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AN OUTLINE OF THE WATER RESOURCES OF CENTRAL AUSTRALIA

by

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Resident Geologists Office, Alice Springs.

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CONTENTS

Geological Map of the Alice Springs Area (1:750,000) (this map will be available in the C.S.I.R.O. Division of Land Research and Regional Survey General Report on the Alice Springs Area, and is not included in this Report).

SUMMARY

Parts of two large simple underground water basins, the Great Artesian Basin and the Barkly Basin, are included in the area. Elsewhere individual aquifers are of limited areal extent, because of stratigraphic and structural complexity. The water table ranges in depth from 0 to 500 feet below the surface of the ground.

Recharge of underground water mainly occurs in these areas of surface flow. Groundwater is lost from the area by evaporation from the salt lake areas and by subsurface flow to the east. The content of dissolved salts in the underground water is variable, but in general the closer a bore is to an area of recharge, the better will be the quality of water obtained from it. With the exception of some shallow soakage waters, there is no sign of depletion of the reserves available for pastoral bores. Detailed investigations would be necessary to estimate the reserves available for specific irrigation projects, both existing and proposed. A qualitative assessment of the underground water resources has been made in terms of 15 Underground Water Provinces.

INTRODUCTION

For the purposes of this Report the area of Central Australia referred to is that which lies between longitudes 130°31'E. and 136°30'E. and between latitudes 20°S. and 26°S. (Plate 1). This report was prepared for inclusion in the "General Report on the Alice Springs Area" by the Division of Land Research and Regional Survey, C.S.I.R.O., Canberra.

Prior to World War II, shallow wells and a small number of bores had been used to supplement the natural waters. Since 1945, there has been a rapid and continuing growth in the number of bores. New pastoral properties are being developed which are dependent on bores for permanent waters. Few bores have been drilled deeper than 600 feet except in the area of the Great Artesian Basin, where several bores have been drilled to 1,000 feet. There are approximately 1,000 pastoral watering points in the area. Assuming that the feeding radius for stock is 3 miles, the area which can be grazed from the existing surface water and bores, allowing for overlap, is about 23,000. square miles.

There are many surface waters in the area, and these are particularly useful in areas where it is difficult to obtain supplies of underground water. They can also be used as supplementary waters to bores.

Underground water conditions in the area are varied, and in many cases, complex. Drilling has shown a relatively wide distribution of useful underground water, although the percentage of successful bores has probably been only of the order of 30 percent. Much information has been collected on the occurrence and salinity of underground water, but quantitative data on reserves are still lacking.

The geological map indicates the areas of outcrop of the main types of aquifers in Central Australia. The existing bores and surface waters are shown in Plate 2, together with form lines on the piezometric surface and the boundaries of the Underground Water Provinces.

SURFACE WATERS

Many of the natural water holes are used to water stock. They are of two types:

(1) Permanent water holes which are part of the main body of ground-water.

(2) Seasonal water holes fed by soakage waters along the main creeks and rivers.

(3) Water holes and clay pans filled by run off.

(1) The permanent water holes are situated at the foot of high sandstone ridges within the Macdonnell Ranges, James and Jervois Ranges. The areas available for stock to graze around them are limited but have a good carrying capacity. These water holes are continuous with the main body of underground water, which is held at or near the surface of the ground by regional aquicludes. The quality of water is good, except in rare cases where it is salty, e.g. the Glen Helen water hole. In this case the salts have been dissolved from the limestones to the north. Tempe Downs Station depends almost entirely on natural waters of this type to water its stock.

(2) Seasonal waterholes occur along the main water-courses for varying periods following rain. Soakage waters in the shallow alluvium provide the supply for these holes. When this supply fails evaporation and consumption dry up the holes, and some but not all turn salty during the process. Important waterholes of this type occur in the beds of the Hugh and Finke Rivers.

(3) There are small depressions, waterholes and claypens on almost all of the pastoral leases. These often hold water for limited periods after rainfall from which there has been run off. These may be useful temporary watering points for stock. In some instances, the storage capacity has been increased by excavation.

In addition to these natural waters artificial storages have been constructed on many properties. These are generally placed in areas where drilling for water has been unsuccessful. The life of these waters depends on their storage capacity, the amount of rainfall and evaporation, the stocking rate, and the quantity of water lost by seepage. A discussion of the optimum size, and some of the factors which should affect the selection of sites for catchment tanks is given elsewhere.

UNDERGROUND WATER

(1) OCCURRENCE

(a) Types of aquifers

Three main types of aquifers are recognised which closely correspond to the following groups of stratigraphic units:

(i) Pre-Upper Proterozoic metamorphic and igneous rocks

(ii) Upper Proterozoic to Middle Palaeozoic sediments, folded and consolidated.

(iii) Permian to Recent sediments, sub-horizontal and unconsolidated.

The surface distribution of each of these groups is known in general, but it is the distribution of the different units below the water table which is significant.

(i) In the metamorphic and igneous rocks, which are pre-Upper Proterozoic in age, the only aquifers are fractured, jointed and weathered zones. In many areas these rocks have not been substantially weathered, and few joints remain open below the water table. Where the Tertiary deep weathering profile is preserved, ground-water prospects may be considerably improved. Drilling in areas of granite has failed to disclose important aquifers in decomposed zones, although they are known to the north near Tennant Creek.

Aquifers in these rocks are generally small, irregular in shape and distribution, and difficult to predict. The quantity of ground-water stored is relatively small, and drilling may be slow and expensive. The quartzites and sandstones of the Hatches Creek Group are rather similar to the younger fractured sandstones in their aquifer properties, in that they could be expected to yield good supplies of good quality water.

(ii) The sediments of Upper Proterozoic to Middle Palaeozoic age are consolidated sandstones, limestones and shales, and except for those in the Barkly Tableland, they have been moderately folded. Although few of the sands remain unconsolidated, many sandstones have a significant interstitial porosity and permeability. The harder sandstones ('quartzites', in local usage) commonly possess a well-developed joint system which may be open below the water table. Some horizons in the limestones have well-developed joint systems or solution cavities. Shales, silty sandstones and silty limestones (e.g. the 'Pertnjara Series' and the 'Sandover Beds') rarely yield useful quantities of ground-water because of their low permeability, even where they have significant porosity.

Aquifers within the sediments of Upper Proterozoic to Palaeozoic age are extensive in area and they store large quantities of readily available ground-water (e.g. the 'Larapintine Series' and the 'Pertaoorrta Series'). Where adequate information is available, individual aquifers can be traced or predicted through large areas. The necessary drilling depth to such aquifers (or the depth at which water will be struck) may also be predicted from the geological structure. However in some areas, e.g. the Missionary Plain, the required depth of drilling is too great to be economic.

(iii) The aquifers of Permian and younger age are flat-lying and, with the exception of the Tertiary and Quaternary limestones, they are generally unconsolidated. In the south-east of the area these sediments form part of the Great Artesian Basin. Here the presence of interconnected aquifers overlain by a regional aquiclude results in extensive sub-artesian and artesian conditions.

Elsewhere the marine and terrestrial sediments occur either as infilling of erosional basins (e.g. the Burt Trough), strike valleys (within the Macdonnell Ranges) or as extensive piedmont-type deposits (e.g. the "Farm Area" at Alice Springs). Deposition of the sediments was controlled by the pre-existing topography. The aquifers are irregular lenses of sand and gravels with variable degrees of interconnection. Regional warping may have been a big factor in the development of some of the larger depressions (e.g. along Karinga Creek and the Burt Trough).

In some areas, e.g. Erldunda and Curtin Springs, the Tertiary lake limestones and the Quaternary groundwater travertine deposits have not been satisfactorily distinguished. Both limestones are very useful aquifers, but salinity and recharge conditions may be different in each case.

The thickness of these sediments may be less than the depth to the water table. This means that aquifers of this age are not as extensive as implied by the area of outcrop and supplies of ground-water in these areas can only be obtained from older underlying rocks. The actual reduction in area is difficult to predict in areas of poor outcrop and where the water table is 200 to 500 feet below the surface of the ground.

Drilling and development problems are not uncommon in 'drift sand' in the alluvium. Improvement in techniques would enable the use of many aquifers at present untouched, and would increase the yield from bores required for irrigation.

(b) The Water Table

The water table (or the surface below which the rock interstices are saturated with water) lies at varying depths below the land surface. This is important because even though a rock may be a good aquifer, in that it has many interstices which will hold water, it must be below the water table before it will actually hold water. The water table form lines shown on Plate indicate that the major topographic relief of the area is reflected in the relief of the water table. The highest points on the water table are in the Macdonnell, Reynolds and Musgrave Ranges, and there is a general fall towards Charlotte Waters in the south-east and towards the Barkly Tableland in the north-east. Movement of ground-water is always toward a lower point. The rate of movement increases as the spacing of the form lines decreases, and this is generally accompanied by a decrease in the salinity of the water.

In hilly areas the depth of the water table below the surface of the ground varies greatly, mainly due to the lesser relief of the water table. A rise in the water table does occur below a hill, but apparently to a lesser degree than would be expected in humid areas under similar geological conditions. A rough correlation can be seen between the average depth to the water table (below the local base level of erosion) and the type of aquifer. The water table is shallowest in and near the salt lakes and within most of the outcrop areas of the Quaternary limestones, usually at a depth of less than 30 feet. In the metamorphic rocks the water table (as represented by a series of standing water levels in discontinuous aquifers) is relatively shallow. Depths greater than 100 feet are uncommon except where the metamorphics have a deep alluvial cover. In the areas of folded sediments the average depth to the water table is somewhat greater, but the actual depths are much more variable because of the influence of large geological structures. The areas of deepest water table are in the elevated margins of the large simple sedimentary basins. In the areas about the Goyder River and to the north-east of the Davenport Ranges, the water table is from 300 to 500 feet below the surface of the ground.

Both free and confined ground-waters are widespread and their areas of distribution commonly overlap. In many cases, particularly in the alluvial aquifers, the presence of confined waters cannot be predicted. The only extensive artesian area is in the extreme south-east of the area, although local artesian conditions occur in other places, e.g. Tuit's bore at Palm Valley. Perched water tables are common, particularly in the alluvium along the major streams. Commonly they are not permanent, but others constantly yield large quantities of good quality water to shallow wells. When the main ground-water is saline, the perched waters may provide supplies of the only useful ground-water available.

(c) Recharge

The recharge of ground-water in the Area comes entirely from the rain falling on the Area or the adjacent ranges. Most of it does not infiltrate immediately below the zone of soil moisture and is thus lost by evaporation and transpiration without adding to the ground-water reserves.

Penetration of water to the water table is, in general, dependent on concentration of water by run-off. The most effective recharge conditions are those, such as at Alice Springs, where run-off from a large hilly catchment area is channelled over a permeable bed with ready access to the water table. A study of the surface drainage system considered in relation to the distribution of aquifers may be expected to indicate the major ground-water recharge zones, as all streams are influent throughout their course.

However, the distribution of low-salinity waters suggests that significant recharge must also occur from local run-off concentrations, e.g. from dune crests to inter-dune depressions. In many cases the low permeability of the floor of the depression will inhibit recharge, but in general sufficient water must be added to maintain ground-water movement in many areas lacking a surface drainage system.

The only quantitative recharge data available is that for the Alice Springs Basin. This indicates that in favourable areas run-off may be in the order of 5 to 10 percent of the total rainfall, but much of this run-off will not be added to the ground-water. In unfavourable areas recharge must then be a very small part of the rainfall. An average recharge rate equal to one percent of rainfall would add some 10^5 million gallons per year to the ground-water stored in the Alice Springs Area. Actual recharge is certainly greatly in excess of current pumping which is in order of 10^3 million gallons per year, as there is no sign of regional depletion.

Recharge is very irregular, as it is dependent on the amount and intensity of rainfall and on the frequency of exceptionally wet periods.

(d) Loss of Ground-water

Ground-water is lost both by sub-surface flow from the area and by evaporation and transpiration. In the eastern half of the Area, the main loss is by subsurface flow towards the Barkly Tableland and the Great Artesian Basin. The water table form lines on the ground-water map (Plate 2) indicate the direction of flow and the extent of the area draining to these areas.

Ground-water loss by evaporation is largely confined to the salt lakes and adjoining areas (see Plate 2). Water table and salinity information show that the near-surface moisture in these lakes is supplied entirely from the ground-water except for short periods after rain. Loss by transpiration is more widespread, but is also confined to areas of relatively shallow water table. No estimate of the relative importance of evaporation and transpiration is possible, but together they account for the greater part of the ground-water loss from the western half of the Alice Springs Area.

The water table is essentially stable and a balance is evident between ground-water recharge and loss. Development of ground-water resources is the substitution of withdrawal for natural loss. The available recharge is the limiting factor in ground-water development, although in many areas withdrawal must be much less than recharge if encroachment of salt water is to be avoided.

(e) Water quality

The groundwater salinity pattern in Central Australia is complex. Contributing factors are the variety of aquifer types and degree of aquifer interconnection, the proportions and solubilities of salts in the rocks, and the relationship of areas of ground-water recharge and loss. In areas with simple stratigraphy, structure and recharge pattern, such as the Cambrian sediments north-east of the Davenport Range, ground-water salinity is relatively uniform. The presence of regional aquifers and good recharge permits the existence of better quality waters throughout this area.

Where aquifers are small and disconnected, with an uneven pattern of recharge and with local areas of evaporation, extreme local variations of salinity occur. In the Alice Springs Town Basin, with an area of only three square miles, the content of total dissolved solids ranges from 70 parts per million to 23,000 parts per million. Similar variations are known in other areas.

In addition to the range in total salinity, there is a wide range in the proportions of different salts in underground water. Certain rock types provide abundant salts to the underground water, e.g. the high sulphate content of the waters of many of the limestones and sandstones in the Amadeus Basin is due to the oxidation of the pyrite in these beds and the shales interbedded with them. The bores at Haast Bluff settlement, drawing from the pyritic Bitter Springs Limestone, were condemned for the high sulphate content (800 parts per million) of water with total dissolved solids of 1,800 parts per million. A high proportion of magnesium appears to be characteristic of water from some metamorphic aquifers. None of the aquifers tapped by bores, all relatively shallow, are believed to retain a major proportion of connate water.

In some areas water of unusual composition can be traced beyond its source. The more saline waters generally move very slowly. The more mobile waters, with lower salinity, are not readily traced back to a particular source bed, largely because of the effects of mixing with the recharge waters. The recharge waters are commonly of low salinity, as all streams are influent throughout their courses and the waters are inland rainwaters which have had little opportunity to dissolve salts from the atmosphere or from the rocks which crop out in the catchment area.

During the movement of water through the aquifers the chemical character of the water may change substantially by ion exchange processes. The changes have not been studied in detail, but the enormous quantities of Quaternary limestone deposited in the area with a shallow water table marginal to the salt lakes indicate the extent of exchange.

In the New Well and Tilmouth Well area on the Burt Plain the better quality water appears to be present as a density layer on the saline water. In other cases, such as Tarlton No. 2 bore, shallow water, which has become saline by evaporation, is separated from underlying good quality water by an impervious bed. In the Henbury-Rodinga area there are many cases of better quality ground-water adjacent to, and possibly overlying, saline ground-water. They appear to be due to more favourable conditions of recharge in small areas. If bores in these areas are over-pumped, the quality of water obtained from them deteriorates rapidly with the encroachment of the main mass of saline ground-water, e.g. Mt. Gloaming bore on Hebury Station.

Pollution of underground water has not been a common problem in Central Australia. In general, the depth to the water table and the low concentration of organic material limit the possibilities of pollution, but some of the shallow soakage waters are polluted by cattle.

(2) RESOURCES

The underground water resources of the area are, in total, more than adequate for likely pastoral development within the area, although locally it may not be possible to obtain a suitable or a sufficient supply of underground water. Where natural surface waters are lacking and conditions unsuitable for surface catchment and storage, the underground water has a special value.

In many areas underground water is suitable for town supplies or irrigation. However, such areas are commonly small and their resources may be limited inrelation to possible requirements. Detailed investigation is necessary before heavy local underground water development can be safely undertaken.

Insufficient basic data on water levels, permeability and recharge has yet been obtained to enable a quantitative assessment of underground water resources. A qualitative assessment can be made using Underground Water Provinces as a basis. Accordingly, the area has been divided into 15 provinces (c.f. Plate 2), and their prominent characteristics are outlined below.

(3) UNDERGROUND WATER PROVINCES

The provinces are defined principally by the types of aquifer present. Some generalisations of both boundaries and characteristics have been necessary. Accordingly some exceptions can always be found to the characteristics attributed to any one province.

Several qualitative terms are used to describe the characteristics of the provinces and arbitrary limits have been assigned to them. The depth to water or the drilling depth is referred to as shallow if it is less than 100 feet, moderate if it is between 100 and 250 feet and deep if it is more than 250 feet. Good quality water contains less than 1,500 parts per million of total dissolved solids, and it is suitable for use in a homestead. A moderate quality water has a content of total dissolved solids between 1,500 and 7,000 parts per million and is suitable for all stock. Above 7,000 parts per million the water is considered to be saline and it may not be suitable for stock.

(i) Davenport Province

Aquifers - Fractured quartzites and volcanics of Lower Proterozoic age in complex structures.

Depth - Water table is at shallow to moderate depth below the local base level of erosion. The depth to water is in part dependent on geological structure.

Salinity - Generally good to moderate but may be saline in areas of sediments of the Warramunga Group.

Resources - Difficult to assess on available information, but may be moderate. Recharge for quartzites aquifers is probably efficient. Availability moderate but commonly confined to topographically inconvenient locations.

(ii) Barkly Province

Aquifers - Fractures and solution cavities in limestone and dolomite and some porous sandstone, all of Cambrian age. The beds dip off the Davenport Range at very low angles.

Depth - The drilling depth and the depth to the water table are both deep.

Salinity - Moderate to good quality water throughout. Approximately 50 percent of the bores produce water which is suitable only for stock.

Resources - Large quantities of ground-water are available throughout except at the margins where basement rocks are present above the water table.

(iii) Wycliffe Province

Aquifers - Unconsolidated sands in alluvium; and Quaternary kunkar.

Depth - The water table is at a shallow to a moderate depth throughout. The depth of drilling is also shallow to moderate.

Salinity - Good to moderate quality water is available throughout most of the province, but the water may be saline to the north-west.

Resources - Moderate to large. Water is available throughout except near the margins of province.

(iv) Sandover Province

Aquifers - Fractured and porous sandstones, limestones and dolomites with fractures and solution cavities. They are of Upper Proterozoic or Palaeozoic age. The geological structures are complex to the south but become more simple to the north. There are areas of sandy alluvium along the main streams.

Depth - The depth to the water table is generally moderate, rarely shallow, in the south, but may be deep in the north-east.

Salinity - Moderate to good quality waters occur throughout.

Resources - Large for most of the area, and water is available throughout except for limited areas underlain by thick shales.

(v) Stirling Province

Aquifers - Porous and fractured Palaeozoic sandstones; Quaternary sands, kunkar and calcrete; and fractured and weathered zones in metamorphic rocks.

Depth - Depth to the water table and the drilling depth are both shallow in areas of Quaternary and metamorphic rocks, but may be moderate to deep in areas of sandstone.

Salinity - Good to moderate quality waters can be obtained from sandstone and kunkar aquifers, but metamorphic aquifers usually yield moderate quality or saline water.

Resources - Variable to moderate in sandstone and kunkar but poor in metamorphics. Availability is good where sandstones and kunkar extend below the water table, elsewhere it is poor.

(vi) Lander Province

Aquifers - Quaternary kunkar and sandy alluvium of doubtful age. Rarely are aquifers found in the weathered and fractured metamorphics.

Depth - The water table is shallow in areas of kunkar; elsewhere it is a shallow to a moderate depth. The depth at which water is struck is variable except in the areas of kunkar where it is shallow.

Salinity - Variable as it is dependent on recharge conditions and the freedom of ground-water movement.

Resources - Moderate to large in the areas of kunkar and 'Deep Alluvium', elsewhere they are small. Water is readily available in areas of kunkar and 'Deep Alluvium', it is difficult to find aquifers in the metamorphic rocks. Little information is available for the western half of the province.

(vii) Plenty Province

Aquifers - Sands in valley fill and piedmont deposits, aquifers can also be found in the small areas of Pleistocene and Tertiary limestones and in weathered zones in the metamorphic rocks.

Depth - The drilling depths are shallow in the areas of limestone, and variable in the areas of 'Deep Alluvium'. The depth to the water table is shallow to moderate, except in areas of 'Deep Alluvium' close to outcrop of the bedrock where it may be deep.

Salinity - Variable, aquifers in the 'Deep Alluvium'yield good quality or saline water. Aquifers in the metamorphic rocks usually contain water of moderate quality.

Resources - Moderate to large in the areas of 'Deep Alluvium' and limestone, elsewhere generally poor. Water is readily available in limestones, but it may be difficult to find aquifers in the metamorphic rocks.

(viii) Coniston Province

Aquifers - Fractured and weathered zones in the metamorphic rocks and sands in small pockets of creek alluvium. The metamorphic aquifers are small and disconnected.

Depth - The depth of the water table and the drilling depth are both commonly shallow.

Salinity - Very variable, depending on local conditions of recharge and ground water circulation.

Resources - Generally small, but are moderate in some larger areas of alluvium. The success rate of drilling is low, and some areas of granite rocks have almost no groundwater prospects.

(ix) Hann Province

Aquifers - Consolidated and folded sandstones and limestones of Upper Proterozoic to Palaeozoic age, sands in the 'Deep Alluvium', and Quaternary kunkar.

Depth - The depth to the water table and the drilling depth are both shallow in the south but they become deeper to the north.

Salinity - Generally good to moderate, but it increases near the salt lake areas.

Resources - Difficult to assess because of the paucity of information, but they appear to be moderate to large for parts of the area. Availability is generally good.

(x) Burt Province

Aquifers - Unconsolidated sands of the 'Deep Alluvium', Quaternary kunkar, and weathered zones in the metamorphic rocks.

Depth - The water table is very shallow near the salt lakes, and it becomes deeper towards the ranges, but it may be shallow along the major streams. The depth at which water will be struck shows a similar relationship but it may be deep near the margins of the province.

Salinity - Good to moderate quality waters are available except in some areas near the salt lakes and in poor recharge areas with metamorphic aquifers, where the water is saline.

Resources - Probably large except in areas of shallow basement. Water is readily available except in the marginal areas/where basement is shallow. /and

(ix) Hermannsburg Province

Aquifers - Consolidated and folded sandstones and limestones of Upper Proterozoic and Palaeozoic age, with pockets of Mesozoic and Quaternary sands. Some areas are underlain by impervious shales which continue to a considerable depth.

Depth - The depth at which water will be struck is dependent on the geological structure. The depth to the water table is largely controlled by the local topography but is generally less than 200 feet.

Salinity - Variable, depending on the extent of recharge and the presence of saline source rocks. In some areas almost all of the aquifers contain saline water.

Resources - Moderate to poor availability of water in the southern portion but it is readily available near the ranges. Large reserves are available in the sandstones and limestones, but the yield is dependent on permeability. The biggest reserves occur in country of poor pastoral potential.

(xii) Macdonnell Province

Aquifers - Fractured and weathered zones in the metamorphic rocks and unconsolidated sands in pockets of alluvium. The metamorphic aquifers are small, disconnected and irregular in distribution.

Depth - The water table is at shallow depths below the local base level of erosion. The depth at which water is struck is also generally shallow.

Salinity - Variable, depending on local recharge. A large quantity of recharge water is available but low permeability and poor interconnection of the aquifers limits intake from run-off water.

Resources - Small except in small alluvial pockets near the margins of the area. Availability is good in these pockets but is poor elsewhere, in part this is because of difficult drilling conditions.

(xiii) Karinga Province

Aquifers - Widespread mesozoic sands with small areas of Tertiary chalcedonic limestone and Quaternary kunkar. There are inliers of Palaeozoic sediments similar to those of the Hermannsburg Province.

Depth - The water table is shallow in the centre of the area but is deeper towards the margins, particularly towards the southern margin. The level of the water does not rise much above the depth at which it is struck.

Salinity - Good to moderate quality water occurs in areas with good recharge and with relatively rapid ground-water movement from the adjoining Kulgera and Macdonnell Provinces. Elsewhere the salinity is high.

Resources - Large except at the margins of the province. Water is not readily available in the marginal areas and some areas appear to have saline water throughout.

(xiv) Kulgera Province

Aquifers - Fractured and weathered zones in granitic and metamorphic rocks. The aquifers are small, disconnected and irregular in distribution.

Depth - Both the depth to the water table and the total depth of the bores are shallow.

Salinity - Extremely variable, depending on the local recharge conditions. There is good concentration of run-off waters but mostly they flow to the adjoining provinces.

Resources - Poor, the success rate of drilling is low, but most areas will yield some useful water. The success rate is slightly better where the Tertiary deep weathering profile is preserved.

(xv) Simpson Province

Aquifers - Unconsolidated sand of Mesozoic and Permian age with some shallow Quaternary aquifers of alluvial origin. The thick sequences of shales which overlie the aquifers are acquicludes and sub-artesian conditions prevail.

Depth - Some shallow perched waters occur along the main water courses, elsewhere the drilling depth is deep to very deep. The standing water level is deep near the western margin of the province, but decreases to the east.

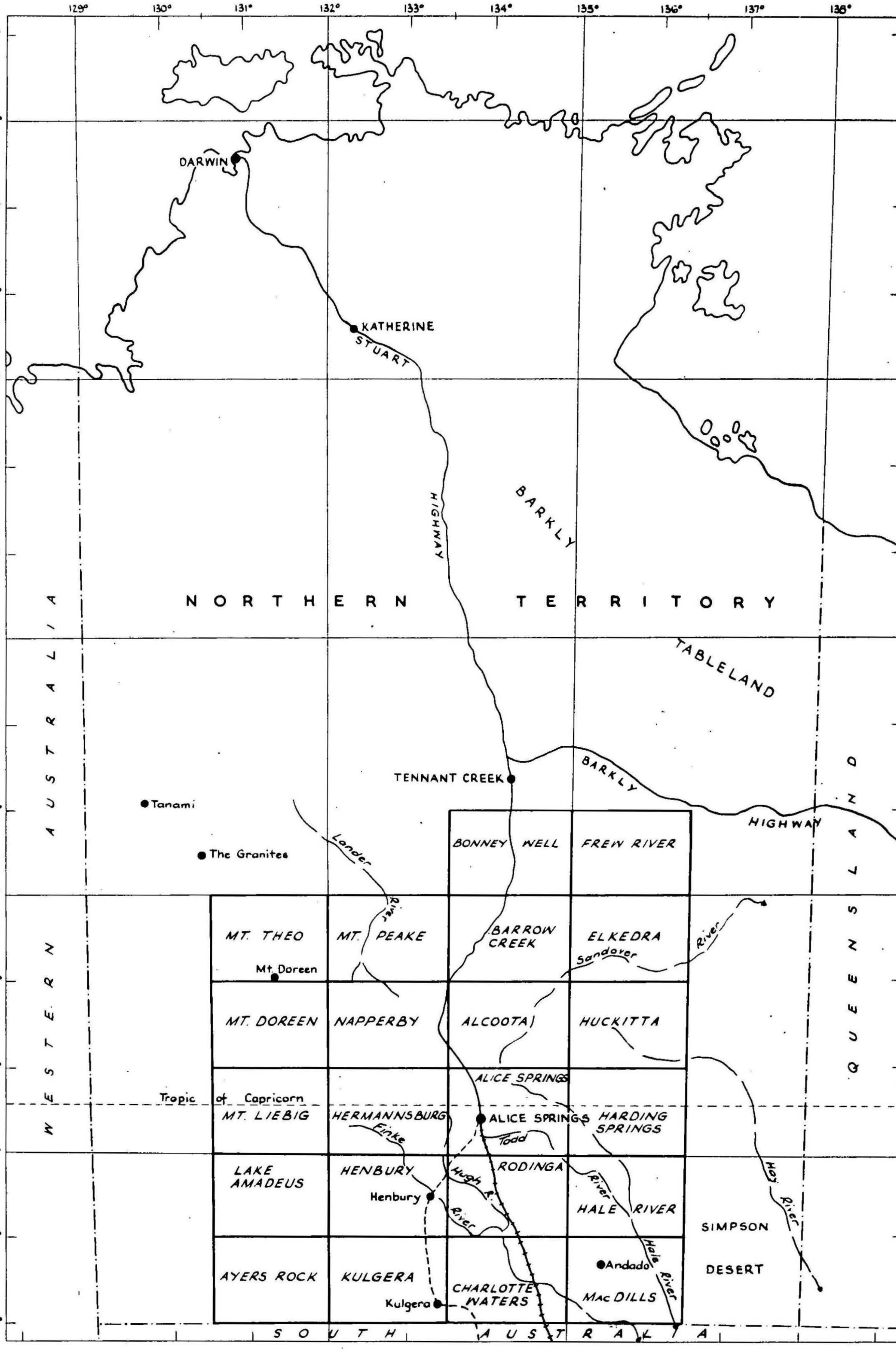
Salinity - The water obtained is of good to moderate quality except in some marginal areas with poor recharge.

Resources - Large in the deeper aquifers. Small supplies only are available from the perched aquifers. Availability is good except near the margins of the province where good aquifers do not occur below the water table.

Investigations of the occurrence of underground water in Central Australia are being continued by the Resident Geologists at Alice Springs. This work will lead to a better understanding of the underground water resources and the distribution of saline water. This information will be of value in the future when boresites are required in areas which, at the present, have poor prospects.

Records 1959/77

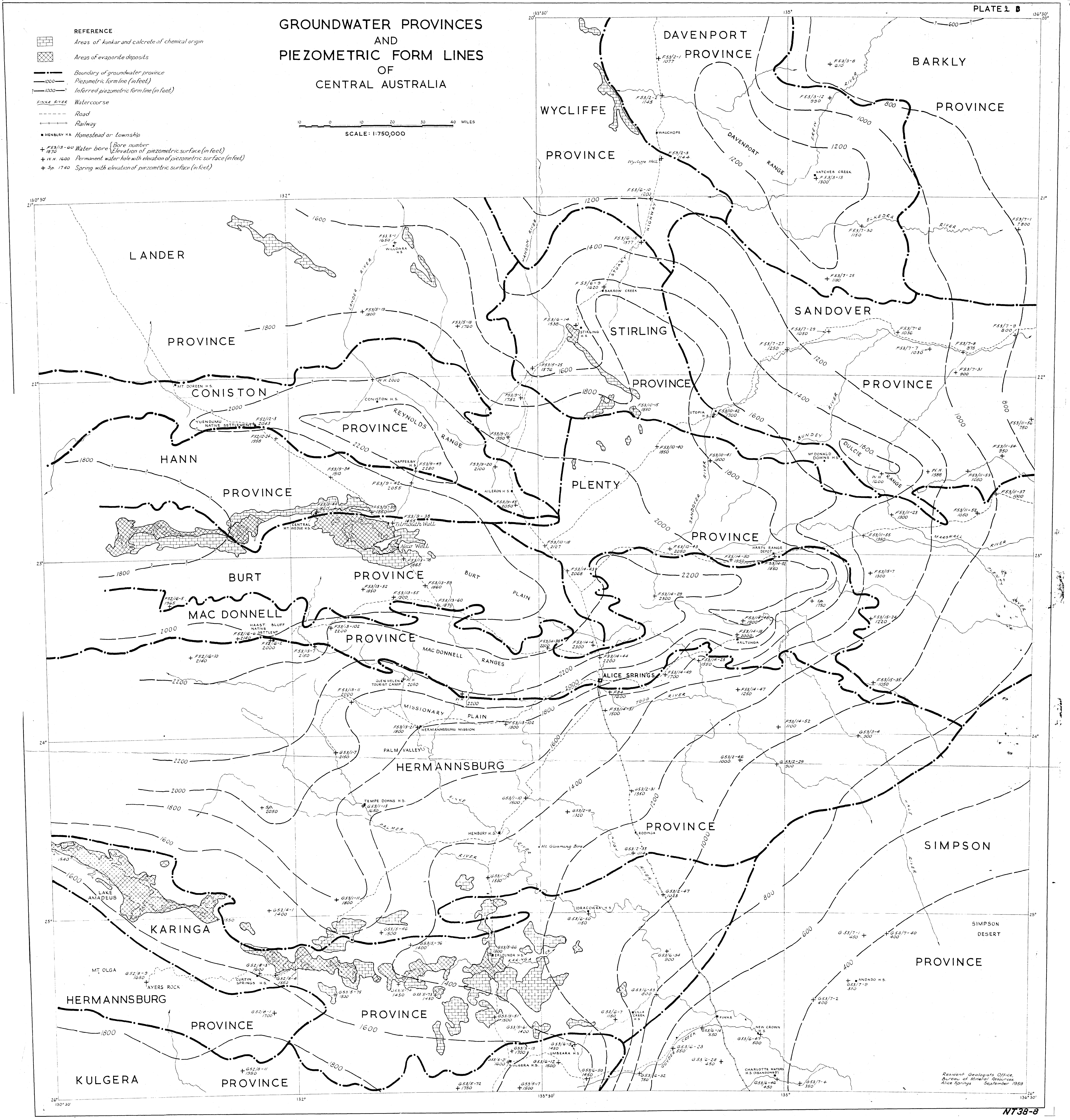
PLATE I



LOCALITY MAP AND INDEX TO 4 MILE SERIES

Resident Geologists Office, Bureau of Mineral Resources, Alice Springs, September 1959.

PLATE 2 B



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