

UR1984-26

1984/26. Spear bores at Peggs Beach, north-western Tasmania.

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Abstract

Spear bores at camping sites at the east and west end of Peggs Beach are likely to be capable of supplying sufficient water for use at the camp sites as well as emergency fire fighting, provided surface storage is available.

The water quality, particularly at the eastern camp site, may restrict the usefulness of the water although in all cases it should be suitable for septic tanks and as a cold water supply for washing.

INTRODUCTION

The Lands Department has developed two camping grounds at Peggs Beach near Wiltshire. One is a fairly large area near the mouth of the Black River [CQ580772] and the other is situated at the eastern end of the beach [CQ610764]. A request was made to examine the potential for ground-water to supply both sites for the use of campers and fire protection.

An initial visit was made to the western camp site and two holes were augered to the water table (fig. 1). One hole was near the end of the newly constructed access road where the water table was 2.1 m below the surface and the salinity, as measured with a conductivity meter, was about 250 mg/l. The other hole was augered near the bend where the road changes direction from extending along the river to along the coast. Here the water table was 0.9 m below the surface and the salinity was about 100 mg/l. Spears were installed in both areas during a later visit.

GEOLOGY

The area has been mapped by Lennox *et al.* (1982). Most of the land between the Bass Highway and Peggs Beach is underlain by largely stabilised dune sand which forms ridges roughly parallel to the present beach. The dune sand is underlain by beach deposits which consist of shelly and sometimes pebbly sand. South of the area of ridges the land surface is flat and low lying, and previous drilling in this area encountered windblown sand with marine deposits at lower levels.

Rocks of Precambrian age occur around the shoreline at the eastern end of Peggs Beach.

GROUNDWATER

Bores in Precambrian rocks in nearby areas have usually been successful in obtaining water but the installation of such a bore requires a large drill which would be expensive.

Installation of spears in sand is much easier and cheaper to accomplish than drilling a bore in rock. The success of a spear depends on the sand being relatively clay free, otherwise the rate at which water will enter the spear will be greatly reduced. Auger drilling in the eastern area has shown that in addition to there being only relatively small depths of sand, the sand is clayey in some parts. The drilling results (Appendix 1) show that at some locations spears produce worthwhile quantities of water. Because of the variation in the amount of clay in the sand over small

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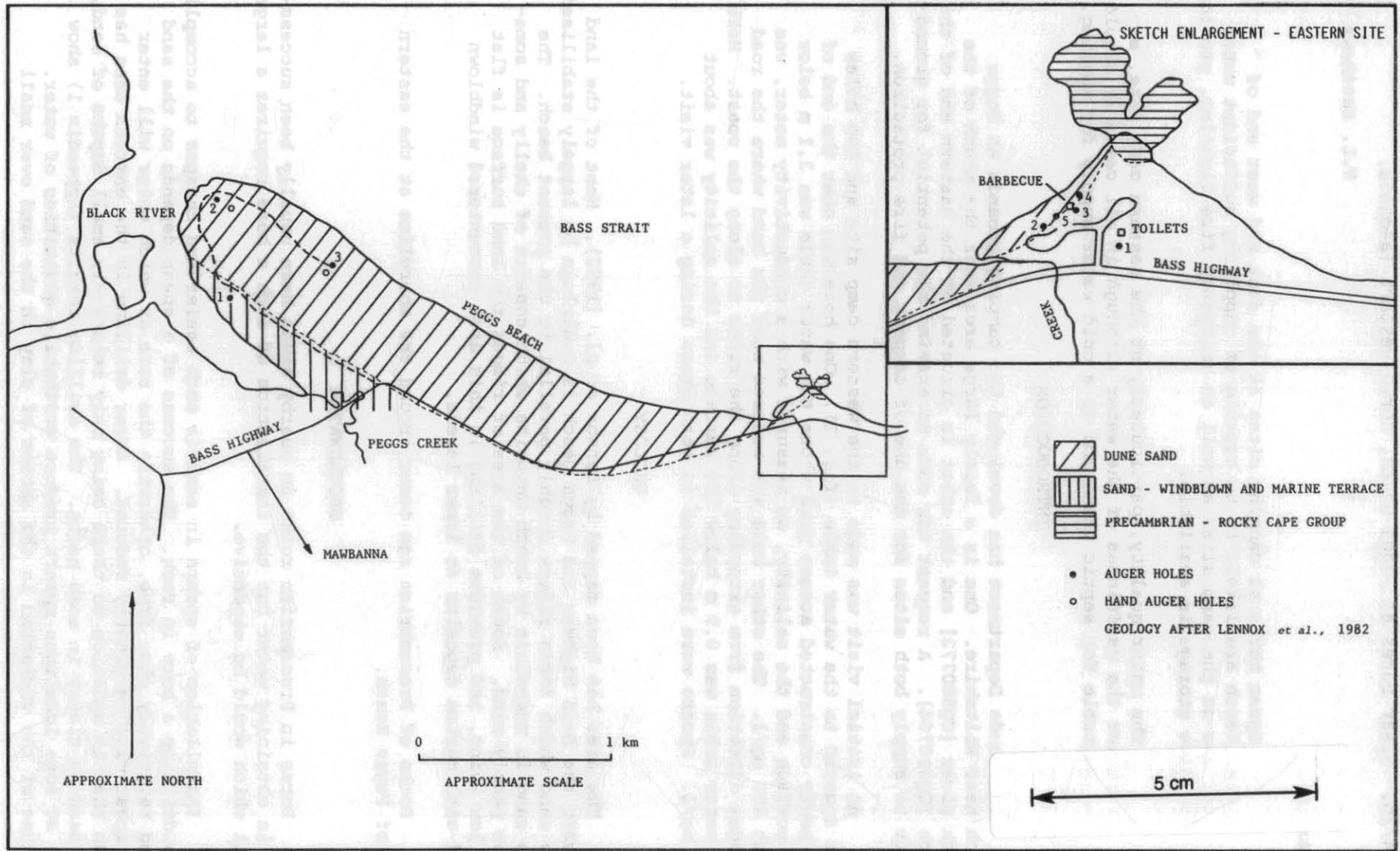


Figure 1. Sketch geology and borehole locations, Peggs Beach camping sites.

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distances, it may not be possible to pump the spears continuously for long periods. The quantities obtained in short pump tests on the two spears which were not removed (10 l/min, 7 l/min) should be sufficient for toilets and most other camping uses.

In the western area, sand and coarse shelly sand without significant amounts of clay were encountered to the depth drilled in each hole. The rate of flow of water to the spear when pumped depends largely on the grain size of the material. Coarse material, including complete shells, was struck in Hole 3 in the western area and this accounts for larger flows obtained during the short pump test. The whole western camping area appears very favourable for the development and use of spear bores as a source of water, the only danger being that if they are installed too close to the estuary or shoreline, saltwater may be obtained. This is not likely to occur in the spears installed at present. The rates pumped (18.2 l/min, 23 l/min and 76 l/min) during the test pumping indicate that there is sufficient water for camping needs. The high rate (76 l/min) may not be maintained for long term pumping but a rate of 45-60 l/min may be possible.

WATER QUALITY

The quality of the water in the eastern area is poorer than that obtained in the western area (Appendix 2). The water from all spears installed should be suitable for septic tank use. As a cold water supply for washing, the hardness values ensure that extra soap will be required to obtain a lather. Some damage to hot water cylinders is likely to occur if water from some of these bores is used for this purpose. The most suited waters for hot water cylinders are from Holes 1 and 2 in the western area. Water from Hole 2 (eastern area) is too saline to be used as a drinking supply and water from Hole 5 is marginal. From the salinity aspect, all three waters from the western area should be suitable for drinking. Although bacterial contamination is unlikely, use of any of the waters as a drinking supply before boiling is not recommended until tests showing the bacterial content to be below the prescribed limits are undertaken.

Because of the variation of the salinity from point to point in the eastern area and the nearness of a small creek which is fairly saline, pumping of either of the spears for long term use may result in a different salt content to that shown in the analyses. Small variations could occur in the western area but they are unlikely to be as marked as in the eastern holes.

CONCLUSIONS

Spears installed at both camping areas should be capable of providing sufficient water for campers and fire protection if surface storage is available.

The water from each spear, if it remains similar to that analysed, should be suitable for most camping uses except perhaps drinking and hot water cylinders for the eastern area bores.

REFERENCE

LENNOX, P.G.; CORBETT, K.D.; BAILLIE, P.W.; CORBETT, E.B.; BROWN, A.V. 1982. Geological atlas 1:50 000 series. Sheet 21 (7916S). Smithton. Department of Mines, Tasmania.

[1 May 1984]

APPENDIX 1

Logs of auger holes

EASTERN END OF BEACH

Hole	Depth (m)	Description
1	0 -1.8	Brown and grey quartz sand
	1.8-2.4	Clayey sand, rock
Further drilling prevented, no water struck.		
2	0 -1.8	Sand, occasional shell
	1.8-2.7	Shelly sand
	2.7-3.4	Gravelly shelly sand, rounded fragments up to 25 mm diameter.
	3.4-	Clay, possibly on top of bedrock.

A 0.6 m long screen was installed (screen opening 0.38 mm) and the spear was pumped at about 10 l/min. Conductivity measurements of the water (3000 $\mu\text{S}/\text{cm}$) suggested about 2100 mg/l total dissolved solids. Standing water level was 1.4 m below the surface. The spear was left in the ground.

3	0 -1.4	Grey-brown sand
	1.4-2.4	Shelly sand, pebbles towards end
	2.4-	Clay

A 0.6 m long screen (opening 0.38 mm) was installed and the spear was pumped at about 2.3 l/min. Conductivity of 900 $\mu\text{S}/\text{cm}$ suggested a total salinity of about 630 mg/l. Standing water level was 1.35 m below the surface. The spear was removed.

4	0 -1.4	Grey-brown sand
	1.4-2.1	Shelly sand
	2.1-3.4	Gravelly clay, clay

Standing water level 1.2 m below surface. No spear was installed because of the expected low yield. Conductivity of water 900 $\mu\text{S}/\text{cm}$.

5	0 -1.8	Light brown sand
	1.8-3.0	Shelly sand, some gravel fragments
	3.0-3.1	Clay

A 0.6 m long screen was installed and the bore was pumped for about 15 minutes at about 7 l/min. The standing water level was 1.5 m below the surface and a conductivity of 700 $\mu\text{S}/\text{cm}$ was recorded. The spear was left in the hole.

WESTERN END OF BEACH

Hole	Depth (m)	Description
1	0 -1.5	Light grey quartz sand, fine-grained
	1.5-3.4	Green, even-grained sand
	3.4-5.2	Mid-grey even-grained sand

A spear with 2 m long screen (opening 0.25 mm) was installed to 5.4 m depth. It was pumped at about 18.2 l/min for about 20 minutes and this drew the

Appendix 1 (continued)

water level to 1.2 m above the bottom of the spear. The standing water level was 2.33 m below the surface and a conductivity measurement on the water was 500 $\mu\text{S}/\text{cm}$ (or about 350 mg/l dissolved solids).

Hole	Depth (m)	Description
2	0 -1.5	Light brown sand
	1.5-3.1	Grey fine sand
	3.1-4.6	Grey sand with shells and shell fragments.

A spear 3.7 m deep was installed using a 0.6 m long screen (opening 0.38 mm). It was pumped at about 23 l/min for about one hour. After this time the water drew down to 1.5 m above the bottom of the hole. At the end of a later pump test at about 28 l/min the water level drew down to one metre above the bottom of the hole. A conductivity of 700 $\mu\text{S}/\text{cm}$ suggests a total salinity of about 490 mg/l.

3	0 -1.5	Fine-grained coffee-brown sand, quartz
	1.5-3.1	Even-grained grey quartz sand
	3.1-4.3	Grey sand, a few shell fragments
	4.3-5.5	Yellow sand, abundant shell fragments, some complete shells up to 30 mm diameter.
	5.5-6.1	Fine-grained quartz sand.

A 0.6 m screen was installed on a spear 4.9 m deep. The hole was pumped at about 76 l/min for about 15 minutes and this drew the water level down to one metre above the bottom of the spear. The standing water level was 2.2 m below the surface and a conductivity measurement of 640 $\mu\text{S}/\text{cm}$ suggested about 450 mg/l total dissolved solids.

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APPENDIX 2

Water analyses, Peggs Beach

Analysis	1	2	3	4	5	6
pH	7.6	7.8	7.7	7.9	7.7	8.3
Conductivity ($\mu\text{S/cm}$)	3850	1160	1500	550	770	690
<i>Item (mg/l)</i>						
CO ₃	nil	nil	nil	nil	nil	nil
HCO ₃	390	370	340	240	350	270
Cl	1080	220	340	70	77	93
SO ₄	115	16.5	72	<5	9.7	18.5
SiO ₂	6.7	10.0	8.6	7.0	5.6	6.0
Ca	230	115	135	68	95	71
Mg	70	18	28	6.1	9.3	6.3
Fe	<0.1	0.2	<0.1	0.5	<0.1	<0.1
Al	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
K	15.0	5.9	8.7	2.1	2.2	1.3
Na	510	120	175	32	50	52
TDS	2560	810	1080	370	480	430
Permanent Hardness	540	52	170	0.8	0	0
Temporary Hardness	320	310	280	195	280	200
Alkalinity	320	310	280	195	290	220

1. Hole 2, east end of beach.
2. Hole 3, east end of beach (hole filled in).
3. Hole 5, east end of beach.
4. Hole 1, west end of beach.
5. Hole 2, west end of beach.
6. Hole 3, west end of beach.

For locations of holes see Figure 1.