	BROWN		<0.16	DRY	1.46	-
17	YEALERING	1.67	0.56	0.32	1.94	0.56
18	DULBINNING		DRY	DRY	0.70	-
19	TOOLIBIN	DRY	DRY	DRY	1.35	-
20	WALBYRING		DRY	DRY	0.37	-
21	TAARBLIN	DRY	DRY	DRY	<0.08	-
22	BOKAN		DRY	0.02	0.39	-
23	LITTLE WHITE		DRY	0.47	0.81	-
24	KWOBRUP		0.14	DRY	DRY	-
25	COYRECUP	1.00	DRY	<0.13	0.35	-
26	CASUARINA	DRY	DRY	<0.49	0.90	-
27	COOMELBERRUP	0.53	DRY	DRY	0.36	0.32
28	COBLININE		0.91	1.27	1.21	0.39
29	DUMBLEYUNG		<0.13	0.13	0.25	-
30	GUNDARING	0.82	0.48	0.67	0.95	0.48
31	PARKEYERRING	0.49	DRY	<0.10	0.60	0.41
32	FLAGSTAFF		DRY	0.14	0.26	-
33	WARDERING	0.82	0.24	0.66	0.99	0.40
34	QUEBERARRUP	0.34	DRY	0.30	0.57	0.34
35	MARTINUP		DRY	0.24	0.33	-
36	WEST ARTHUR 5456			DRY	0.80	-
37	TOWERINNING	1.69	0.81	0.54	1.10	0.51
38	KONDININ		0.20	DRY	0.62	-
39	GOUNTER			DRY	0.10	-
40	ACE			DRY	<0.02	-
41	PALLARUP			DRY	<0.07	-
42	KENT 29020			DRY	DRY	-

TABLE 1 : November depths of monitored wetlands; 1978-1981. Refer to Figure 8 (fold-out map) for wetland locations.

WETLAND No.	WETLAND NAME	DEPTH (metres)				MAXIMUM RECORDED NOV--JAN DEPTH DECREASE (metres)
		NOV 1978	NOV 1979	NOV 1980	NOV 1981	
43	BRYDE		DRY	DRY	DRY	-
44	CAIRLOCUP			DRY	DRY	-
45	GNOWANGERUP 26264			0.07	DRY	-
46	CAMEL			0.19	DRY	-
47	CRANBROOK 25812			0.20	0.06	-
48	ENEMINGA			DRY	3.00	-
49	CRACKERS			DRY	0.05	-
50	KARAKIN		0.55	0.82	0.98	0.82
51	WANNAMAL	1.14	1.15	1.24	1.23	0.80
52	YURINE		1.01	0.66	2.20	0.60
53	GINGIN 31241		2.08	2.14	2.07	0.60
54	BAMBUN		2.27	2.31	2.32	0.50
55	NAMBUNG		DRY	0.07	0.49	-
56	MUNGALA		0.10	0.12	0.70	-
57	CHANDALA		0.74	0.82	0.70	0.44
58	CHITTERING	1.39	1.38	1.45	1.31	0.45
59	JANDABUP	1.35	1.25	1.22	1.27	0.39
60	JOONDALUP	3.01	2.87	2.88	2.92	0.35
61	THOMSONS	0.94	0.17	0.86	0.90	0.44
62	FORRESTDAL	0.92	0.30	0.79	0.93	0.42
63	MURRAY 24739			0.57	0.32	0.57
64	HARVEY 12632			1.16	1.08	0.51
65	BOYUP BROOK 18239			<0.05	DRY	-
66	UNICUP			0.60	0.64	0.35
67	MUIR		0.14	0.17	0.52	-
68	BYENUP	2.40	2.27	2.14	2.38	0.29
69	TORDIT-GARRUP	3.15	2.91	2.75	2.88	0.29
70	POORGINUP	0.55	0.53	0.55	0.54	0.23
71	WARRINUP			0.21	0.12	-
72	KWORNICUP		0.41	0.26	0.39	0.33
73	PLANTAGENET 25386		0.73	0.48	0.41	0.73
74	ALBANY 27157			1.10	0.84	0.23
75	PLEASANT VIEW		2.20	1.52	1.15	0.28
76	MOATES		4.44	4.51	4.32	0.46
77	JERDACUTTUP		2.41	1.30	0.62	0.38
78	SHASTER		1.04	0.17	0.20	0.37
79	GORE		1.72	1.35	1.32	0.30
80	SHARK		2.40	2.25	2.29	0.25
81	WARDEN		1.53	<0.84	0.66	0.32
82	MULLET			0.57	0.53	0.35

TABLE 1. CONT'D...

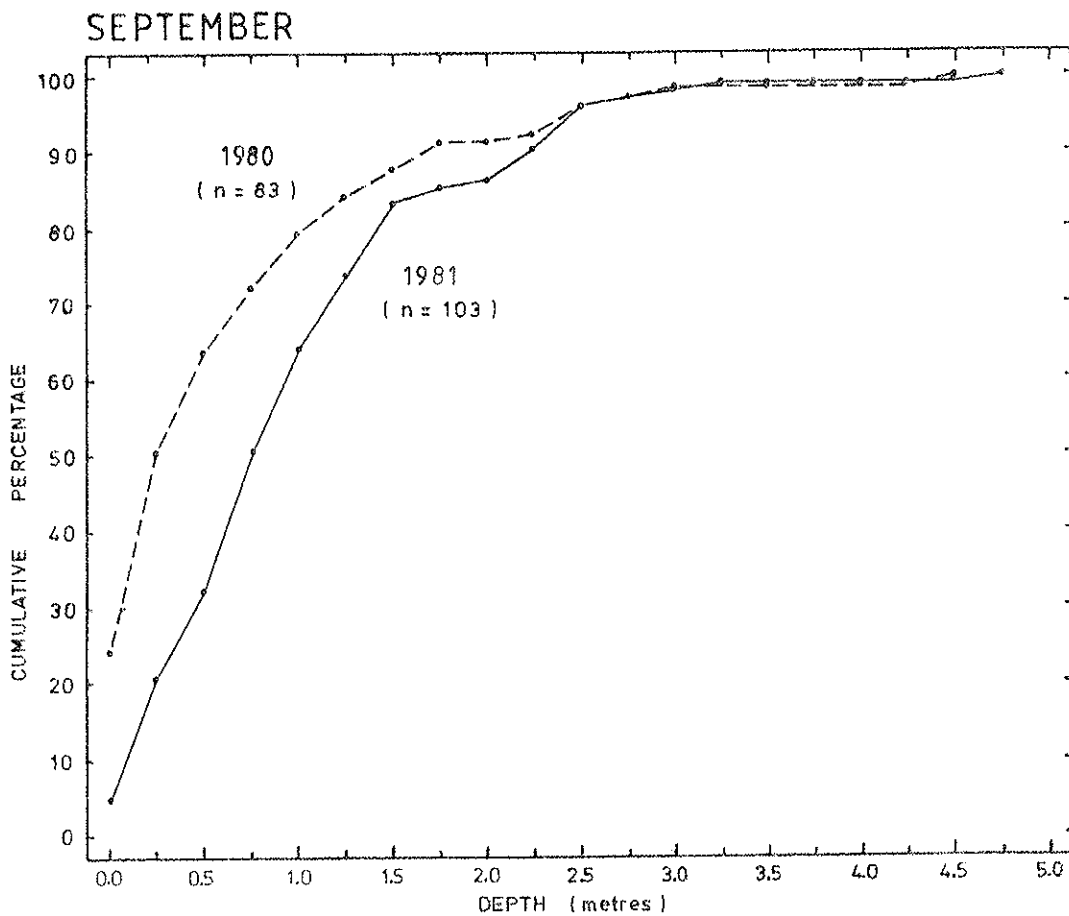
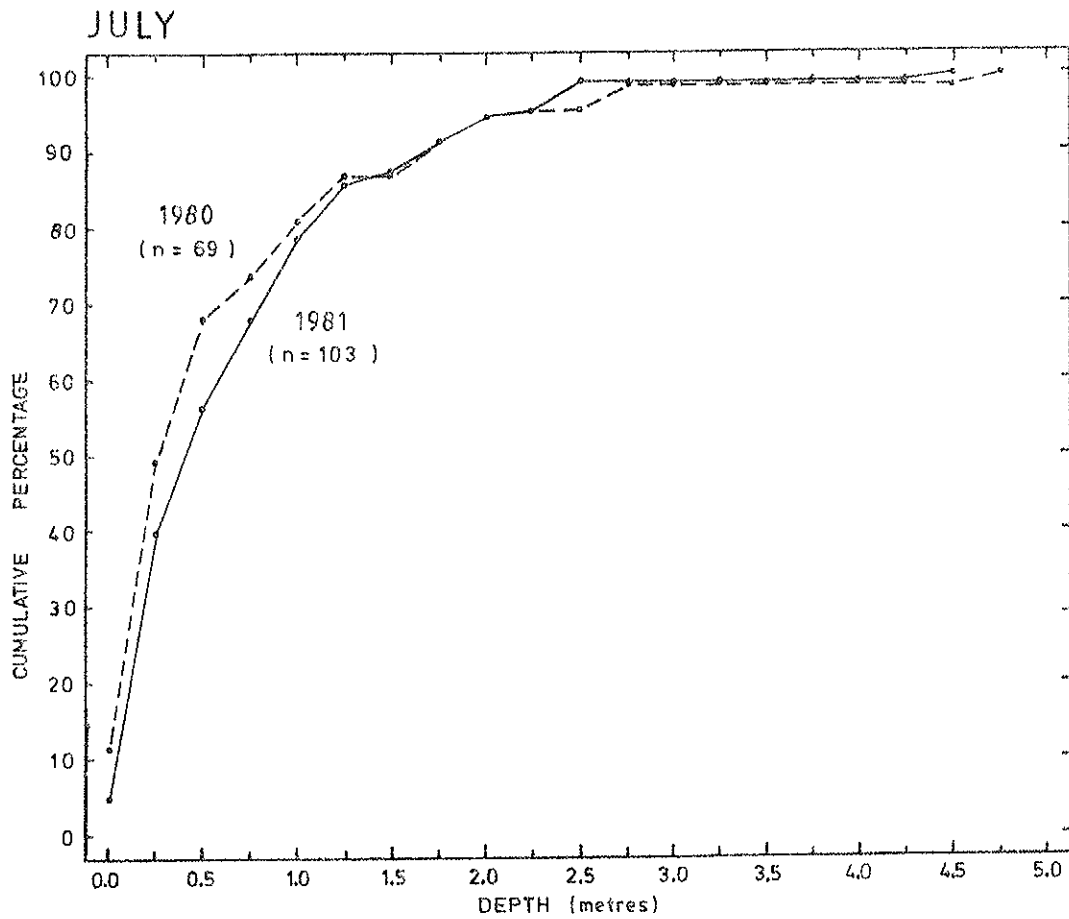
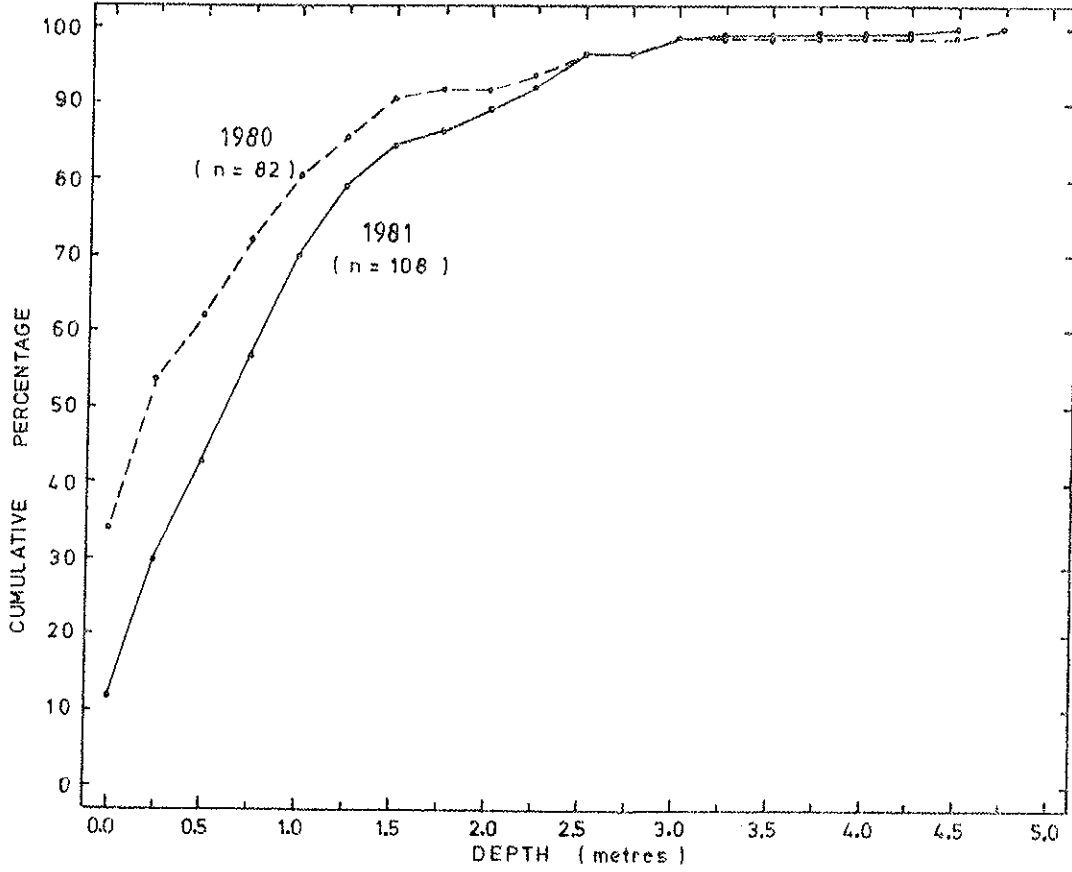


FIGURE 6. Year to year comparisons of depths of monitored wetlands. "n" is the number of wetlands monitored.

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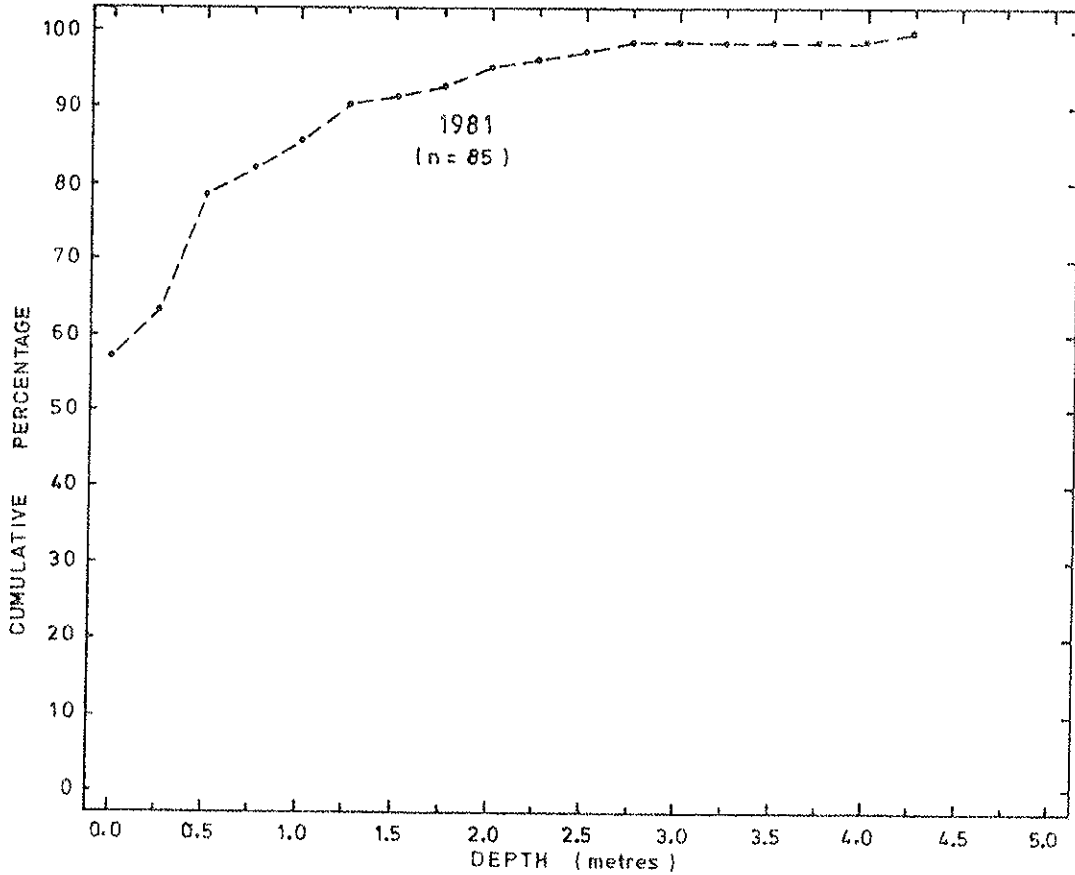
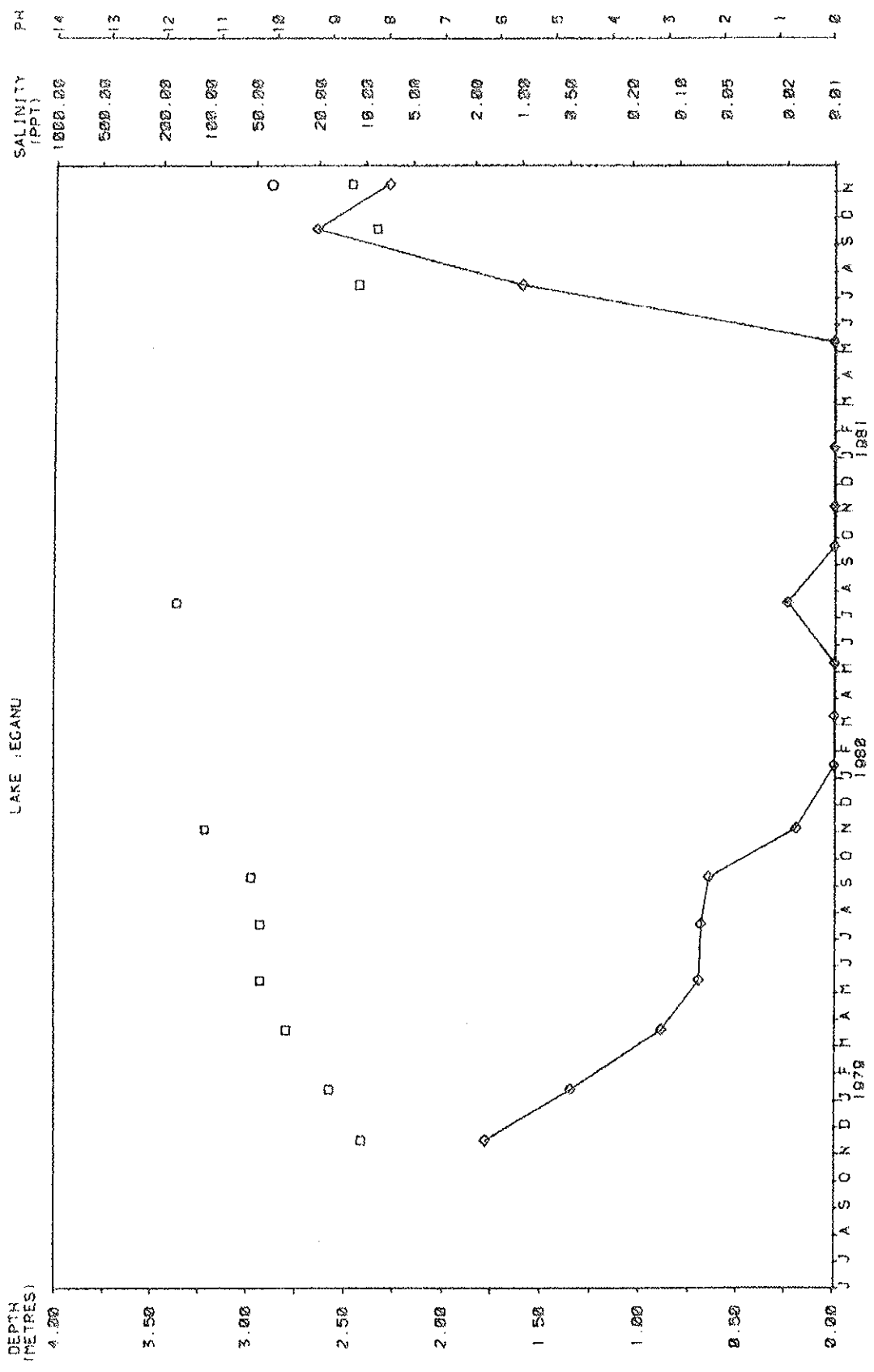
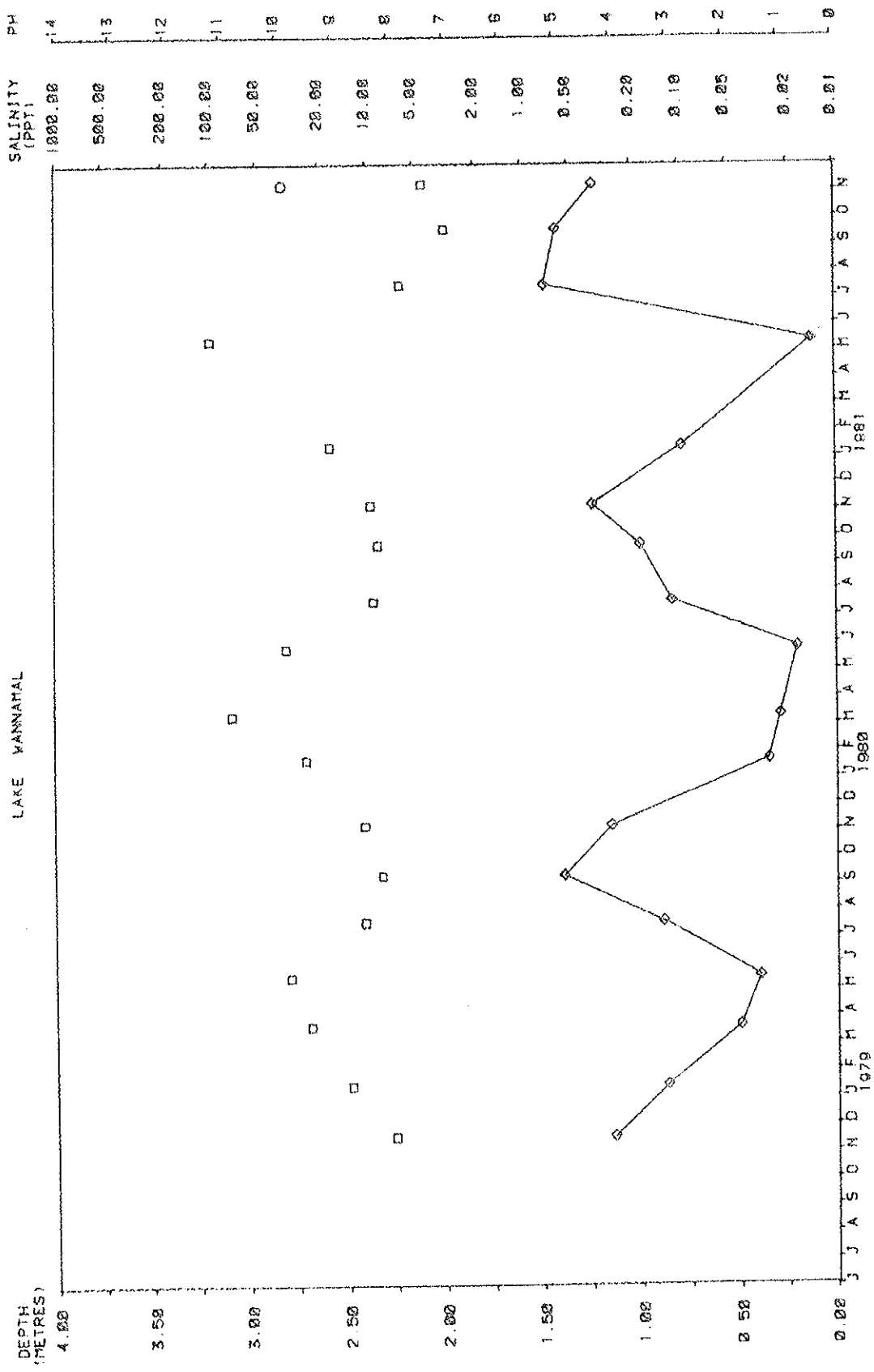


FIGURE 6 CONTD.



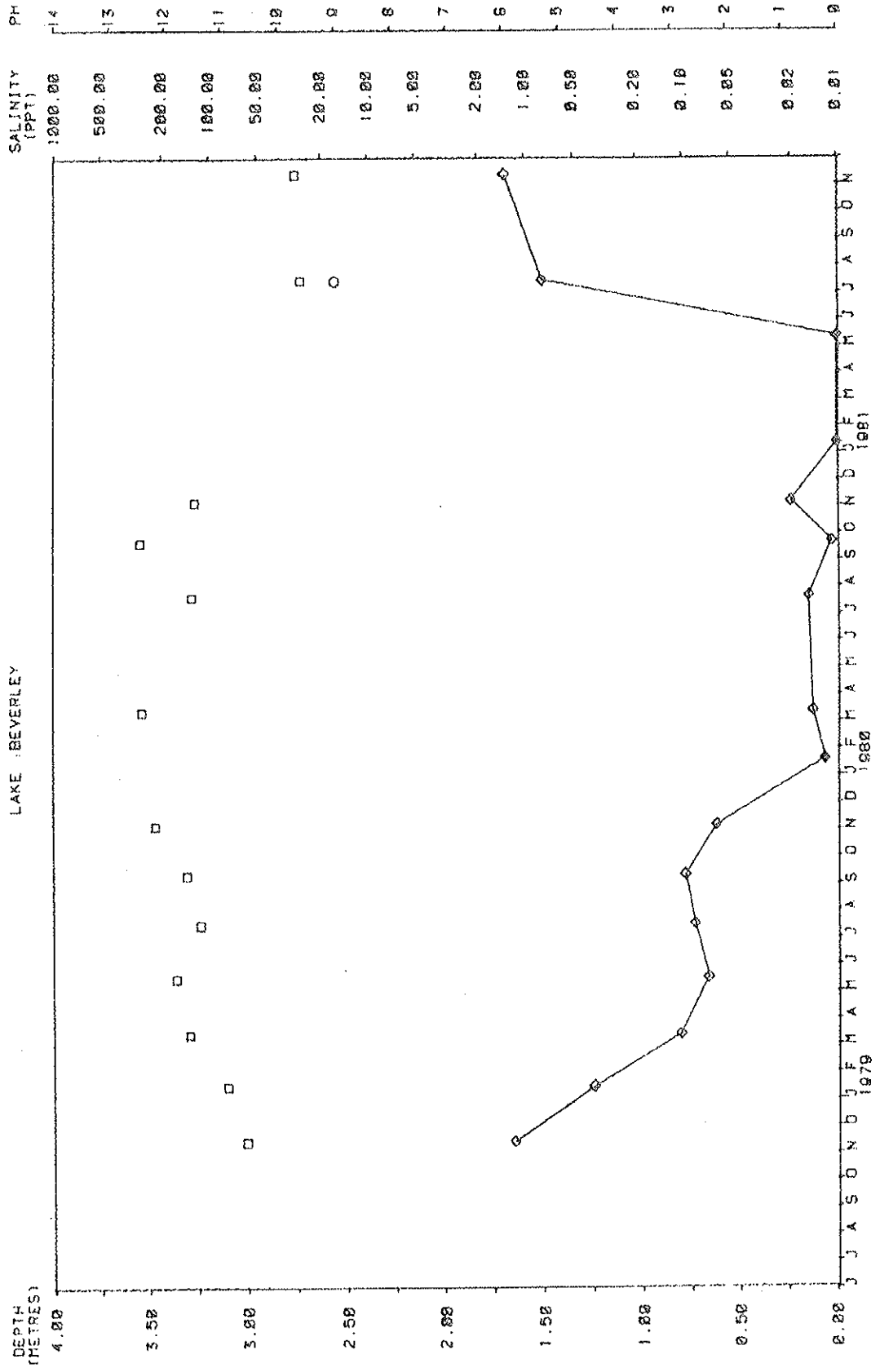


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 WATERBIRD RESEARCH



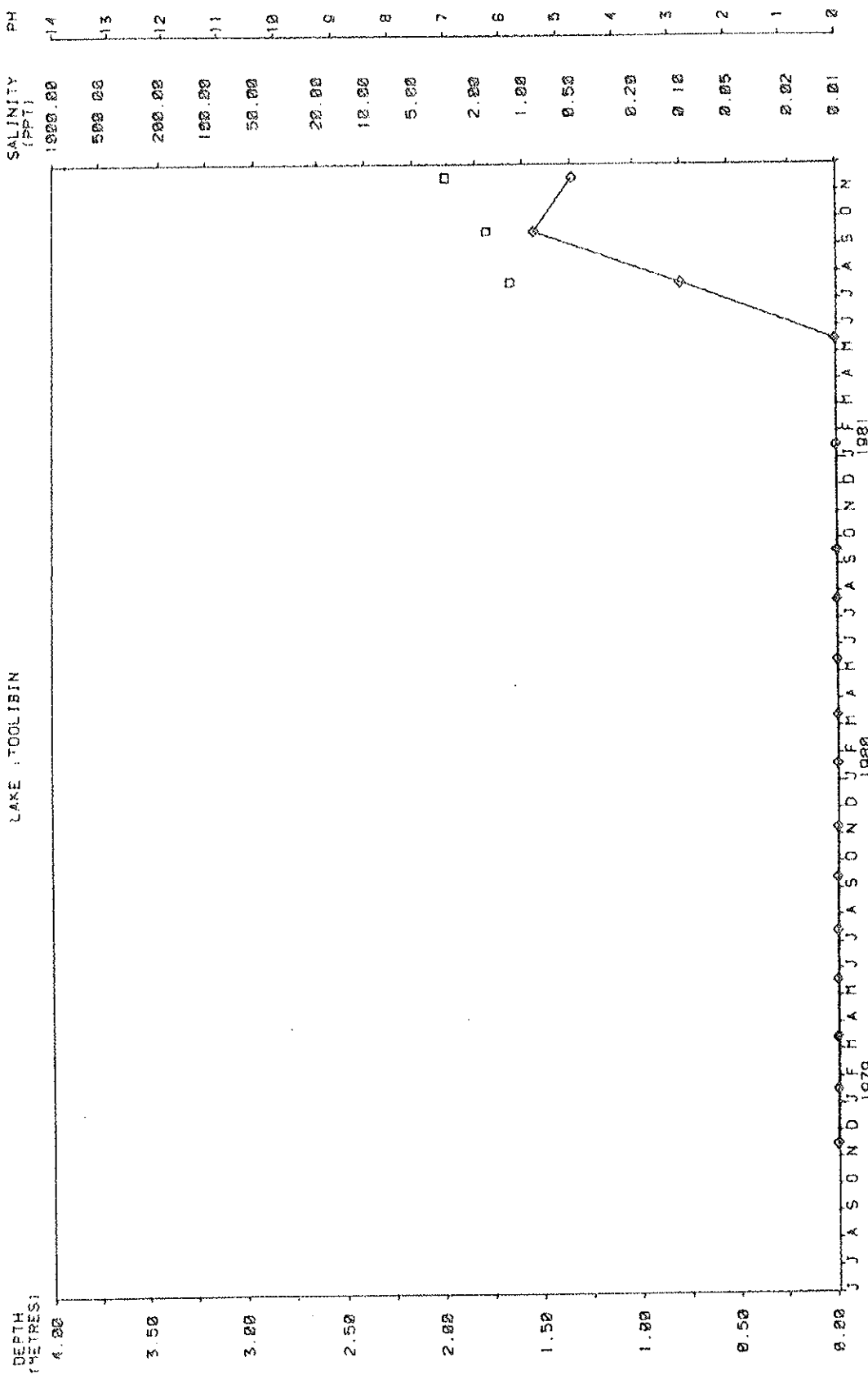
VA DEPT FISHERIES + WILDLIFE  
 WATERBIRD RESEARCH

◇ DEPTH    □ SALINITY    ○ PH FACTOR



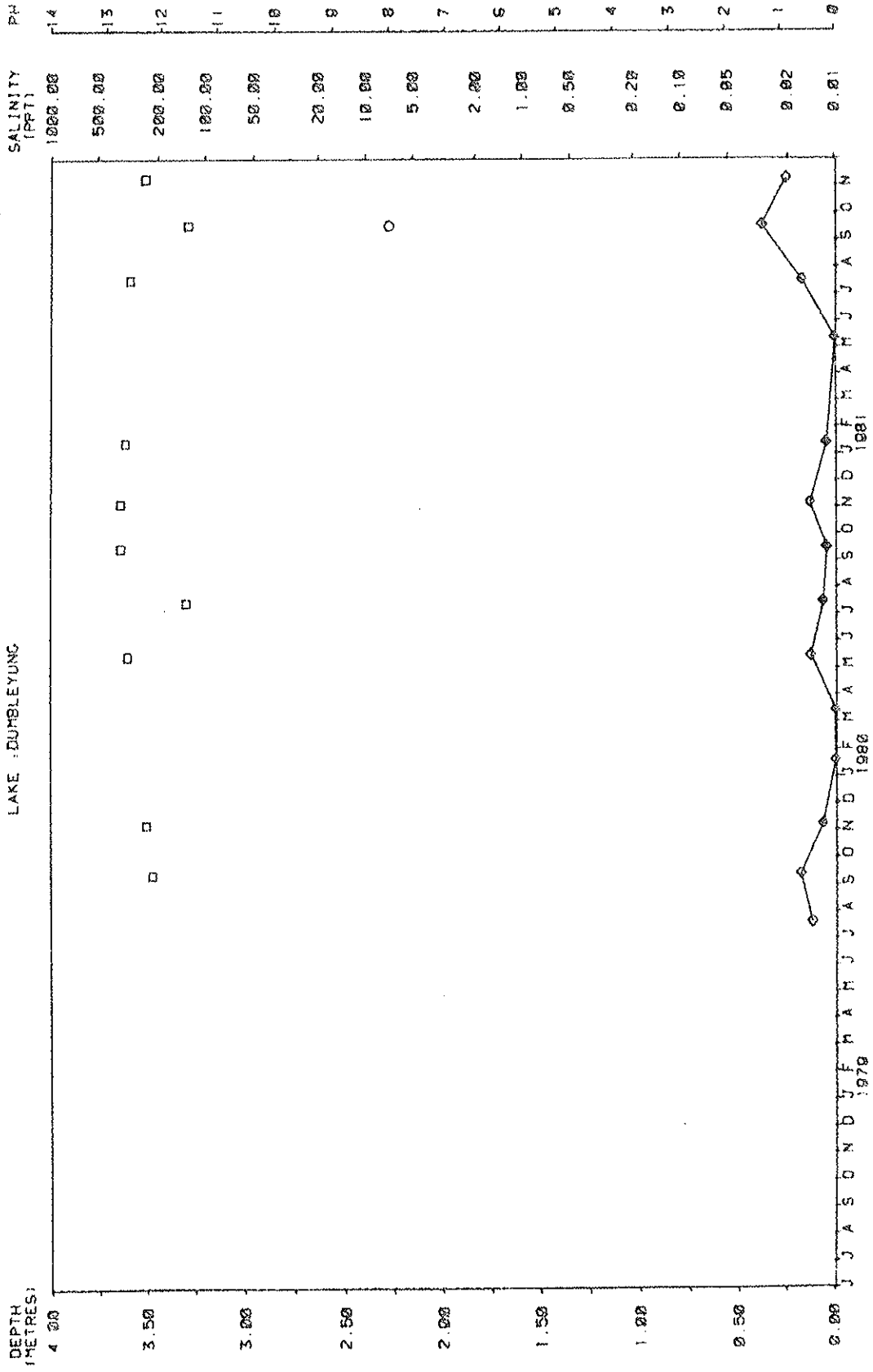
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 WATERBIRD RESEARCH

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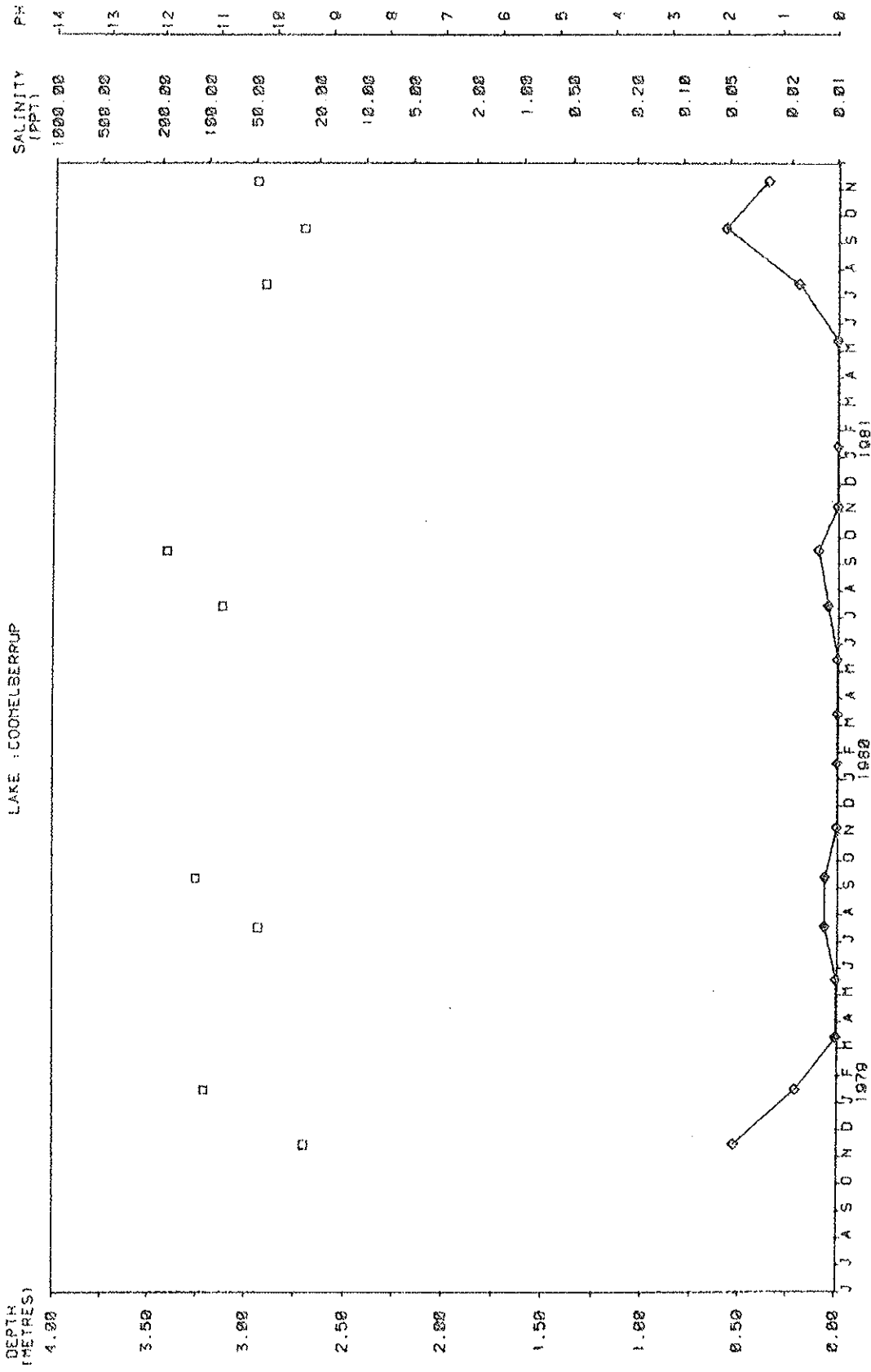
VA DEPT. FISHERIES & WILDLIFE  
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◇ DEPTH   □ SALINITY   ○ PH FACTOR



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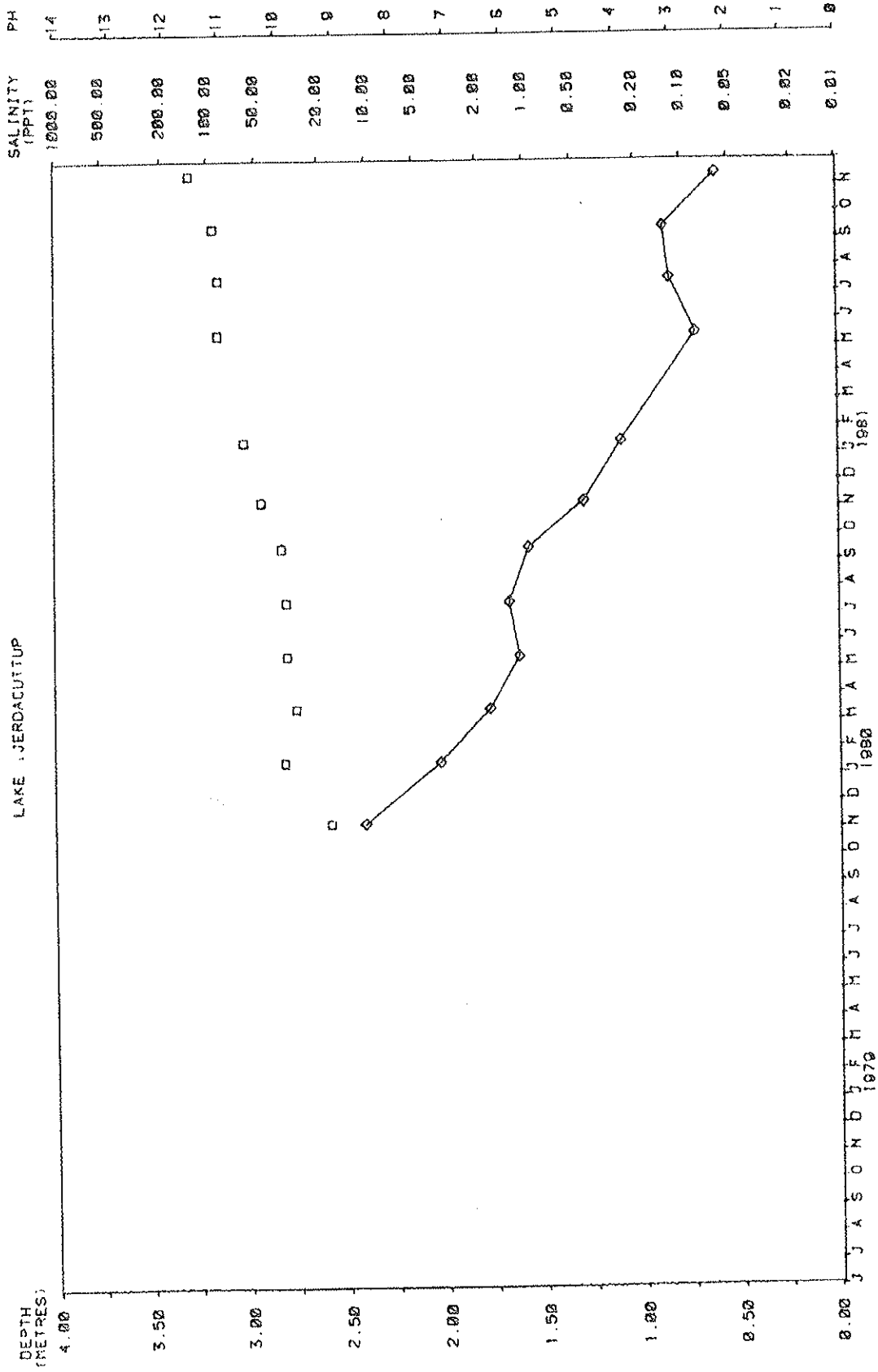
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◇ DEPTH    □ SALINITY    ○ PH FACTOR





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◇ DEPTH □ SALINITY ○ PH FACTOR

## SUMMARY

### RAINFALL

Rainfall was average over central and northern areas of the south-west during 1981, with small areas of above-average rainfall in the Northam-York-Chidlow vicinity and below-average rainfall north of Geraldton (see Figure 3). Rainfall in southern areas, however, was generally below - to much-below-average. South coastal areas from Augusta to Albany and north to Borden received average falls.

District Rainfall Averages in 1981 were, in most cases, substantially higher than those recorded in 1979 and 1980 however none exceeded the long term average. (Figure 5).

Unusually heavy falls were recorded in North Coastal, North Central and Central Coastal Districts in May, and average falls were recorded in all Districts (except the South Central) in June and August (Figure 4). Falls were generally below average in March, April, July, September and October.

### WETLANDS

Wetlands in central and northern areas of the south-west showed substantial increases in depth from 1979 and 1980 to 1981 (Table 1). Most also exceeded 1978 levels. Many important waterfowl sites which were dry in November 1980 contained 1.00 metres or more in November '81 (e.g. Logue, Streets, Hinds, Ninan, Noonying, Mears, Brown and Toolibin). Some were more than 2.00 m deep (e.g. Eganu, Pinjarrega and Eneminga).

Wetlands in southern areas (south of a line through Wagin, Lake King and Salmon Gums) also showed some improvement on levels for the preceding 2-3 years however the increases were generally not as great as those of wetlands further north. Water levels of some gauged wetlands were still lower than those recorded in 1978 (e.g. Coyrecup, Coomelberrup and Towerinning).

Water levels of gauged wetlands of the south coast from Albany to Esperance were similar to or below those of 1980. All were below 1979 levels, some markedly so (Pleasant View, Jerdacuttup, Shaster and Warden).

Summarizing, 1981 saw a substantial (and in some cases, dramatic) improvement in the condition of wetlands in central and northern areas of the south-west to pre-1978 levels; a less substantial but significant improvement in the condition of wetlands in southern areas; and a further, slight deterioration in conditions on the south coast from Albany to Esperance.

Unlike the summers of 1979/80 and 1980/81 when virtually all wetlands of inland areas of the south-west were dry by January, in 1981/82 many wetlands of the inland, in addition to those of the coast, will hold water at least until March, and in some cases right through to next winter.

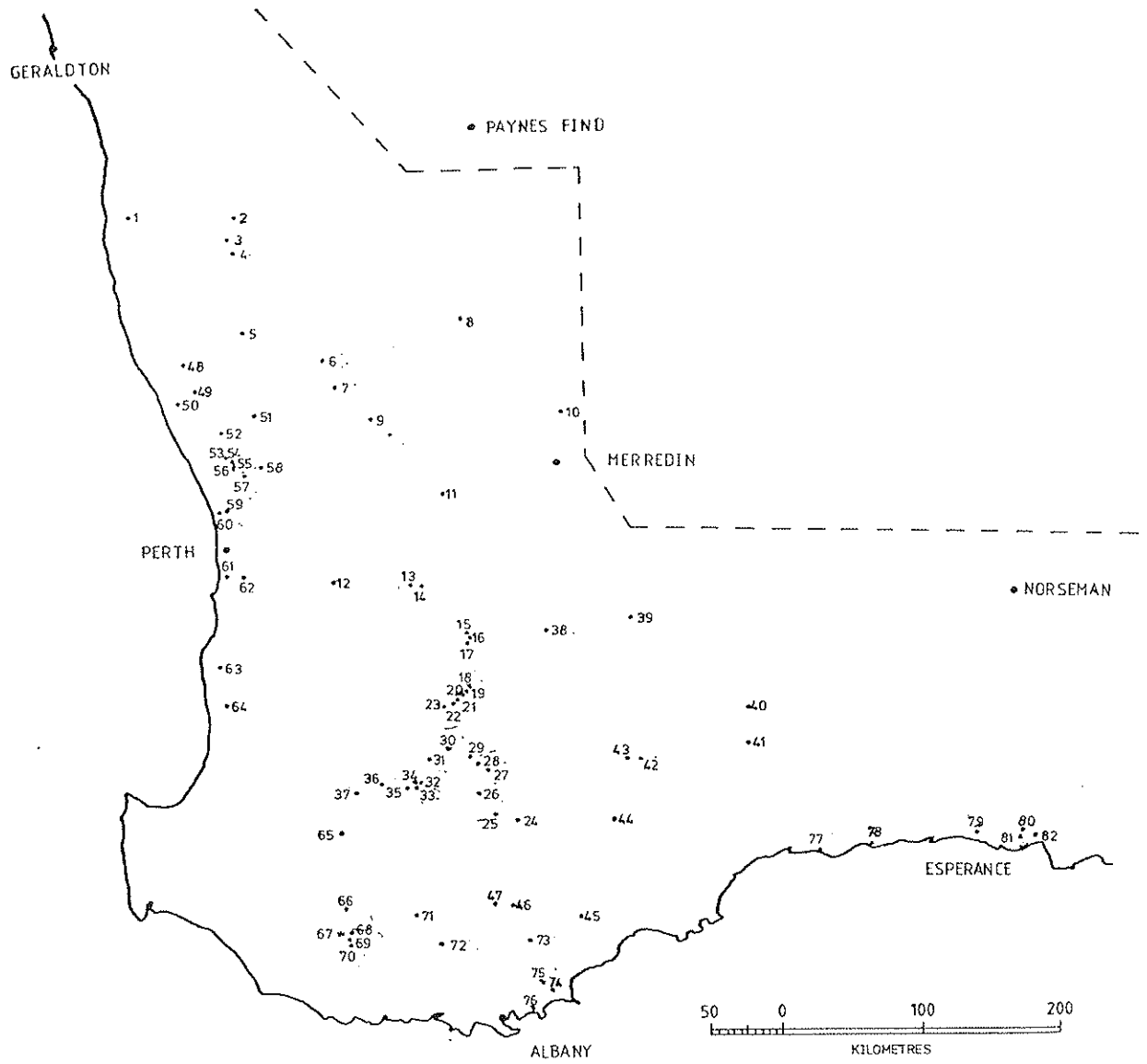


FIGURE 8. Location of Gauged Lakes.

# Water level determines wildfowl season

WHEN Fisheries and Wildlife biologists began to assess the prospects for a duck shooting season in the South-West this year, the last thing they thought of was counting birds.

Instead, they measured the water levels in the wetlands where the wildfowl gather.

This method, introduced in 1978, is unique in Australia and it may be the most accurate. Like many innovations, it grew out of necessity.

Few countries in the world—least of all one as big as Australia—have been able to put an accurate figure on their wildfowl populations.

Nomads or migrants, the birds move so swiftly in search of food, water and breeding sites that even the United States has not been able to muster the resources to fully assess the impact of shooting on their numbers.

## Closer

The WA approach gets closer to basics—the biological principles that control reproduction.

Put simply, this means that if there are good falls of rain during winter the wetlands will fill, food will be plentiful, and the ducks will pair off to raise their young.

If it is a bad season many will defer breeding until conditions are better.

Either way, the birds' winter activities will be reflected in the numbers present in November and these will decide whether there will be a shooting season.

"Earlier, the department tried to assess the conditions for waterfowl breeding during ground and aerial surveys of the wetlands," the officer in charge of waterbird research, Mr Jim Lane, said.

"We noted whether the water levels were dry, low, half-full, high or full. Where we could, we made counts and checked breeding activities.

"It was a lot of work and we knew we were working only on rough estimates. We began the new system in 1978, when we started

putting depth gauges on the wetlands.

"We have installed about 100 and we will put in another 10 by next winter. When that is done we will have covered all the major wetlands nature reserves in the South-West land division between Dongara and Esperance."

Part of the new system's success rests on the South-West's strongly seasonal rainfall pattern.

About 70 per cent of the annual rain falls between May and September and half of this is recorded in June and July.

Water levels continue to rise well into spring before the seasonal drop in summer and autumn.

Nesting reaches its peak in August and September. Broods of ducklings are most common from September to November and most are flying by January.

Their numbers peak early in the New Year, when the duck shooting season is due to open.

In a good year it extends from January to

By ALEX HARRIS

March. A poor season means restricted shooting but the idea is the same—to keep to a minimum its effects on the total duck population.

To some extent shooting acts as a form of culling. Ducks are prolific breeders, and if the year's entire hatching lived to maturity the State's wetlands could not support them.

Nature restores the balance with a high mortality rate. Deaths occur from natural causes like food and water shortages, predation and disease.

Where bird numbers are out of proportion to the food resources, a shooting season accounts for many of the previous season's hatchings which would have died naturally in any case.

"The Fisheries and Wildlife Department has three options after making its spring assessment of water levels," Mr Lane said.

"It can declare a full season of 10 weeks, with shooters entitled to take 10 birds of any game species. Or it can declare a restricted

season of four weeks, with a bag limit of five birds.

"Or, it can do as it did last year, and have no season. This is naturally a disappointment to the South-West's 6000 licensed shooters, but they recognise that it makes good sense.

"An open season at set times each year, as happens in the Eastern States, could mean that over a period duck numbers would fall so low the sport would disappear."

## Declared

Most of the wetlands being monitored for water levels are declared wetland nature reserves under the control of the WA Wildlife Authority.

The gauges also make it possible for biologists to keep accurate readings of levels on a seasonal basis. They are reaching the stage when they will be able to forecast "dry-out" dates for lakes and swamps.

Biologists are also measuring the wetland systems for salinity and acidity or alkalinity, to give a clearer picture of changes in the environment and the steps that might need to be taken for its long term management.

The information is being stored on computer at the Wildlife Research Centre at Wanneroo.

"At the moment our information is based on two-monthly observations and we will continue to do this until the end of 1985," Mr Lane said.

"After that we expect to cut it back to three times a year—the breeding season and the start of the shooting season.

"In time we hope to be able to use satellite imagery to tell us more about our water areas, but at the moment the lag time is too great and the service is too costly."

Already the new system is proving its value to shooters. The department is able to call up information to advise which water levels can be expected in many favourite game reserves.

By 1983 it expects to issue graphs giving the same data in an ex-

panded and more permanent form.

But the actual number of birds will always remain something of a mystery. "We can't foresee the time when we'll have the resources to count the ducks in the South-West," Mr Lane said.

"Even if we did, we would still have to know how many birds of each species were taken each season and how this related to the natural mortality.

"This would not be possible without a large scale banding programme—and even then there would be doubts."



Fisheries and Wildlife research officer Jim Lane monitors the water in Lake Jondabup, near Wanneroo. The lake is an important water bird refuge during summer.

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