

ANGAS BREMER PROCLAIMED WELLS AREA

MANAGEMENT PLAN

JULY 1992 - JUNE 1997

A BACKGROUND PAPER

B APPENDICIES

C POLICY PAPER

ANGAS BREMER PROCLAIMED WELLS AREA

MANAGEMENT PLAN - JULY 1992 TO JUNE 1997

PART A - BACKGROUND PAPER

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BACKGROUND PAPER

1 STATUS OF THE BASIN

Prior to the commencement of irrigation in this basin, natural recharge to the limestone aquifer occurred along the escarpment to the northwest and through the river beds at a rate sufficient to flush the aquifer and maintain relatively low salinities across an area some 15 km long and 10 km wide. Water from the aquifer discharged through the low lying land to the south of Ballandown Road adjacent to Lake Alexandrina because the pressure head in the aquifer was higher than the ground surface in this area.

Since the start of irrigation using groundwater there has been a marked decrease in the pressure head in the main aquifer and in many areas there has been a substantial increase in salinity of the groundwater. These changes are graphically illustrated by comparing the salinity contour maps drawn in the 1950s and for 1991 (see Appendix 1).

The main points illustrated by these maps are:

- o Water with a salinity of over 5 000 mg/L has moved to within 1 km of the Langhorne Creek township.
- o The area where water with a salinity of less than 2 000 mg/L has decreased from more than 25% of the basin in the 1950s to about 7% in 1991.
- o Groundwater salinities on grazing land to the east of the irrigation area have risen to the extent that the water is no longer usable for stock watering.

These changes have occurred because the volume of water withdrawn for irrigation over the past 3 decades has far exceeded the natural recharge to the basin. As a result of this overuse, the natural through flow of the basin has been stopped and more saline water to the north, west and east has been drawn towards the main irrigation areas where a large cone of depression has developed. This cone of depression has also induced downward leakage from the more saline upper aquifer further increasing salinities in the water used for irrigation.

It is quite evident that unless these changes are reversed, the ground water will continue to become more saline.

UNLESS THE CURRENT OVERUSE OF GROUNDWATER IS STOPPED, THE WATER WILL EVENTUALLY BECOME TOO SALINE FOR MOST CROPS EXCEPT IN THOSE AREAS IMMEDIATELY ADJACENT TO THE RIVERS.

2 LONG TERM PROSPECTS

The long-term sustainability of the Angas Bremer Basin will depend on The significant shift in community attitude to farming in the region. For true sustainability the basin can probably only support irrigation of low water use crops or "top up" and "drought proofing" irrigation. The amount of water available both from the rivers and the groundwater and the rate of flow through the aquifers are such that irrigation of large areas of high water use summer crops is not sustainable.

The changes necessary to return to a sustainable situation cannot occur quickly. Property owners must have time to adjust their operations to the changed circumstances.

However unless these changes are made, the long term prospect will be for irrigation farming activities to be restricted only to those areas where natural and artificial recharge are able to displace the encroaching saline water. This will only occur along narrow strips near the rivers and the lake.

Although this management plan is for the next 5 years the overall vision for the area must encompass a much longer time frame. The individual 5 year management plans should be seen as milestones within the broader vision for the area. Each plan should endeavour to take a step towards the long term vision of sustainable use of the resource although in reality this vision may not be achieved for 20 years or more.

3 THE MANAGEMENT PLAN PROCESS

The problems related to overuse of the groundwater resources were identified several years ago. The area was proclaimed under the Water Resources Act in 1981 and a management plan which came into effect in 1987 was negotiated with the community.

The first management plan for the Angas Bremer Proclaimed Wells Area expired on 30 June 1992. During the life of the plan the policies have had a marked impact on the water balance of the basin by contributing to a substantial decrease in water use from 21 050 ML in 1985/86 to 10 896 ML in 1990/91. Over the same period licence entitlements have fallen from 29 611 ML to 19 524 ML. However, potential still exists for a substantial increase in water use within the existing licence entitlement. The amount of water artificially recharged through both private and government wells has risen from 173 ML to up to 1 362 ML.

A new plan is required to direct the management of this important resource for the next 5 years_ The Angas Bremer Water Resources Committee is charged with the responsibility of overseeing the development of the new plan taking into account the desires of the local community.

Many issues and policy alternatives were explored by the Committee during the course of preparing a revised policy document. These issues included many raised by the local community both in written submissions and at a public meeting in April 1991. The main issues considered were:

- Whether the existing policies need to be changed,
- Alternative water allocation policies,
- Charging mechanisms to modify water use and recharge,
- Licence buy back schemes,
- A wide range of alternative transfer and recharge policies,
- Community pipelines from Lake Alexandrina for both irrigation and recharge,
- Community based recharge schemes to provide a hydraulic barrier against the inflow of saline water along the margins of the basin,

- Community based land management initiatives to improve irrigation efficiency and to reduce the impact of salinisation and rising watertables, ,
- Community based management of the area.

However the first issue to be addressed was a statement of objectives for the new plan.

4 OBJECTIVE FOR A NEW REGIONAL MANAGEMENT PLAN

The successful implementation of a revised management plan will depend on there being an identifiable objective to which the irrigation community can relate.

It is evident that a "do nothing" option is totally unacceptable to the local community because of the problem of increasing salinity.

The only way the basin can remain a sustainable irrigation area in the long term will be for the rate of extraction of groundwater to be kept below the total recharge to allow the reinstatement of a flushing flow through the basin to prevent a continuing build up of salts. This can only be achieved by reducing the amount of water extracted for irrigation, by increasing the recharge or by a combination of these.

Unfortunately even if this was achieved immediately the basin would not return to its former condition quickly and may never completely recover. It is also recognised that if the main part of the basin is allowed to recover, some smaller areas will suffer from a rise in watertable which may prevent certain farming activities. This would be no different to the situation that occurred prior to irrigation in this area as it would be an expression of the through flow in the basin.

However as agreed at the public meeting held in April 1991, it is necessary for the overall good of the basin and the existing irrigators to at least arrest the current decline in water quality and if possible to improve the situation.

It is recognised that the community must be given time to adjust to changed circumstances and it is considered that the most appropriate objective for the management plan for the next 5 years is:

TO ACHIEVE A BALANCE BETWEEN GROUNDWATER EXTRACTED FOR IRRIGATION AND THE NATURAL AND ARTIFICIAL RECHARGE TO THE BASIN.

5 IMPLICATIONS OF THE OBJECTIVE

If the objective is met the current decline in water quality should be slowed but it must be recognised that some farming operations will still be affected as more saline water continues to move into the main irrigation areas and some areas will suffer from a rise in watertable which may affect farm operations. However this rise in watertable will only be a return to the pre irrigation conditions and changes in land management to minimise these impacts will be encouraged.

The best estimate of the natural recharge to the basin is between 4 000 and 5 000 ML per annum which is supplemented by artificial recharge of about 1 300 ML. A conservative

estimate of 4 000 ML for natural recharge is used throughout this document. Thus the current use of groundwater (about 11 000 ML) exceeds the total amount of recharge (natural + artificial = 5 300 ML) by about 5 700 ML.

For the objective to be met it will be necessary to introduce decisive, innovative and far reaching policies which will, of necessity, affect the operations of every licensee.

As no one policy can achieve the necessary nett reduction in water usage without extreme hardship, a broad range of policies needs to be put into place to provide alternative courses of action for individual irrigators. However the final outcome and the degree of hardship suffered by farmers will depend on community acceptance of the plan and cooperation to spread the impact of the policies equitably.

6 NEW MANAGEMENT PLAN

As mentioned previously a wide range of options have been investigated by the Committee. The options are discussed below and policy statements to implement those options considered the most effective and appropriate for the Angas Bremer area have been prepared. These policy statements are contained in the attached Policy Document.

The various policy alternatives have been considered keeping in mind the need to protect the existing irrigators in the most equitable manner possible by providing alternative courses of action to achieve a sustained reduction in nett water use and by introducing change in a staged manner to allow irrigators time to adjust within their own specific circumstances.

The attached policy document sets a strategy to achieve the stated objective concentrating on the following primary directions:

- Reducing the risk of an increase in water use within the existing policies by reducing the total licence allocation.
 - o Encouraging irrigators to transfer licences to another location within the River Murray Proclaimed Watercourse.
- Encouraging licensees to increase the amount of artificial recharge.
 - o Promoting conservation of water through improved irrigation practices and farm management.
- Promoting land management techniques to minimise the impacts of rising water tables in the area near Lake Alexandrina.
 - o Promoting research into the sources of salinity affecting the Bremer catchment and methods to minimise the salinity of winter runoff that affects the viability of both natural and artificial recharge.
- Promoting moves towards locally based management of the resource.

These policy directions have been identified as the most effective and equitable in attaining the objective of balancing water use with recharge.

Estimates have been made of the potential impact of the policy options as part of this assessment and the policies put forward have been framed with specific targets in mind. The overall outcome of the implementation of these policies is predicted to result in a balance between recharge and groundwater extraction. The targets for the individual policies are set out in appendix 3.

7 POLICY OPTIONS

All policy options considered by the Committee are discussed below. Many are considered inappropriate for the Angas Bremer area but the benefits and disadvantages of all options are addressed.

7.1 RETENTION OF THE CURRENT POLICIES

The public meeting held in April 1991 overwhelmingly agreed that revised policies should be put into place. Failure to take action to reverse the current deterioration in water quality will condemn the basin to a rapid decline as a high quality irrigated agricultural area.

It is considered that the option to retain the current policies is not acceptable.

7.2 REALLOCATION OF THE RESOURCE

As mentioned in a written submission to the Committee an effective option for managing water use is to reallocate the available resource. This could be done using a variety of criteria such as a set volume per hectare currently irrigated, volume per hectare of property or a crop area ratio. Reallocation on any one of these proposals would subject the majority of irrigators to a major reduction in entitlement.

It is considered that the disruption caused by reallocating resources outweigh the benefits of immediately achieving the desired objective of reducing water use and this option is not included in the policies proposed for the next 5 years.

7.3 REDUCTION IN LICENCE ENTITLEMENT

The current total licence entitlement for all licences is over 19 000 ML although only 10 896 ML was used for irrigation in 1990/91. While there is a major discrepancy between the allocation and actual use there is the risk that use could increase substantially without any change in policies. This . uncertainty makes it difficult to manage the basin satisfactorily and it is considered essential that this discrepancy is reduced over the life of this management plan..

A reduction in licence entitlement is effectively the only way of reducing this risk with any certainty. A licence reduction is considered to be an essential and equitable approach to managing the resource provided there is some alternative for licensees to adjust their operations to make allowance for the loss in flexibility caused by the reduction. Alternatives are provided by policies such as those which allow for recharge and rollover credits and the transfer policies.

It is recognised that the opportunity to adjust operations varies between irrigators. An immediate across the board reduction in licence entitlement sufficient to remove the uncertainty between allocation and actual use would cause many irrigators extreme hardship.

It is proposed the reduction in licence entitlement should be introduced progressively in the first three years of the plan to allow irrigators time to make other arrangements to minimise the impact of the policy. Most importantly it is considered the policies introducing licence reductions should encourage the adoption of other policies designed to reduce nett water use throughout the basin.

A reduction in licence entitlement is one of the few definite ways of ensuring a permanent reduction in nett groundwater use. If it is apparent that the other policies included in this plan are unlikely to achieve the agreed objective at the end of the 3rd year, a further reduction in licence will have to be considered as an option to meet the required level of water use. The options open to ensure that the objective is met after the third year are discussed further in section 8.

The policies proposed provide for a staged 15% reduction in licence entitlement over the first three years of the plan with the possibility of a further reduction determined by the success or otherwise of policies in achieving the overall objective of the plan.

It is anticipated that the 15% reduction in entitlement will decrease water use by approximately 5% of the current groundwater use or 550 ML.

7.4 LICENCE BUY BACK SCHEMES

A direct option for reducing water use is to establish a licence buy back scheme. Although this option has the advantage of providing an immediate and readily measurable impact on water use it was recognised that the cost implications are significant and currently there is no source of funds to finance such a scheme. If it were to be introduced the funds would have to be raised by the community. This is another option that could be considered after the third year of the plan.

7.5 MOVEMENT OR SALE TO RIVER MURRAY WATER

An agreement was reached during the drafting of the previous management plan that up to 15 000 ML of River Murray water taken from Lake Alexandrina could be used to alleviate the overuse of groundwater in the Angas Bremer basin. This was based on the inflows to the lake from the Angas and Bremer Rivers. As one of the many alternatives adopted to reduce groundwater use, policies in the previous plan provided for transfer of groundwater licence to the lake for use within the Angas Bremer basin.

The effect of this policy has been to encourage licensees near the lake to transfer to River Murray water but it has had little effect on those located more than about 4 km from the lake. This limitation has arisen because of the cost of installing pumping mains and has severely restricted the impact of this policy in the main part of the basin where the overuse is most pronounced. The total amount transferred to River Murray water under the previous policy which ceased operation in June 1991 is about 2 700 ML.

The restrictions on the use of water from Lake Alexandrina have been renegotiated with the River Murray Water Resources Committee and, in a major concession to the Angas Bremer area, it has now been agreed that an Angas Bremer groundwater licence may be moved or sold anywhere on the River Murray Proclaimed Watercourse.

This change will allow Angas Bremer licensees to either move to a location anywhere on the River Murray within South Australia or sell all or part of their groundwater licence to an existing or proposed user of River Murray water. The current value of River Murray water allocations is between about \$300 and \$400 per ML and about 2 000 ML are traded each year. As these licences are traded on the open market the value per ML will be dictated by supply and demand. All movements or sales of entitlements will be subject to the existing policies for the River Murray Proclaimed Watercourse.

An additional benefit" for Angas Bremer licensees will be that proceeds from the sale of groundwater allocations to the River Murray could enable them to finance other measures such as recharge schemes.

It is anticipated that policies encouraging licensees to sell water or move out of the Angas Bremer area will result in a decrease in groundwater extraction of about 2 000 ML over the next 3 years.

7.6 CONVERSION TO RIVER MURRAY WATER WITHIN THE ANGAS BREMER AREA

The policies in the 1987 management plan providing for the . conversion of groundwater licences to River Murray licences were designed to reduce the overall impact of irrigation on the basin. To date this has been moderately successful with approximately 2 700 ML of groundwater, licence being converted to River Murray licence.

Although the adoption of this policy has reduced the overall groundwater use in the basin, it has also led to an increase in nett recharge particularly in the area near Lake Alexandrina which may exacerbate the problem of rising watertable in these areas. The policy expired in June 1991 and it is considered that to avoid the potential problems of rising watertable, any new conversion policy should exclude the areas where a rising watertable is likely to be a problem.

It is anticipated that the new policies addressing these issues will result in a decrease in groundwater extraction of about 750 ML.

7.7 SALE OF PROPERTIES WITH GROUNDWATER LICENCES

Policies in the 1987 management plan applied a 5% reduction in licence entitlement whenever a property with a groundwater irrigation license was sold unless the property was sold to an immediate relative of the existing licensee. The policy aimed to protect the existing irrigators while reducing the total amount of water allocated.

The impact of this policy has been to reduce licence allocations by only 172 ML.

It is considered that the existing policy direction should be continued, however the level of reduction be increased by introducing a sliding scale of reduction based on the size of licence attached to the property being sold. The proposed reduction in allocation ranges from 5% at 0 ML to 15% at 400 ML and above.

It is anticipated that these policies will result in a decrease in groundwater extraction of about 250 ML over the next 5 years.

7.8 TRANSFER OF LICENCES WITHIN THE ANGAS BREMER AREA

As salinities increase around the margins of the basin there will be an increasing tendency for irrigators affected by deteriorating water quality to seek to move licences to the better parts of the basin through transfer or amalgamation. It is considered that this presents an unacceptable situation in a small groundwater basin such as the Angas Bremer and policies should prohibit transfers within the basin.

However transfer policies can be a useful adjunct for managing the distribution of water use and this policy may be reviewed within the life of this plan.

7.9 AMALGAMATION OF LICENCES

Amalgamation of licences on properties has been a common method of maximising the effectiveness of farm operations. Generally this will not exacerbate the situation with regard to salinity or increased water use if properly managed. However amalgamations could be used to transfer water allocations from areas of high salinity to low salinity areas. Thus it is considered that amalgamations should only be permitted under certain conditions and upon receipt of acceptable hydrogeological report .

7.10 RECHARGE POLICIES

Artificial recharge, both controlled and uncontrolled, has long been a feature of irrigated agriculture in the Angas Bremer area. The flood irrigation of vineyards with spring river flows and more recently the use of both private and government bores for artificial recharge have contributed to the recharge of the basin to an increasing degree.

Natural recharge is estimated at 4 000 to 5 000 ML per annum and controlled artificial recharge has contributed approximately 1 000 to 1 300 ML per annum over the past two years.

Although most private artificial recharge to date has been undertaken to improve the salinity of the water used for irrigation by that landowner, increased artificial recharge is one of the few regional options open to improve the management of the basin without reducing the licence entitlement.

However there are limitations and costs associated with increasing recharge. Policies have been developed to encourage private recharge and cooperation between landowners to reduce costs. In addition investigations have been initiated to help overcome some of the limitations such as the availability of suitable water for recharge, the definition of suitable areas for recharge and appropriate guidelines for the construction of recharge wells and supply systems.

A further benefit of artificial recharge targeted to specific areas can be to alleviate some of the more serious problems identified in relation to the rapidly increasing salinity in some key areas by establishing a hydraulic barrier.. The need for local or regional hydraulic barriers to address specific problem areas such as that to the north east of Langhorne Creek and the area near the eastern end of Ballandown Road will be assessed during the life of this plan in consultation with all licensees.

If it is agreed that hydraulic barrier schemes are necessary policies will be developed to promote the design, funding and installation of suitable schemes. The schemes could involve some form of community pipeline either from the Lake Alexandrina or from one of

the rivers but it is recognised that funding predominantly would have to come from the irrigation community.

To date most artificial recharge using river water has been along the Bremer River although this is the less reliable stream with respect to both flow and salinity. There is a need to encourage recharge along the Angas River.

Policies have been developed to facilitate private and cooperative recharge schemes over the next 5 years.

The use of River Murray water for recharge purposes is-, considered a viable option to increase the amount of recharge to the groundwater basin while maximising the use of pipelines from Lake Alexandrina which would normally remain idle throughout the winter.

Limited recharge capabilities exist for the holder of a River Murray licence to use portion of the existing River Murray allocation for recharge purposes on the understanding that such use will be recorded against the allocation and may be charged for if the total use exceeds the licensed allocation.

The feasibility of expanding the use of River Murray water for recharge will be investigated further in consultation with the River Murray Water Resources Committee and options for greater use of that resource may be introduced in the future.

The target for private recharge is to increase the current rate of about 1 300 ML per annum to 3 300 ML.

7.11 POLICIES PROMOTING CONSERVATION OF WATER

Reductions in licence entitlement over the past 5 years, along with other financial pressures, have had a significant impact on the efficiency of water use in the area, with the introduction of dripper and centre pivot irrigation systems becoming widespread. However there are many other avenues that have not been explored to any significant degree and further improvements can still be made in irrigation practices, crop management and crop type.

It is inappropriate to compel irrigators to use particular practices however it is in their best interest to maximise the efficiency of water application and crop management. The main policy to promote careful use of water has been the rollover credit policy. Although this type of policy is appropriate it needs to be supported by extension information and demonstrations of improved irrigation and crop management practices and improved crop types. The policies covering all of these issues have been developed to apply for the next 5 years. It is not possible to estimate the potential impact of these policies.

7.12 LAND MANAGEMENT POLICIES

Improved land management can mitigate many problems facing the Angas Bremer area. Issues such as dryland salinisation and waterlogging due to rising watertables are causing increasing concern and if the policies in this plan result in a reduction in the cone of depression in the main irrigation area they may exacerbate these problems.

Many changes that have occurred over the past few years will assist in the promotion and adoption of land management techniques to reduce the impact of these problems. The

establishment of a soil Conservation Board for the Fleurieu Peninsula, the appointment of a Landcare officer in the Department of Agriculture at Victor Harbor and the availability of assistance for land management from sources such as Landcare and the Murray Darling Basin Commission will help the Angas Bremer community in adopting land management initiatives to reduce the impact of these problems.

One of the major issues facing the Angas Bremer region is the level of salinity in water flowing down the Angas and Bremer Rivers from the upstream catchments and this problem cannot be remedied by action within the basin.

Preliminary investigations in the Bremer catchment have indicated that there is no single source of this increased salinity and that the only way to resolve the problem is on a "total catchment management" basis where the myriad of small sources of salt and other pollution are addressed.

Obviously policies in this management plan cannot directly influence or enforce action on these issues but they can provide the best climate for the adoption of relevant land management and community action to reduce these impacts. Policies have been prepared to encourage community based action to address these issues and to ensure that the relevant investigations are undertaken to allow the best course of action to be decided.

7.13 POLICIES PROMOTING SELF MANAGEMENT

Management of the Angas Bremer Basin by a body directly appointed by the community is recognised as the most efficient long term mechanism for protecting and allocating the available resources. It is anticipated that the Angas Bremer community will gradually adopt policies towards this long term aim.

However there are many issues to be addressed before self management can be implemented. These include such aspects as establishing minimum requirements for meter reading, meter maintenance and recharge facilities and establishing the administrative framework for setting and collecting meter rents, meter reading fees and licence fees.

A partial self management scheme would be beneficial in helping to resolve some of these issues and it is suggested that the establishment of either a locally operated and funded meter reading service or a board to oversee and monitor all recharge operations would be an attractive half way point in this process.

It is not considered that self management alone will have any significant impact on the quantity of water used but it will ensure that the community becomes more aware and involved in the day to day operation of the basin.

7.14 STOCK SUPPLIES

Concern has been expressed regarding the deterioration in water quality in some areas at the margins of the basin. In certain cases the water is no longer useable even for stock watering.

It is considered that there are adequate alternatives available for farmers in this situation and that no special action needs to be taken. The alternatives available include use of lake

water either directly or for recharge, the use of surface water storages or sourcing water from elsewhere on the property where the water salinity is acceptable.

7.15 BASIN MANAGEMENT

It is recognised that there are several issues that should be addressed to improve the overall management of the basin. These include issues such as the replacement of meters, monitoring salinity and water level changes in the aquifers, monitoring salinity in the Angas and Bremer Rivers, developing promotional material to explain to irrigators the current state of the basin and to identify and rehabilitate leaky wells where more saline water from the upper aquifer is contaminating the lower aquifer.

Many of these issues will be dealt with in the course of routine investigations by the various agencies assisting the Water Resources Committee. However it is considered that specific policies should be included in the plan to address the issues of river water salinity, promotion of water local resources issues and public involvement.

7.16 COMMUNITY PIPELINES FOR IRRIGATION

The concept of a community funded and operated pipeline to the central basin area to provide River Murray water for irrigation is not considered a viable or necessary option at present. Although it would have the advantage of being available for recharge when not being used for irrigation, the cost of a pipeline sufficient to provide a reasonable amount of irrigation water would be prohibitive. Consideration may have to be given to a community funded pipeline- at a later date if a regional hydraulic barrier is necessary. No policies are proposed addressing this option at present.

8 ACHIEVING THE OBJECTIVE

The policies described above should result in a near balanced situation between groundwater withdrawals and total recharge by the end of the first 3 years of the Plan. However if they are not adopted by the community to the degree predicted there will still be a shortfall between recharge and groundwater use. If the objective of this plan is to be achieved under these circumstances it will be necessary to take definite and positive action to reduce groundwater use immediately.

In this situation there will be very few viable options open and unless the community can provide substantial funds for the introduction of a policy such as a buy back scheme, it is likely that the only alternative will be to introduce an "across the board" reduction in licence entitlement sufficient to attain the objective of a balance between groundwater use and total recharge.

These decisions will have to be made when the situation is reviewed at the end of the third year of this plan. However it must be recognised that unless the whole community has tried to promote and adopt the policies set out in the attached statement in a vigorous and cooperative manner, a much less palatable approach will have to be adopted to ensure that the objective is reached.

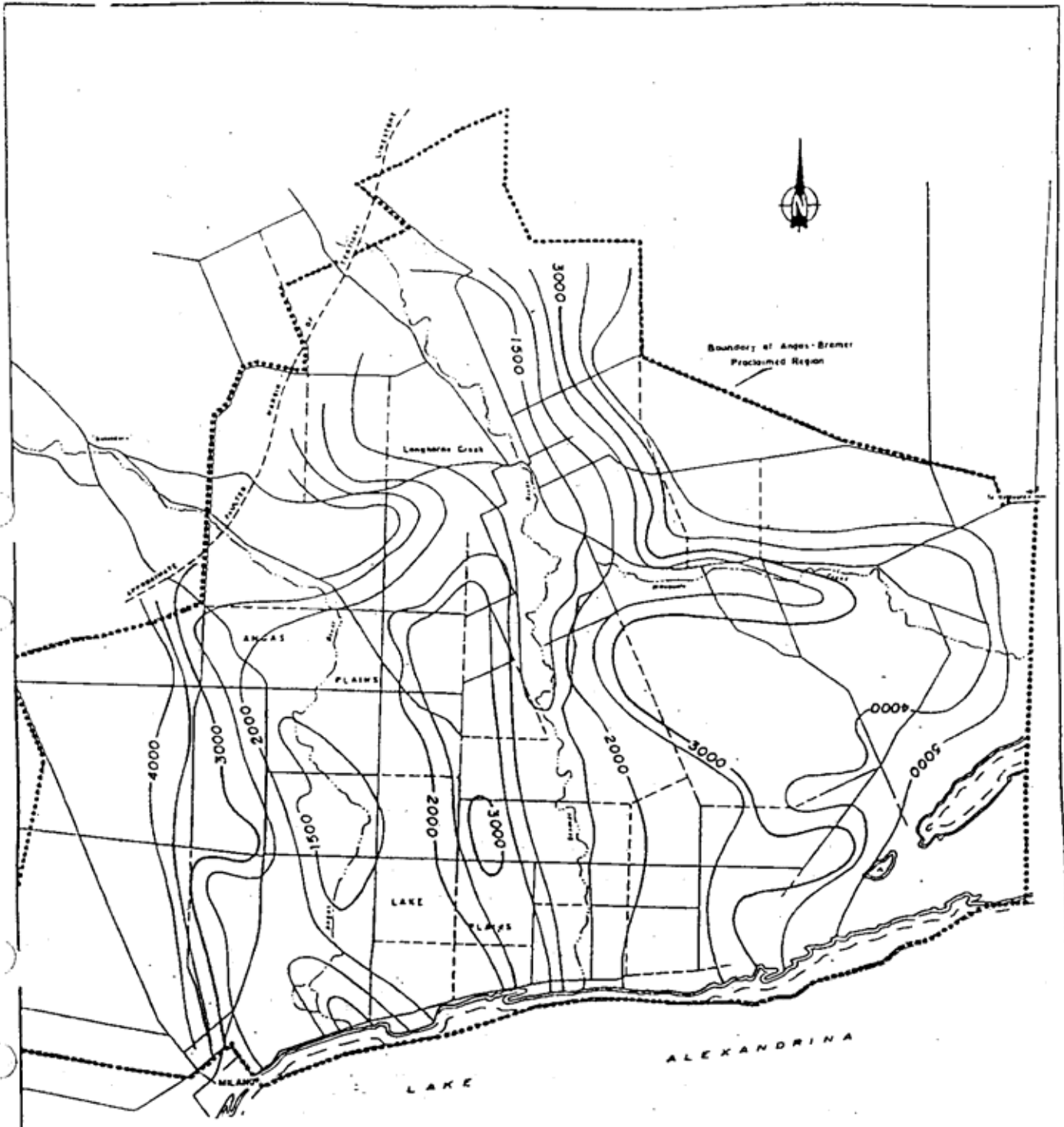
ANGAS BREMER PROCLAIMED WELLS AREA

MANAGEMENT PLAN


JULY 1992 TO JUNE 1997

PART B – APPENDICES

- 1 Maps of Salinity Contours
- 2 Impact of Existing Policies
- 3 Predicted Impact of Proposed Policies

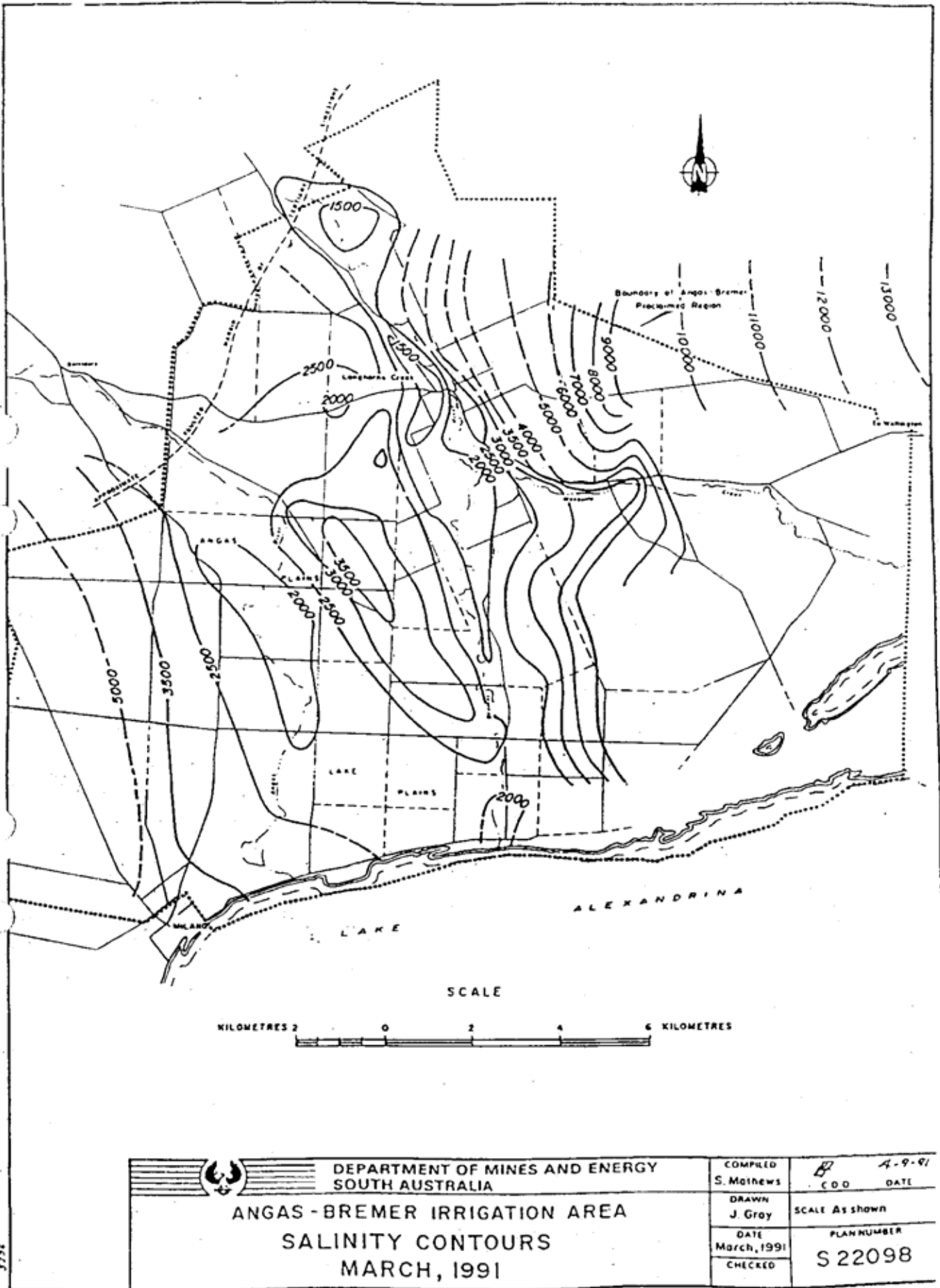



Salinity contour (mg/L TDS).....—2000—

 DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	COMPILED S.H.	C.D.D.	2-9-91 DATE
	DRAWN M.B.	SCALE As shown	
	DATE Sept '91	PLAN NUMBER	
	CHECKED	S22441	

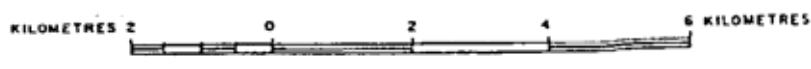
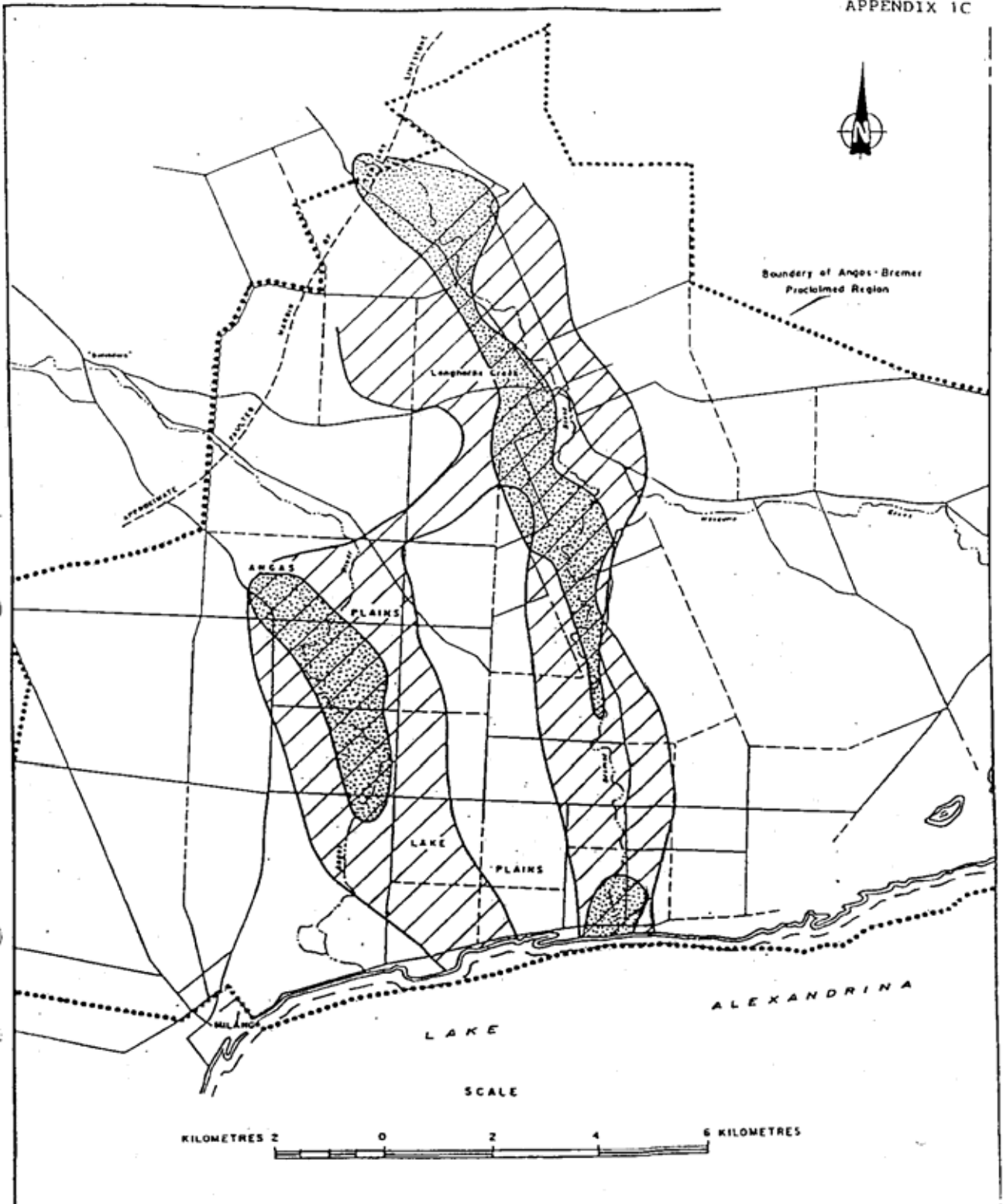
ANGAS-BREMER IRRIGATION AREA
SALINITY CONTOURS
1950's

5426



 DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	COMPILED S. Mathews	4-9-91 C O O DATE
	DRAWN J. Gray	SCALE As shown
	DATE March, 1991	PLAN NUMBER S 22098
	CHECKED	

3736



Area with groundwater salinity less than 2000mg/l (confined aquifer)

1950's 1991

5296



DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

ANGAS - BREMER IRRIGATION AREA
2000mg/l SALINITY DISTRIBUTION
CONFINED AQUIFER
1950's - 1991

COMPILED X.P.S.	C.D.O.	DATE
DRAWN J.G.	SCALE As shown	
DATE Sept, 1991	PLAN NUMBER	
CHECKED	S 22452	

APPENDIX 2

DATA RELATING TO THE IMPACT OF THE POLICIES IN THE 1987 MANAGEMENT PLAN

1 TOTAL USE COMPARED WITH ALLOCATION

YEAR	ALLOCATION (ML)		USE (ML)		% USED
1985.86	29	611	21	050	71.1
1986.87	29	611	20	079	67.8
1987.88	25	025	12	141	48.5
1988.89	21	234	15	175	71.5
1989.90	19	525	11	491	58.8
1990.91	19	525	10	896	55.8

2 RECHARGE TO THE GROUNDWATER BASIN

YEAR	RECHARGE (ML)						
1985		173					
1986		409					
1987		570					
1988		552	(50% of	248	ML claimed	as	credit)
1989	1	362	(50% of	816	ML claimed	as	credit)
1990	1	025	(50% of	595	ML claimed	as	credit)
1991	1	069					

3 LOSS OF ENTITLEMENT DUE TO TRANSFER OF OWNERSHIP

Total allocation returned to Minister after property transfer since the commencement of the plan = 172 ML

4 CONVERSIONS TO RIVER MURRAY WATER

Total allocation converted to River Murray to January 1991 = 1 830 ML
 Additional allocation approved for transfer = 915 ML

PREDICTED IMPACT OF PROPOSED POLICIES

Current Use Approximately	11 000 ML
Predicted-reduction due to 15% reduction	550 ML
Predicted reduction due to movements out of basin	2 000 ML
Predicted reduction due to conversions to lake water	750 ML
Predicted reduction due to transfer of ownership	250 ML

PREDICTED USE BY 1995.96 7 450 ML

Natural recharge 4 000 ML

Current artificial recharge 1 200 ML

Predicted increase in artificial recharge 2 000 ML

PREDICTED NETT RECHARGE BY 1995.96 7 200 ML

NOTE: The estimate of natural recharge based on the best available information is between 4 000 and 5 000 ML per annum. However throughout this document a conservative value of 4 000 ML is used as the prescribed value. This estimate will be reviewed along with all other aspects of the performance of the basin at the end of the third year of the operation of this management plan.

ANGAS BREMER PROCLAIMED WELLS AREA
MANAGEMENT PLAN
JULY 1992 TO JUNE 1997
PART C - POLICY DOCUMENT

ANGAS BREMER PROCLAIMED WELLS AREA
MANAGEMENT PLAN - JULY 1992 TO JUNE 1997
PART C - POLICY DOCUMENT

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POLICY DOCUMENT

1 OBJECTIVE

the agreed objective for the management plan for the next 5 years is:

TO ACHIEVE A BALANCE BETWEEN:

- THE GROUNDWATER EXTRACTED FOR IRRIGATION AND
- THE NATURAL AND ARTIFICIAL RECHARGE TO THE BASIN.

2. POLICY STATEMENTS

The following policy statements are explained in the Discussion Paper.

These policies should be viewed as the means of implementing a comprehensive plan of action to resolve the issues affecting the long term sustainability of the basin. As such individual policies should not be taken out of context but rather should be read as one facet of the overall plan.

2.1 REDUCTION IN LICENCE ENTITLEMENT

- There will be a 15% reduction in the basic 1991.92 water entitlement on all groundwater licences. The reduction will be spread equally over the first 3 years of the operation of this plan at 5% per year commencing with the 1992.93 licence.
- At the end of the third year of this management plan there will be a review of water use, licence allocation, the total amount of artificial recharge and the general performance of the basin. Options will then be re-assessed and it is possible that a further reduction in licence entitlement will be necessary to achieve a balance between water use and total recharge (natural + artificial).

2.2 MOVEMENT OR SALE TO RIVER MURRAY WATER

- During the period 1 July 1992 to 30 June 1996 inclusive licensees may move or sell their groundwater entitlement, or portion of their entitlement, elsewhere within the River Murray Proclaimed Watercourse.
- After 30 June 1996 no further movement or sale of water entitlement to the River Murray Proclaimed Watercourse will be granted.
- Within the period July 1992 to 30 June 1995 a licensee may move or sell all or portion of a groundwater entitlement to a property on the River Murray at a rate equal to the water allocation applicable to the groundwater licence in 1986.87.
- Where portion of a groundwater entitlement is to be moved or sold the amount of water available as a River Murray entitlement will be calculated as an equivalent percentage of the total groundwater allocation existing during the pre-review (1986/87) licence year. For example:

Groundwater allocation during 1986.87 = 200 ML
Groundwater allocation for 1992.93 = 100 ML

50 ML or 50% of groundwater allocation to be retained therefore 50% of licensed allocation to be moved or sold.

Amount of water available for a River Murray entitlement = 50% of 200 ML (86.87 groundwater allocation) or 100 ML

Groundwater allocation = 50 ML
River Murray allocation = 100 ML

- During the 1995.96 licence year the water allocation available for movement or sale as a River Murray entitlement will only be that amount endorsed on the Angas Bremer groundwater licence at the time of transfer.
- Any remaining groundwater allocation endorsed on a licence is subject to the reductions detailed in this plan.
- Water entitlements moved or sold as River Murray water entitlements are not subject to any reduction under the policies approved for the Angas Bremer Proclaimed Wells Area.
- Angas Bremer licences already converted to River Murray licences under the previous management plan may also be moved or sold along the River Murray Proclaimed Watercourse at the amount of allocation currently licensed.
- All movements, or sales will be subject to the policies applying to the River Murray Proclaimed Watercourse.
- A maximum of 15 000 ML of River Murray water is available as a replacement for groundwater.

2.3 CONVERSIONS TO RIVER MURRAY WATER WITHIN THE ANGAS BREMER AREA

o During the period 1 July 1992 to 30 June 1996 licensees may convert their groundwater entitlement, or portion of their entitlement, to River Murray water subject to the following:

The water is used on a property within the Angas Bremer Proclaimed Area.

Within the period July 1992 to 30 June 1995 the amount available for conversion to River Murray water will equal the 1986.87 Angas Bremer groundwater licence entitlement.

During the 1995.96 licence year the water allocation available for conversion as a River Murray entitlement will only be that amount endorsed on the Angas Bremer groundwater licence at the time of transfer.

- After 30 June 1996 no further conversions to River Murray water will be granted.
- Applications to convert groundwater entitlements to River Murray entitlements for use on land north of Ballandown Road will be approved without hydrogeological assessment.

- For the area south of Ballandown Road, conversion to River Murray water will only be allowed if a satisfactory hydrogeological report is received which indicates that the conversion will not exacerbate problems of rising watertable, salinisation or waterlogging.
- Where only a portion of the groundwater entitlement is to be converted the amount of water available as a River Murray entitlement will be calculated in the same manner as shown in Section 2.2 of this plan.
- The remaining groundwater allocation endorsed on a licence is subject to the reductions detailed in this plan.
- All licences or part licences converted to the River Murray will be subject to the policies applying to River Murray licences.

2.4 SALE OF PROPERTIES WITH GROUNDWATER LICENCES

- Whenever a property with a groundwater irrigation licence is sold there will be a reduction in the groundwater entitlement based on a sliding scale from 5% at 0 ML to 15% at 400 ML and above licence allocation (see diagram attached).
- If a licensed property is subdivided the existing groundwater allocation may be divided on the basis of a satisfactory hydrogeological report indicating that the division will not adversely affect the groundwater basin.

2.5 TRANSFER OF LICENCES WITHIN THE ANGAS BREMER AREA

- There will be no provision for the transfer of groundwater licences from one property to another within the basin for the period of this management plan.

2.6 AMALGAMATION OF LICENCES

- There will be no provision for amalgamation of licences within the basin other than licences held by one licensee and only if the amalgamation is supported by a hydrogeological report which indicates that there will not be any significant detrimental impact on the basin.

2.7 RECHARGE POLICIES FOR WATER TAKEN FROM THE ANGAS AND BREMER RIVERS

- Licensees undertaking controlled recharge of suitable water from either the Angas or Bremer Rivers will be eligible for a credit on their groundwater licence entitlement equal to 50% of the amount recharged subject to certain conditions.
- A recharge credit can be carried over for a maximum of 3 years and will not affect any other credits. There will be no limit to the size of the recharge credit granted within these criteria.
- The recharge credit can only be claimed if the volume of recharge is measured using an approved meter and pipework arrangement and if the water used for recharge has a

salinity less than the groundwater salinity at the site of recharge and in all circumstances is less than 1 500 mg/L.

- Any additional meter readings necessary to define the amount of recharge will be undertaken at the irrigators expense.
- A land owner may obtain a groundwater irrigation licence by recharging from either the Angas or Bremer Rivers to gain a recharge credit. However the licence gained will have a base entitlement of zero.
- Recharge credits cannot be sold or transferred from one property to another. However when a property is sold any recharge credits will be transferred to the new owner.
- The availability of water from the Angas and Bremer Rivers and the impact of upstream recharge operations on downstream users will be monitored and assessments made. If necessary, controls will be put in place under the Water Resources Act to ensure the available resources are equitably shared.

2.8 RECHARGE POLICIES FOR WATER TAKEN FROM THE RIVER MURRAY

- The feasibility of expanding the use of River Murray water for recharge purposes is being investigated and further options for its use may be introduced in the future.

2.9 POLICIES PROMOTING CONSERVATION OF WATER

- A licensee will be credited with 50% of the basic groundwater licence entitlement not used in the previous year. This "rollover" credit will be cumulative on a 3 year rolling basis but will be limited to a maximum of 30% of the current base licence entitlement.
 - This provision is not applicable to licences transferred to the River Murray.
 - The rollover credit cannot be transferred or sold and cannot be amalgamated with another licence or used on any other property. However when a property is sold any rollover credits will be transferred to the new owner.
 - For the purposes of calculating credits, water consumption will be assessed first against the base entitlement followed by any rollover credit and any recharge credit in that order.
 - Where an irrigator uses in excess of the total groundwater licence entitlement (base entitlement + rollover credit + recharge credit), excess water will be charged at the current metropolitan water rate.
 - River Murray licences will be charged for excess consumption over the base water entitlement at the rates payable under River Murray policies.
- o The Angas Bremer Water Resources Committee will actively support and promote extension and demonstration programs to assist the implementation of improved irrigation and crop management practices.

2.10 METERS

- Provision will be made for licensees to have the option of either purchasing or continuing to rent irrigation meters. This will include the setting of performance criteria for meters to ensure that irrigators meet the basic requirements for monitoring water use.
- The responsibility for ensuring that a meter is accurately recording consumption remains with the licensee at all times. Where a meter is not recording or it is believed that it has not been recording an estimate will be made of consumption based on factors such as electricity usage, the area of crop irrigated and rainfall during the irrigation season. Excess charges can be levied on the basis of such an estimate.

2.11 LAND MANAGEMENT POLICIES

- The Angas Bremer Water Resources Committee will support moves to establish community-based self help groups to address the issues of rising watertable and dryland salinisation.
- The Committee will lobby for the establishment of a broad ranging investigation into integrated catchment management in the Bremer River catchment to address the issue of increased salinity. A variety of funding sources will be approached including the Murray Darling Basin Commission, the Land and Water Resources Research and Development Corporation and the National Soil Conservation Program.

2.12 BASIN MANAGEMENT POLICIES

- The Angas Bremer Water Resources Committee will monitor the total usage and commitment to River Murray and lake water to ensure that the agreed allowance of 15 000 ML is not exceeded. If the commitment to river water approaches this level it will be necessary to stop all further conversion or transfer schemes.
 - Investigations will be carried out into the variation in salinity in both the Bremer and Angas Rivers and a more extensive and streamlined system developed and implemented for notifying irrigators of stream salinity.
- o Regular promotion of information and factors affecting irrigators will be provided through a variety of channels as a first step towards upgrading community involvement in decision making in the basin.

2.13 SELF MANAGEMENT POLICIES

- The Angas Bremer Water Resources Committee will explore opportunities for the progressive introduction of self management of the basin with the aim of moving to full self management at the start of the next management plan.
- The need for, and level of licence fees, resource charges or, water use charges that would be necessary for self management will be investigated by the Committee and reported to the community.
- The feasibility of establishing a locally based recharge board to manage community and cooperative recharge schemes as a first step towards self management will be investigated by the Committee and a report prepared for community consideration.

- The feasibility of financing and establishing a community pipeline from the lake for recharge will be investigated.
- All these investigations will be completed in time to be considered in the review of the basin planned for the third year of operation of this Management Plan.

3 REACHING THE OBJECTIVE

- At the end of the third year of this plan there will be a review of water use, licence allocation, the total amount of artificial recharge and the general performance of the basin in relation to the objective for this plan.
- If the objective has not been achieved or it is apparent that it will not be reached within the life of this plan, options to rapidly reach) the balance between recharge and groundwater use will be reassessed.
- If, to attain this objective, further licence reductions prove necessary they will be introduced on a sliding scale basis related to the total reduction in nett groundwater water use achieved by individual licensees. Factors which would be included in assessing the nett reduction in groundwater use include average recharge achieved and improvements in irrigation efficiency as well as the direct reduction in groundwater extracted. The assessment would be undertaken using the whole period for which records are available.

SCALE OF LICENCE REDUCTION ON SALE

