DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

Rept. Bk. No. 80/14

ANDAMOOKA 1:250 000 SHEET WATER WELL SURVEY

By

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and

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MARCH, 1980.

Eng. No. 77/66
D.M. No. 978/63

CONTENTS

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ANDAMOOKA 1:250 000 SHEET WATER WELL SURVEY

ABSTRACT

Approximately 60 water wells were examined on the ANDAMOOKA 1:250 000 sheet during the field survey which took 11 days to complete. Information on a further 120 wells was obtained from Departmental records.

Very high salinity of the groundwater is characteristic of the area. Useful water has, however, been obtained from Adelaidean sediments, Upper Proterozoic Tent Hill Formation, Cambrian Andamooka Limestone, an unnamed Cretaceous formation, and Cainozoic Pirie - Torrens Basins sediments.

Standing water levels ranged mainly between 3 and 15 metres, and yields were small, with supplies as low as 5 kL/day in production.

The salinities of water samples taken during the survey were in many cases affected by recent exceptional rains.

INTRODUCTION

ANDAMOOKA is one of a series of 1:250 000 scale map sheets for which water well surveys are being carried out.

The Andamooka sheet covers an area between latitudes 30° & 31° south and longitudes 136°30' and 138°00' east and includes substantial parts of the following pastoral stations:

Andamooka, Witchelina, Stuart Creek, Purple Downs, Roxby Downs, Beltana, Billa Kalina and Parakylia. A large part of Lake Torrens is also included (See fig. 1).

PHYSICAL FEATURES

Topography and Surface Hydrology

More than half of the sheet area is covered with longitudinal sand dunes trending E.N.E. to W.S.W. A large area to the SW of

Lake Torrens is covered by dissected stoney plateaux, and Lake Torrens itself covers 20% of the sheet. There is a relatively small area of ranges in the NE. The sand dune areas have no surface drainage but the remaining parts are drained through numerous creeks toward Lake Torrens. The dunal areas in the NE are traversed by creeks which originate in the ranges to the East.

Vegetation and Land Use

The predominant vegetation of the dunal areas is mulga, native cypress and native shrubs. The plateaux are largely bare and other areas are covered with salt bush and blue bush. Many of the major creeks are lined with Eucalypts. Land use is predominately grazing but some land at Andamooka and Stuart Creek opal fields has been set aside for mining.

Rainfall

Rainfall is low, averaging approximately 150 mm and is highly irregular. At Witchelina and Roxby Downs, rainfall records have been kept since 1898 and 1931 respectively. (Figs. 2A, 2B).

Annual evaporation (from a Class A pan with a bird guard) is about 2 700 mm.

GEOLOGY

Rocks of the Adelaide system form the basement for the sheet area; these are overlain by sediments of the Pirie Torrens Basin in the east and some Cambrian and Cretaceous sediments in the west (Fig. 3.)

HYDROGEOLOGY

Aquifers

On the western side of Lake Torrens three aquifers are being

used. The Upper Proterozoic Tent Hill Formation yields water to wells on Bosworth, Arcoona and Andamooka stations. Arcoona, Purple Downs and Roxby Downs have successful wells completed in the Cambrian Andamooka Limestone. An unnamed Cretaceous formation has been tapped only in the Andamooka township area. No successful wells have been completed in the Quaternary.

On the eastern side of Lake Torrens, Witchelina station has several wells in upper Proterozoic Adelaidean rocks. There are also a few disused wells in the Cainozoic Pirie-Torrens basin, located mainly on stream channels.

Yields from all aquifers are generally low.

Recharge

Recharge occurs through direct downward percolation of rainfall and along stream beds where these exist. Small clay pans and swamps result in useful local concentrations of water and subsequent recharge.

Standing Water Levels

These vary in a similar, but more subdued way to the topography and range from 52 m in a mineral exploration well in the west, to above ground level at Wilaroo Lagoon and Lake Torrens.

Salinity

High ground water salinity is the greatest problem in the utilisation of this resource, and has caused the abandonment of numerous wells. Water of usable quality has, however, been obtained at favourable sites mainly on creeks or in swampy areas. Salinities vary between 1 000 mg/L and 220 000 mg/L. Some water samples taken during the survey are suspect due to runoff following recent exceptional rains.

No groundwater of a quality suitable for stock has been found in the whole of the north-western part of the sheet (No. 6237

1:100 000 sheet on Fig. 4.)

WELL CONSTRUCTION AND EQUIPMENT

The great majority of productive wells were hand dug and timber lined to the hard rock (where this was intersected). Equipment includes windmills, jack pumps or fire fighting pumps (on the surface)

POLLUTION POTENTIAL

Some wells at Andamooka Opal Field have been polluted by septic tank effluent and are now considered unfit for human consumption. Outside of this relatively densely populated area pollution is not considered to be a hazard, except that a nitrate (NO_3) analysis should be done when young children may be consuming the groundwater.

DKC, DL:AF

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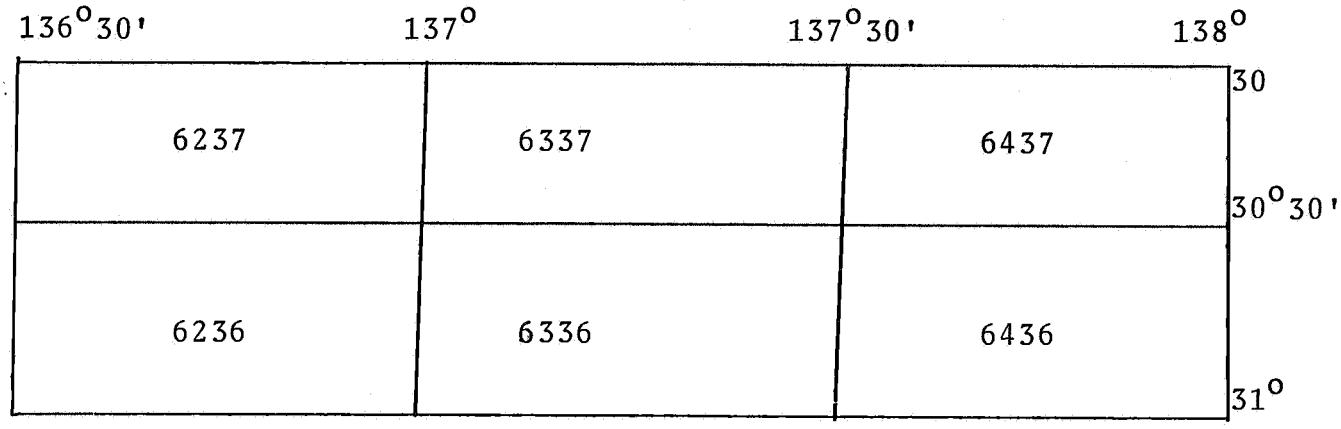
APPENDIX A

Water Well Data

ANDAMOOKA 1:250 000 Sheet



1:100 000 sheets

NOTES ON WELL DATA TABLES

Well details are listed under 1:100 000 sheet numbers which may be found at the top of each page.

SWL column

(1) The date shown in this and the next column indicates the month and year in which that particular datum was recorded.

(2) The reference point for measurements on drilled wells was local ground level. The reference point for dug wells was the top of the earth mound surrounding the well.

SALINITY column

See note (1) under SWL column above.

Key for Equipment/Status

A Abandoned

W/M Windmill

J.P. Jack pump

L/S Lake sample

D Dam sample

N.I.U.Not in Use.

M.E. Mineral exploration

U/E Unequipped

T.W.S. Town water supply.

Key for Type

W Hand dug well

B cased well (drilled)

S Spring

F.B. Foundation bore

D Dam

M.E. Mineral Exploration

T.H. Test Hole

R.H. Rock Hole

1:100 000 Sheet No. 6236

Well No.	Depth m	S.W.L. m (date)	Salinity mg/l (date)	Yield kl/day	Equip/ Status	Type	Name / Remark
0001	51·82	–	V. high (?)	High	A	–	–
2	16·90	Dry (6-79)	–	–	A	W	Nolans Well
3	53·04	–	8 100 (?)	Small	A	W	Wendts Well
4	67·06	–	9 400 (?)	0·2	A	–	–
5	33·8	1·63 (6-79)	1 700 (6-79)	70	W/M	W	–
6	19·20	–	V. high (?)	–	A	–	–
7	21·3	–	V. high (?)	–	A	–	–
8	–	–	830 (1-50)	–	L/S	–	Lake Cambell
9	28·96	18·29 (8-27	13 000 (8-27)	18·2	A	W	Pan Well
10	31·39	17·72 (6-79)	3 400 (6-79)	40	W/M	W	Sisters Well
11	18-21	9·14 (?)	Low (?)	V. low	A	–	–
12	18-21	17·07 (?)	3100 (?)	V. low	A	W	–
13	15·24	–	1 600 (?)	0·9	A	W	–
14	45·72	–	V. high (?)	–	A	–	–
15	12·19	–	–	–	A	–	–
16	21·34	–	V. high (?)	–	A	W	–
17	11·23	3·26 (6-79)	–	–	J.P.	W	Purple Well
18	9·75	3·66 (?)	–	68·2	A	W	Purple Well
19	10·97	–	11 000 (?)	High	–	W	Swamp Well
20	20·73	14·63 (6-59)	>17000(6-59)	22	A	B	–
21	20·12	–	–	–	A	–	–
22	65·53	53·34 (8-59)	>17 000(8-59)	0·2	A	B	–
23	38·10	31·39 (4-59)	17 000 (4-59)	0·3	A	B	–
24	10·97	–	–	–	A	B	–
25	51·21	–	V. high (?)	–	A	–	–
26	11·28	–	V. high (?)	–	A	–	–
27	6-9	–	V. high (?)	–	A	–	–
28	6-9	–	V. high (?)	–	A	–	–
29	6-9	–	V. high (?)	–	A	–	–
30	–	–	–	–	D	–	Dam sample.
31	92·96	0·91 (8-49)	140 000 (8-49)	76	A	B	–

Sheet 6236 cont.

Well No.	Depth m	S.W.L. m (date)	Salinity mg/l (date)	Yield kl/day	Equip/ /Status	Type	Name / Remark
0032	–	–	–	–	–	L/S	Lake Koolymilka
33	12·19	–	–	–	A	F.B.	–
34	–	–	>17 100 (5-64)	–	D	S	Leak or spring in dam
35	3·35	–	V. high (?)	–	A	–	–
36	36·38	–	V. high (?)	–	A	–	–
37	12·19	6·71 (?)	Fresh over salt	–	A	W	–
38	15·24	9·14 (2-63)	8 000 (2-63)	–	A	W	–
39	21-34	–	V. high (?)	–	A	–	–
40	48·16	42·67 (8-49)	10 000 (8-49)	2·2	A	B	–
41	38·10	–	4 700 (10-59)	–	A	B	Coorlay Lake Bore
42	–	–	8 200 (11-77)	–	–	D	–
43	11·03	3·18 (6-79)	2 600 (6-79)	>200	W/M	W	–
44	33·6	16·56 (6-79)	–	70	–	W	–
45	27·35	16·59 (6-79)	4 000 (6-79)	20	J.P.	W	–
46	–	52·42 (?)	–	–	M.E.	B	–
47	1·54	Dry (6-79)	–	–	A	B	–
48	18·62	9·31 (6-79)	–	–	U/E	B	–
49	16·25	Dry (6-79)	–	–	W/M+J.P.	W	Bambridges

1:100 000 Sheet No. 6237

Well No.	Depth m	S.W.L. m (date)	Salinity mg/l (date)	Yield kl/day	Equip./Status	Type	Name
0001	>73·15	Dry (?)	—	—	A	—	—
2	45·2	—	28 000 (10-75)	—	A	W	Sunday Well
3	—	—	—	—	A	—	—
4	—	—	—	—	A	—	—
5	47·24	—	14 000 (?)	Large	A	—	—
6	55·78	—	25 000 (?)	Large	A	—	—
7	80·0	—	27 000 (10-75)	—	A	B	—

1 : 100 000 Sheet No. 6336

Well No.	Depth m	S.W.L. m (date)	Salinity mg/l (date)	Yield kl/day	Equip./ Status	Type	Name
0001	33·53	–	–	–	A	B	–
2	13·41	10·36 (3-58)	23 000 (3-58)	0·7	A	B	–
3	49·38	21·95 (2-58)	27 000 (2-58)	0·1	A	B	–
4	8·53	3·35 (?)	V. high (?)	–	A	–	–
5	21·34	17·37 (7-35)	32 000 (7-35)	–	A	W	Wirrda Salt Well
6	28·55	14·6 (6-79)	4700 (6-79)	–	N.I.U.	W	Wirrda Well
7	13·72	–	V. high (?)	–	A	–	–
8	31·70	18·29 (8-47)	4400 (8-47)	22·7	–	W	Yarloo Well
9	13·72	–	V. high (?)	–	A	–	–
10	15·65	7·45 (6-79)	170 (6-79)	–	N.I.U.	W	Centenary Well
11	35·04	7·3 (6-79)	4000 (6-79)	1·8	U/E	W	Myall Well
12	0·9	flows (6-79)	18000 (6-79)	13	A	W & B	Willaroo Lagoon Bore
13	–	–	–	–	Bf	W	Station Well
14	–	–	7100 (7-29)	–	A	TH	–
15	12·19	–	–	–	A	TH	–
16	13·00	3·35 (6-79)	5100 (6-79)	–	U/E	W	Todd Ridge No.1 We
17	28·75	19·50 (6-79)	7600 (6-79)	–	U/E	W	Todd Ridge No.2 We
18	25·30	–	–	–	A	B	–
19	3·70	3·30 (6-79)	1000 (6-79)	–	N.I.U.	W	Little Mulga Well
20	–	3·70 (6-79)	–	–	A	W	Mulga Well
21	9·01	2·83 (6-79)	23000 (6-79)	–	A	W	Station Pines Well
22	–	–	9900 (11-28)	–	A	B	No.6 Bore at Todd Ridg
23	29·79	26·63 (6-79)	6200 (6-79)	23	N.I.U.	W	Nick o' Time
24	77·11	73·0 (5-58)	17000 (5-58)	1·1	A	B	–
25	16·15	12·19 (5-58)	33000 (5-58)	0·9	A	B	–
26	45·75	–	Low (?)	V. low	A	–	–
27	117·0	107·29 (8-48)	12 000 (8-48)	5·5	A	B	–
28	75·6	67·67 (3-59)	15 000 (?)	2·2	A	B	–
29	8·85	–	–	–	A	–	–
30	28·45	14·77 (6-79)	22 000 (6-79)	33	A	W	Old Whip Well
31	–	7·62 (?)	1600 (?)	1·6	A	W	–

Sheet 6336 cont.

Well No.	Depth m	S.W.L m (date)	Salinity mg/l (date)	Yield kl/day	Equip/ /status	Type	Name
0032	4·89	-	V. High (-47)	-	A	-	-
33	15·24	-	6800 (2-63)	-	A	W	-
34	15·24	-	4900 (2-63)	Mod.	A	W	-
35	22·05	15·30 (6-79)	1800 (6-79)	-	A	W	Wilsons Well
36	19·0	18·15 (6-79)	4100 (6-79)	-	A	W	Horse Well
37	27·3	18·90 (6-79)	9400 (6-79)	-	W/M	W	Giles Well
38	45·75	-	V. high (?)	-	A	-	-
39	22·45	17·60 (6-79)	13000 (6-79)	-	U/E	W	Whim Well
40	14·46	0·74 (6-79)	-	-	W/M	B	Gypsum Bore

1 : 100 000 Sheet No. 6337

Well No.	Depth m	S.W.L. m (date)	Salinity mg/l (date)	Yield kl/day	Equip./ Status	Type	Name
0001	36·38	21·74 (4-65)	6900 (4-65)	V. low	A	B	-
2	54·86	24·38 (?)	-	0·5	A	W	North Swamp Well
3	45·72	21·95 (12-62)	1500 (12-62)	2·7	-	B	North Well
4	-	-	-	-	A	B	-
5	30·48	Dry (11-62)	-	-	A	B	-
6	30·.	Dry (11-62)	-	-	A	B	-
7	70·10	57·91 (12-62)	12 000 (12-62)	2·2	A	B	-
8	27·43	15·24 (4-65)	>17 000 (4-65)	-	A	B	-
9	4·57	1·22 (4-65)	>17 000 (4-65)	-	A	B	-
10	35·05	15·46 (4-65)	>17 000 (4-65)	-	A	B	-
11	65·23	3·96 (6-25)	20 000 (6-25)	High	A	B	Yarrawurrta Bore.
12	29·57	21·95 (?)	Mod. (?)	1·4	A	B	-
13	61	-	-	-	A	W	Horn Well
14	51·82	Dry (1-58)	-	-	A	B	-
15	15·24	7·62 (?)	Low (?)	V. low	A	-	-
16	18·29	-	High (?)	V. low	A	-	-
17	1	-	-	-	-	W	Station Well
18	-	-	-	-	-	W	Station Well
19	10·97	8·03 (7-35)	1630 (7-35)	-	-	B	Four Corners Hut Bor
20	12·80	10·97 (7-35)	1200 (7-35)	0·2	-	W	Four Corners Hut Well No
21	-	-	-	-	-	W	Gougers Well No. 1.
22	-	-	-	-	-	W	Gougers Well No. 2
23	12·50	6·71 (2-48)	15 000 (2-48)	0·6	-	B	-
24	1	-	-	-	-	-	Barnes Bore
25	15·24	6·10 (?)	1 300 (?)	0·7	-	W	Opal Fields Well
26	-	-	1 200 (5-62)	-	-	R.H.	Chimney Rockhole
27	34·75	-	V. high (?)	4·6	A	-	-
28	8·53	-	V. high (?)	V. low	A	-	-
29	63·4	5·18 (3-67)	82 000 (3-67)	6·6	A	B	-
30	79·25	53·04 (4-67)	16 000 (4-67)	7·6	A	B	-
31	32·31	12·19 (5-67)	35 000 (5-67)	-	A	B	-

Sheet No. 6337 cont.

Well No.	Depth m	S.W.L. m (date)	Salinity mg/l (date)	Yield ml/day	Equip./ Status	Type	Name
0032	61·27	33·22 (5-67)	19000 (5-67)	11	A	B	–
33	54·86	–	V. high (?)	–	A	–	–
34	45·72	–	V. high (?)	–	A	–	–
35	82·3	–	V. high (?)	–	A	–	–
36	55·17	–	–	–	A	–	–
37	97·54	15·24 (?)	V. high (?)	3·6	A	–	–
38	20·12	–	V. high (-70)	–	A	–	–
39	31·7	–	V. high (-70)	–	A	–	–
40	6·4	5·49 (6-53)	>17 000 (6-53)	–	A	W	–
41	42·82	22·14 (6-79)	–	–	W/M	W	–

1 : 100 000 Sheet No. 6436

Well No.	Depth m	S.W.L m (date)	Salinity mg/l (date)	Yield kl/day	Equip / Status	Type	Name
0001	1·52	0·78 (8-60)	22 000 (8-60)	–	A	–	–
2	7·25	3·6 (6-79)	450 (6-79)	–	w/m + J.P.	W	North Well
3	20·7	5·0 (6-79)	2 300 (6-79)	< 5	w/m	W	No. 3 Well
4	27·5	2·7 (6-79)	> 15 000 (3-72)	–	w/m	W	Top Well
5	30	–	–	0·9	A	W	–
6	–	–	–	–	–	–	–
7	5·65	3·0 (6-79)	360 (6-79)	–	w/m + J.P.	W	Glynns
8	13·9	3·84 (6-79)	1200 (6-79)	–	w/m + J.P.	W	No. 4 Well
9	5·52	3·3 (6-79)	210 (6-79)	–	U/E	W	Paddy's Well
10	26·32	7·55 (6-79)	2 600 (6-79)	–	w/m + J.P.	W	Garden Well
11	> 93	Flow (6-79)	14 000 (6-79)	30	M.E.	B	–
12	–	Flow (6-79)	22 000 (6-79)	0·1	M.E.	B	–
13	6·5	0·5 (6-79)	70 000 (6-79)	–	M.E.	B	–

1 : 100 000 Sheet No. 6437

Well No.	Depth m	S.W.L. m (date)	Salinity mg/ℓ (date)	Yield kℓ/day	Equip/ Status	Type	Name
0001	–	–	7800 (7-64)	–	N.I.U.	B	Berlina Bore
2	–	17·47 (6-79)	7600 (6-79)	40	W/M	B	Coronation Bore
3	–	–	10 000 (?)	–	–	–	West Mount Well
4	498·5	Flow (1884)	High (1884)	–	A	B	Mirrabuckina Bore
5	44·81	2·13 (?)	–	–	A	B	Flagstaff Bore
6	10·0	6·55 (6-79)	9000 (6-79)	4·5	A	W	Sister Well Nth.
7	8·53	6·10 (6-57)	11 000 (6-57)	4·5	–	W	Sister Well
8	24·69	18·59 (11-57)	41000 (11-57)	22	A	B	–
9	–	–	950 (8-51)	–	D	D	Middle Dam
10	14·63	12·19 (7-58)	>17000 (7-58)	–	A	B	–
11	24·38	13·10 (7-58)	>17000 (7-58)	–	A	B	–
12	18·29	–	9 000 (11-57)	–	A	B	–
13	–	–	–	–	A	B	–
14	13·80	9·66 (6-79)	5300 (6-79)	–	U/E	W	Glenview Well
15	22·6	11·20 (6-79)	2800 (6-79)	–	N.I.U.	W	Berlina Well
16	–	–	2300 (?)	–	–	W	Coronation Well
17	–	–	–	–	A	W	New Tilterana We
18	8·3	Dry (6-79)	–	–	A	W	3rd Tilterana Well
19	38·41	–	–	–	A	W	Old Tilterana Well
20	23·17	–	–	–	A	W	Bushcowie Well
21	27·13	25·60 (6-57)	18 000 (6-57)	32·7	A	–	–
22	14·02	10·97 (8-51)	7400 (6-57)	10·9	A	W	Homestead Well
23	39·01	–	32 000 (6-57)	V. low	A	–	–
24	21·4	20·10 (6-79)	7 800 (9-79)	High	A	W	Mt Victory Well
25	–	–	13 000 (7-27)	–	A	W	West Well
26	32·92	–	18 000 (-70)	–	A	B	–
27	60·66	–	V. High (-70)	–	A	B	–
28	–	–	8 600 (9-60)	–	A	B	–
29	–	–	–	–	–	–	–
30	–	–	4200 (6-79)	87	J.P.	B	East Mount Bore

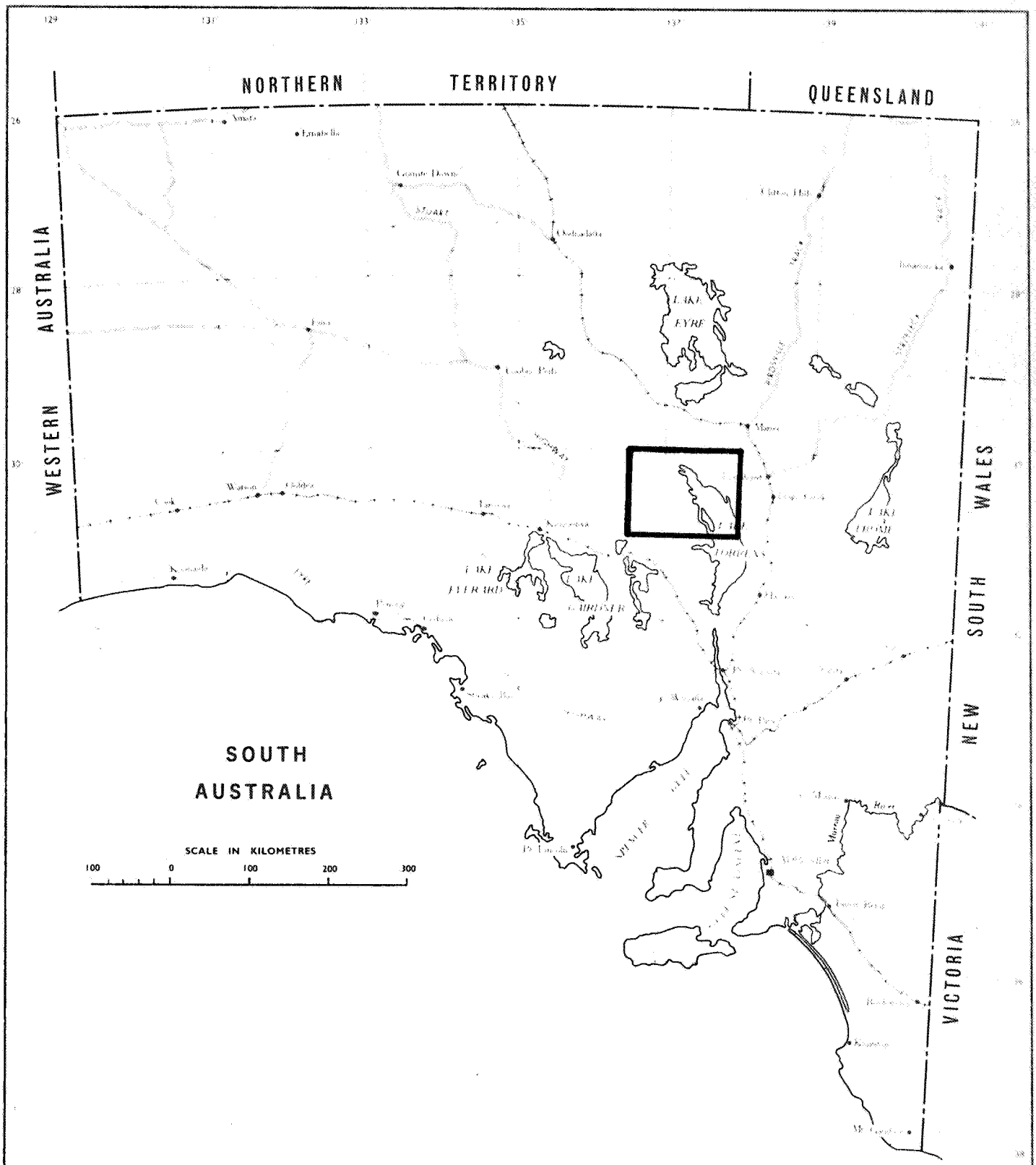
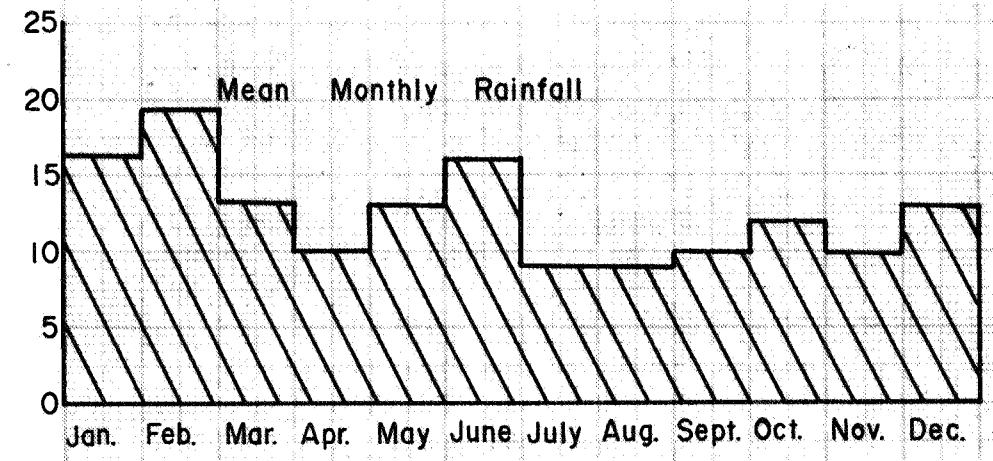


FIG.1

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

Compiled D. Clarke	ANDAMOOKA 1:250,000 WATER WELL SURVEY	Date Jan. 7, 1980
Drn E.C. / Ckd	LOCALITY PLAN	Drg No S14608

1663



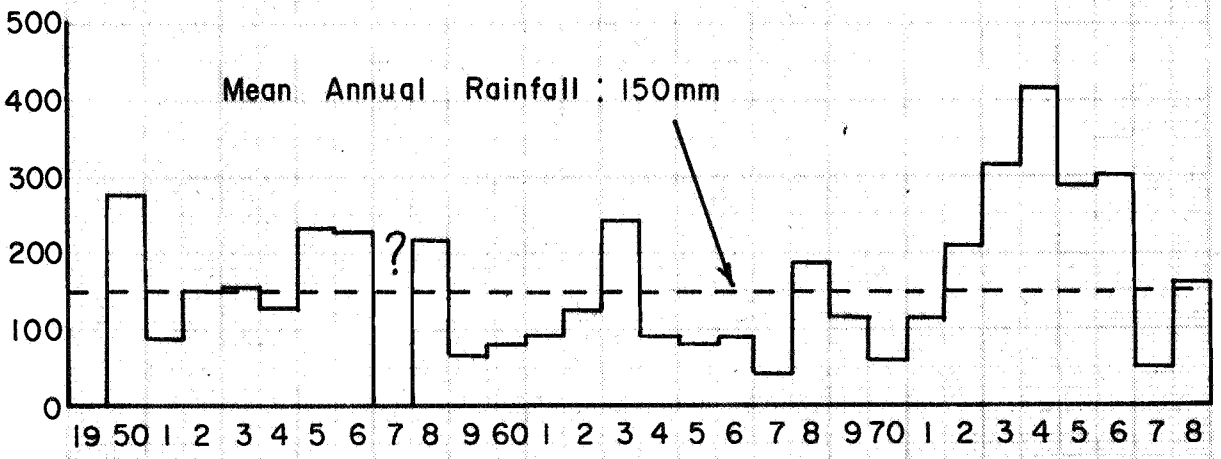
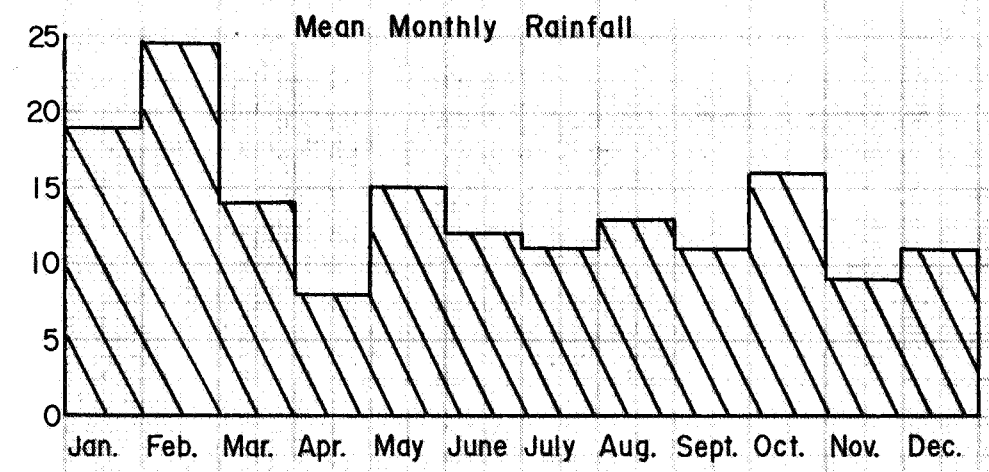


FIG. 2a

	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	SCALE
COMPILED D.K. Clarke	ANDAMOOKA 1:250,000 WATER WELL SURVEY	DATE Jan. 9, 1980
DRN E.C. CKD	WITCHELINA	PLAN NUMBER S 14609
	RAINFALL STATISTICS	

1663



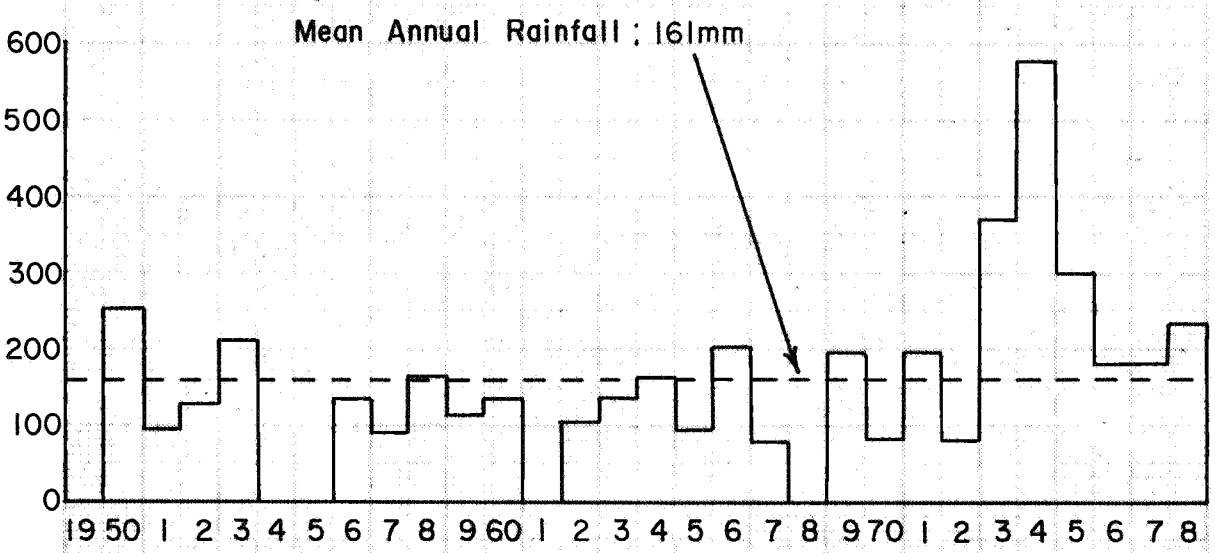


FIG.2b

	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	SCALE
COMPILED D.K. Clarke	ANDAMOOKA 1:250,000 WATER WELL SURVEY	DATE Jan. 10, 1980
DRN E.C. CKD	ROXBY DOWNS	PLAN NUMBER
	RAINFALL STATISTICS	S14610

1663

CAINOZOIC:

Sand dunes, lake deposits and claypans. Includes gypseous clay, silts and sands with some gravels along drainage lines, and tertiary lateritic grits. . . . . .

CRETACEOUS:

Kaolinitic sandstones, with sands and grits. . . . . .

CAMBRIAN:

Shale and siltstone . . . . . .

Andamooka Limestone - generally massive brownish grey limestone . . . . . .

UPPER PROTEROZOIC:

Quartzites, sandstones, siltstones, shale and dolomite. . . .

FIG. 3

	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	SCALE: 1:1,000,000
COMPILED: D.K. Clarke	ANDAMOOKA 1:250,000 WATER WELL SURVEY GENERALIZED GEOLOGY	DATE: Jan. 15, 1980
DRN: E.C. CKD:		PLAN NUMBER S14611

1663

BILLA KALINA

6237

STUARTS CREEK

6337

MULGARIA

WITCHELINA

6437

EDIACARA

PARAKYLIA

ROXBY DOWNS

6236

ANDAMOOKA

6336

PURPLE DOWNS

WIRRAMINNA

ARCOONA

BOSWORTH

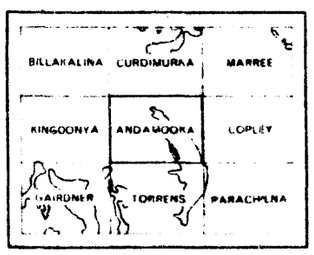
LAKE TORRENS

6436

NILPENA

ISLAND RANGES

ASSOCIATED 4 MILE SHEETS



SCALE

GROUNDWATER SALINITY (mg/ℓ)

28• 17,000 . . . . . Representative Samples Taken During Survey

(34,000) . . . . . Other Samples

. . . . . Flowing well

FIG. 4

DEPARTMENT OF MINES AND ENERGY – SOUTH AUSTRALIA

ANDAMOOKA 1:250,000 WATER WELL SURVEY

WELL LOCATIONS AND SALINITIES

	COMPILED D. Clarke	DRN E. C.	SCALE 1:250,000	PLAN NUMBER
DIRECTOR GENERAL		CKD	DATE Jan. 9, 1980	80-118