



A CREATIVE ENGINEERING SOLUTION

SALINITY CRISIS

ACTION PLAN

A CONCEPT TO POWER RURAL RECOVERY

This book was produced and distributed by **DM Civil** as its contribution and commitment to the environment, farmers and rural communities of Western Australia



Peter A. Coyne
David R. Williamson
Jonathon F. Thomas
2002



**Salinity is an insidious creeping cancer
which causes a significant blight
on the landscape and has been
identified by both Federal and State
Governments
as the single biggest
environmental issue facing
Australia today.**

The compilation and publication of this book required an enormous effort from a number of people without whose help this book would not have become a reality.

I gratefully acknowledge and thank:

- David Williamson
- Jonathon Thomas
- Reg Toohey
- Tony Spanjers
- Graeme Campbell
- Damien Demaj and Astrid at Penguin Cartography
- Jenny, Penelope and Peter at ASAP Print
- Avon Lovell
- Jon Warren
- Gordon White
- DOLA

PREFACE

This book serves a number of purposes, providing hope and expectation to farmers and the rural communities of Western Australia that the devastation and losses caused by salinity may be reversed and the land returned to production within the current generation of farmers.

During the three years it has taken to complete the pre-feasibility of this project many engineers, scientists, academics and farmers have expressed the view that for the first time we have a realistic opportunity to provide a 'whole of catchment' approach to dealing with increasing salinity. Agencies charged with the responsibility for salinity and land degradation for many years have been negative in their approach to the fight. Their suggestions included *"no amount of revegetation or engineering solutions would save the upper reaches of the Avon and Blackwood rivers", or "I accept that some of the stream systems in the South West will be irreversibly lost"*.

Other statements sure to cause farmers concern include *"people might have to live with encroaching salt unless farmers could be convinced to move away from traditional practices and the State embark on a massive revegetation program"*. Another has warned *"that between 50 and 60 per cent of farming land could be lost to salinity. He said the widely accepted prediction of 30 per cent was conservative"*. Then added *"I think we have to do our best to control it but to solve it, I'm not sure we can do that."*

Salinity is a commercial and environmental problem requiring a commercial solution. To effect positive, swift and meaningful results, responsibility for action should be transferred to the major stakeholders, including the Shires, farmers, rural residents and businesses in these areas. These people are substantially at risk and have a real and vested interest in any outcomes, in contrast to the salaried position of Government scientific advisers and policy makers.

Political will is the other major area of change needed. Every political party attempting to win office targets salinity and land degradation to win votes. Once the election is over those promises are quickly forgotten. A recent example is the Government's decision to cancel the Matrix car leasing deal at a cost to the State of \$200m plus a potential further tax liability of \$60m. This decision was made because the Matrix deal was costing the State \$2.0m per month. If a quick decision can be made and \$200m found to save \$24m a year in static losses, surely logic would guarantee that the same

Government would find the same amount of money to eradicate the \$300m per year in losses caused by salinity, excluding losses in biodiversity and environmental sustainability. The fact is that, by their own published figures, losses to State infrastructure in roads, buildings etc is \$12m per month or \$150m per year. The other \$150m per year are production losses, but these affect seed and fertiliser merchants, stores, contractors, employees, hotels etc. which in turn affects State and Federal tax receipts.

The ultimate irony in discharging the Matrix liability was the Governments decision to then defer a number of current budget items including the expenditure of \$4.0m earmarked for pilot engineering projects designed to combat salinity.

The State Salinity Strategy released in 2000 was the culmination of 10 years investigation into the problem before deciding on a course of action. In that ten years saline land increased from 1.0m hectares to 2.0m hectares and is forecast to double again in a reasonably short time. Now another new report has recommended the scrapping of the earlier Strategy.

When will Governments ever wake up to these agencies and bureaucrats who continually push for yet more investigation and research. This serves to guarantee their continued employment. It does not develop creative solutions, but perpetuates the culture of salinity management established in the 50's and 60's.

This publication – and all the research, reports and investigations advancing the projects – has been carried out *privately* by competent professional people whose credentials appear in this book. Funding was *privately* sourced with not one cent coming from agency or government sources.

The reports contained within this publication are at arms length and independent and were commissioned so as to obtain an unbiased view of the problem and possible solutions. The authors are named and stand behind their findings and reports. They are not the usual "faceless men," so often encountered.

I urge all readers to come to their own conclusions about the contents, and if satisfied that the proposals are sensible and rational, to communicate those views or concerns to the authors so that a collective, determined and focused voice can be directed to the Government.

Peter Coyne



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© Agri-Tech Hydropower 2002
ISBN 0-9580568-0-3

Published by Agri-Tech Hydropower, 3 Curtin Grove Bentley, WA 6102 Tel: (08) 9258 8188
Email: agritech.hydropower@bigpond.com
Website: www.agritech.hydropower.com

Printed in Australia by ASAP Print & Design, 328 Albany Highway, Victoria Park, WA

The Project

BLACKWOOD RIVER CATCHMENT SALINITY AND HYDRO-ELECTRIC PROJECT

This proposal is borne from the often used expression that 'necessity is the mother of invention'.

Farmers and rural communities can no longer discharge saline groundwater into existing rivers, streams, lakes or watercourses and as a consequence can only watch as the groundwater continues to rise and are powerless to negate the inevitable damage caused.

Our State Government and its agencies continue to promote tree-planting, re-vegetation and farmer education as the tools necessary to fight salinity. If it is so patently clear to them that the water usage and pumping qualities of trees and vegetation will arrest the problem, why do they continually oppose engineering solutions such as aquifer pumping and open drains?



This scheme proposes a system of pumping bores, canals and lateral drains within the Shires of Dumbleyung, Wagin, West Arthur, Woodanilling, Narrogin, Wickepin, Broomehill, Katanning, Kulin, Kojonup, Boyup Brook and Collie. The drainage water will be transferred to the ocean in a main canal with length of approximately 200km.

The purpose of the canal system is to allow groundwater drainage within its proximity and receive water from pumping bores in palaeo-drainage aquifers so as to reduce the water table in that area. An additional series of lateral drains connecting the main canal will also assist in this function and, additionally, allow farmers to discharge their groundwater from distant points.

For most of the canal's journey to the Beaufort River Flats, the water will be a gravity supply. Once at the Flats, the water will be directed west on the contour towards the ocean, to a point on the Darling Scarp just south of the Wellington Dam.

Necessarily, a substantial amount of the canal west of the Beaufort River Flats will have to be concrete-lined to avoid any environmental problems while passing through the Wellington Dam Catchment, or other possibly sensitive areas.

Once at the escarpment, the water will be held in a storage dam of approximately 1,000,000 cubic metre capacity. From there, it will be discharged down the escarpment through penstocks (large pipes) to a hydro-electric generating plant located at the foot of the scarp.

Once the water has been through the power generating turbines, it will continue its journey for a further 20kms before its final discharge to the sea.

On the preliminary work and investigation of the proposal, it has been found that the scheme will remove approximately 400 million cubic metres of saline groundwater per annum at a rate of 12 cubic metres per second and generate between 15-20 megawatts of power (sufficient to supply between 4,500-6,000 homes) annually.

WHAT ARE THE BENEFITS?

- Correction of vast tracts of land lost to salt.
- Ongoing removal of excess saline groundwater to the ocean.
- Reverse the current expansion of salt affected land.
- Complementary to benefits of biological control methods.
- Rapid response time which can encourage application of whole of catchment management of the salinity problem.
- Restoring productivity to previously good agricultural land.
- Restoring confidence in food production on broad acre farms.
- Restoration of economics and environmental benefits to rural communities.
- Jobs during the construction phase and afterwards to maintain the drainage system.
- A clean renewable energy project which will contribute to Western Australia's target of reducing Greenhouse Gas Emissions under the Kyoto Convention.



What can we do?



Digging a lateral drain

WHAT ABOUT AN ENGINEERING SOLUTION?

In the past, engineering solutions have been dismissed as too expensive! Nothing can be too expensive given the rapid degradation of our State's agricultural land and consequent loss of productive capacity.

The community cannot accept that "some of the stream systems in the South West will be irreversibly lost" (Tim McAuliffe, West Australian Newspaper, 15.2.99).

We believe that a drainage system can help revitalise the Upper Blackwood River Catchment. Lake Dumbleyung was previously a pristine freshwater lake, but is now becoming a saltlake with salinity higher than that of seawater.

An extensive canal system would be supplied with water from open drains and pumping bores. It would run from Lake Dumbleyung and the Wagin Lakes and join other canal systems draining saline land in the upper reaches of the Blackwood River. The canals would collect and carry saline water away from these areas and provide an opportunity for effective renovation of previously waterlogged and salt affected land.

From the Beaufort River Flats, the main canal will be directed towards Collie. Once near Collie the water will be transported in lined canals or piped to a point just south of the Wellington Dam where it will be stored in a one million cubic metre dam approximately 220 metres above sea level.

WHAT USE IS SALINE WATER?

The significance of this engineering scheme is the added value component of using the saline water as feedstock for a hydro-electric plant located at the foot of the Darling Scarp. In this context, the saline water has an economic value.

Scientists estimate that this solution will remove approximately 400 million cubic metres of saline water from the Wheatbelt each year over a distance of some 200 kilometres. This, in turn, would ensure an annual generating capacity of between 15-20 megawatts of clean hydro-electric power. That is enough power for 4500-6000 homes for a year! Once this saline water has helped to create electricity, it will be discharged out to sea.



Lake Dumbleyung

Salinity and land degradation have been identified by both State and Federal Governments as the biggest single environmental issue problem facing Australia today.

THE STATISTICS ARE HORRIFYING!

- In Western Australia it is estimated that we are losing 11.4 hectares to salinity every hour. That amounts to 100,000 hectares every year and increasing.
- Over the past ten years the area of land affected by salinity has grown from one million hectares to two million hectares.

WHAT CAN WE DO TO ARREST THIS DEGRADATION?

Salinity is a whole community issue. No one group of people can fight it on their own.

It is too late to apportion blame – what we need is action. Action by governments, communities and individuals.

Tree planting has been put forward as the solution but 60-90% of cleared land must be covered in trees to deal with the water. This is socially and economically unacceptable.



WILL IT WORK?

David Williamson, Salinity Consultant and former Research Scientist with the CSIRO, has reviewed the extensive research done into the salinity problem over the last 50 years. This illustrates that this proposal can work in principle. (See report One)

Johnathon Thomas and David Williamson have studied the economic factors which affect the justification to invest in rehabilitation of saline land using drainage and ocean disposal of drainage water. (See report two) They have found that the restoration of saline land to full agricultural land use provides the economic returns needed to support the implementation of engineering methods.



Encroaching Salinity

WHAT CAN WE DO?

In order for this project to succeed, it requires broad community support. That means:

- individual farmers and catchment groups being willing to commit themselves to this engineering solution on their land and working with their neighbours to ensure maximum effectiveness for drainage and effluent disposal.
- shires and councillors being prepared to promote the benefits of such a scheme to their constituents and committing the necessary resources both in terms of labour and knowledge to the Project Team;
- willingness on the part of State and Federal Governments to support a feasibility study of the use of engineering solutions to rectify and rehabilitate existing salt affected land.

WHERE CAN I GET MORE INFORMATION?

Peter Coyne,
Agritech Hydropower
3 Curtin Grove
Bentley W.A. 6102
Tel: (08) 9258 8188
Fax: (08) 9258 8199
Email: agritech.hydropower@bigpond.com
Web: www.agritech.hydropower.com

Salinity crisis needs bold action

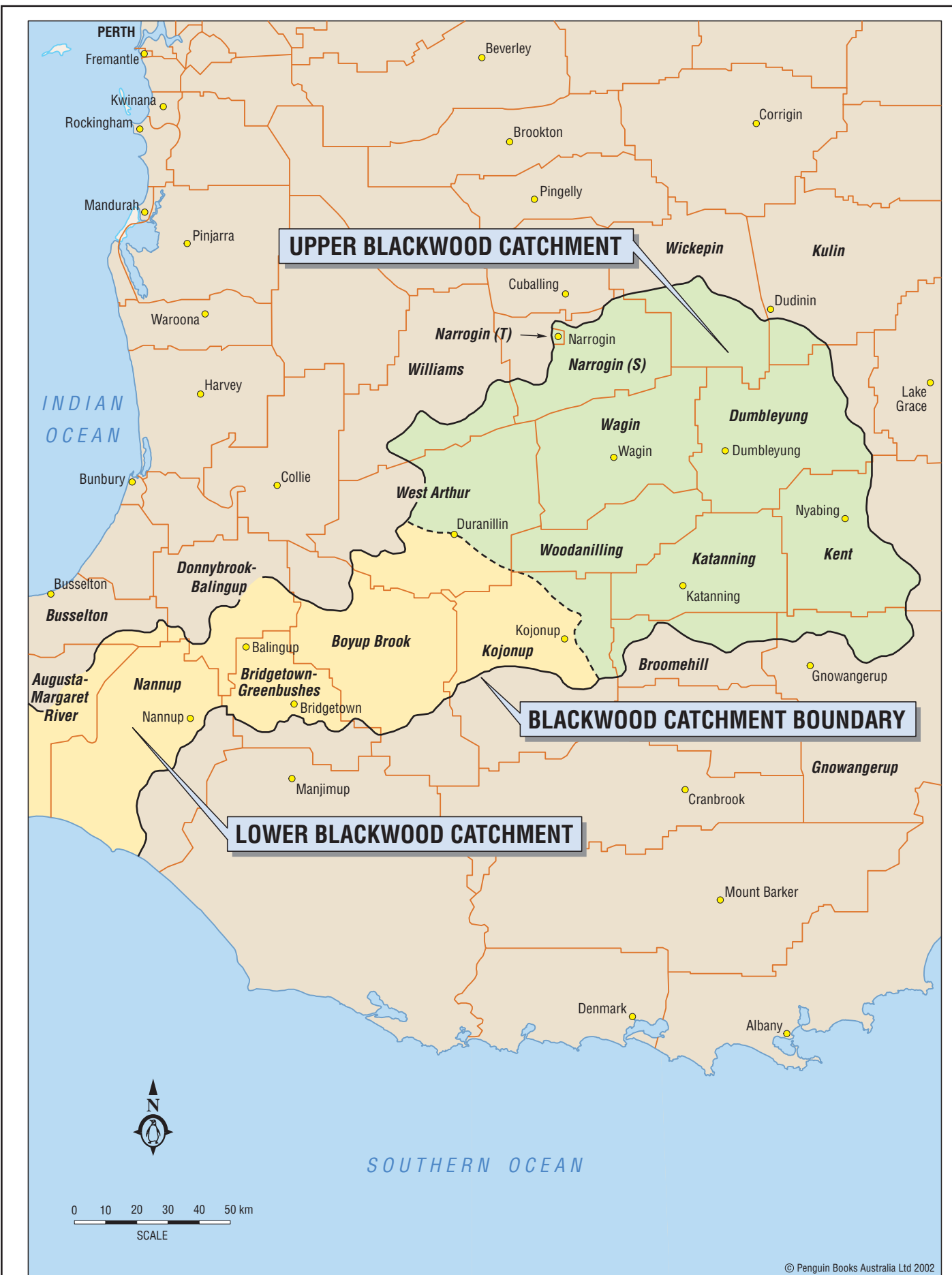
A Recommendation

CUTTING INTO THE SALT PROBLEM

Western Australia's salinity problem is one of the world's great environmental disasters. Solutions to it involve massive reforestation of the Wheatbelt. Peter Coyne's engineering solution is to cut into the centre of the problem and drain out the excess salty water. Like the Dawsville Cut was able to reverse the pollution of the Peel Inlet, this engineering proposal offers the basis of a solution to Western Australia's salinity problem. It does not mean reforestation and other changes to agricultural practise are unnecessary, they are all needed as part of the total solution. But the Coyne Cut is the visionary backbone to reverse the irreversible.

Professor Peter Newman

Murdoch University, July 1999.



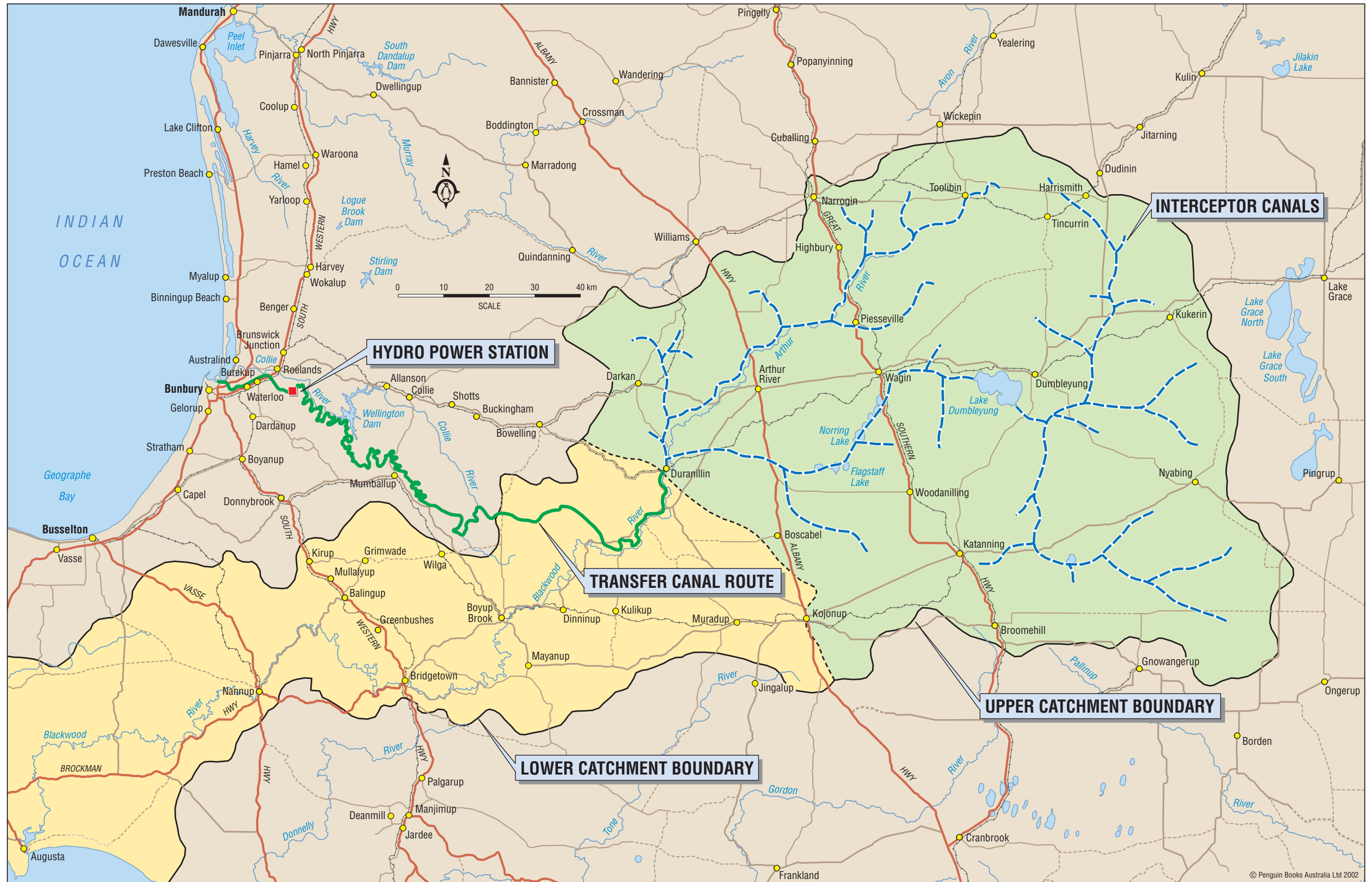
Map 1



**Upper and Lower Blackwood
Catchment showing
Shire Boundaries**

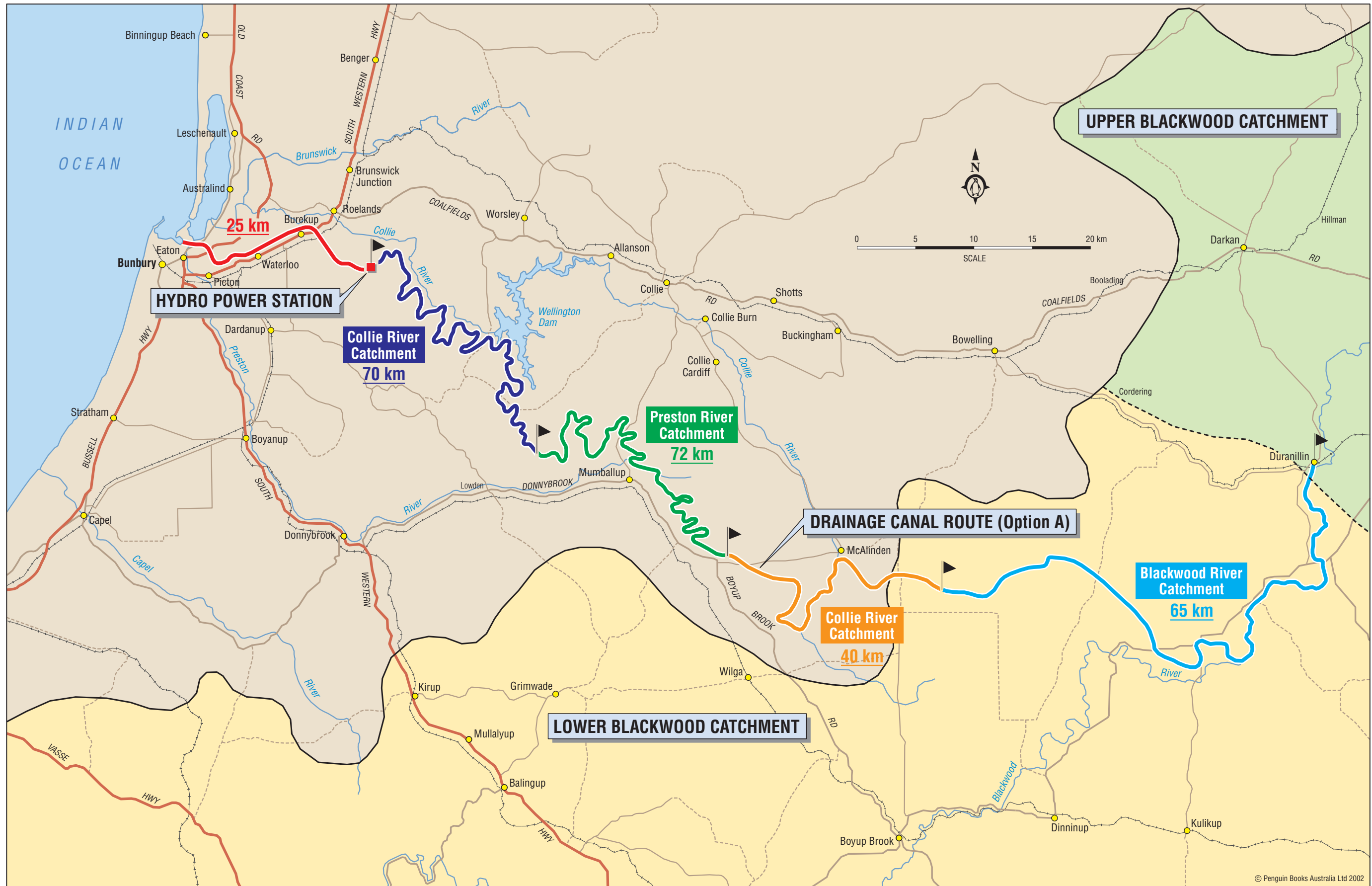


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Map 2



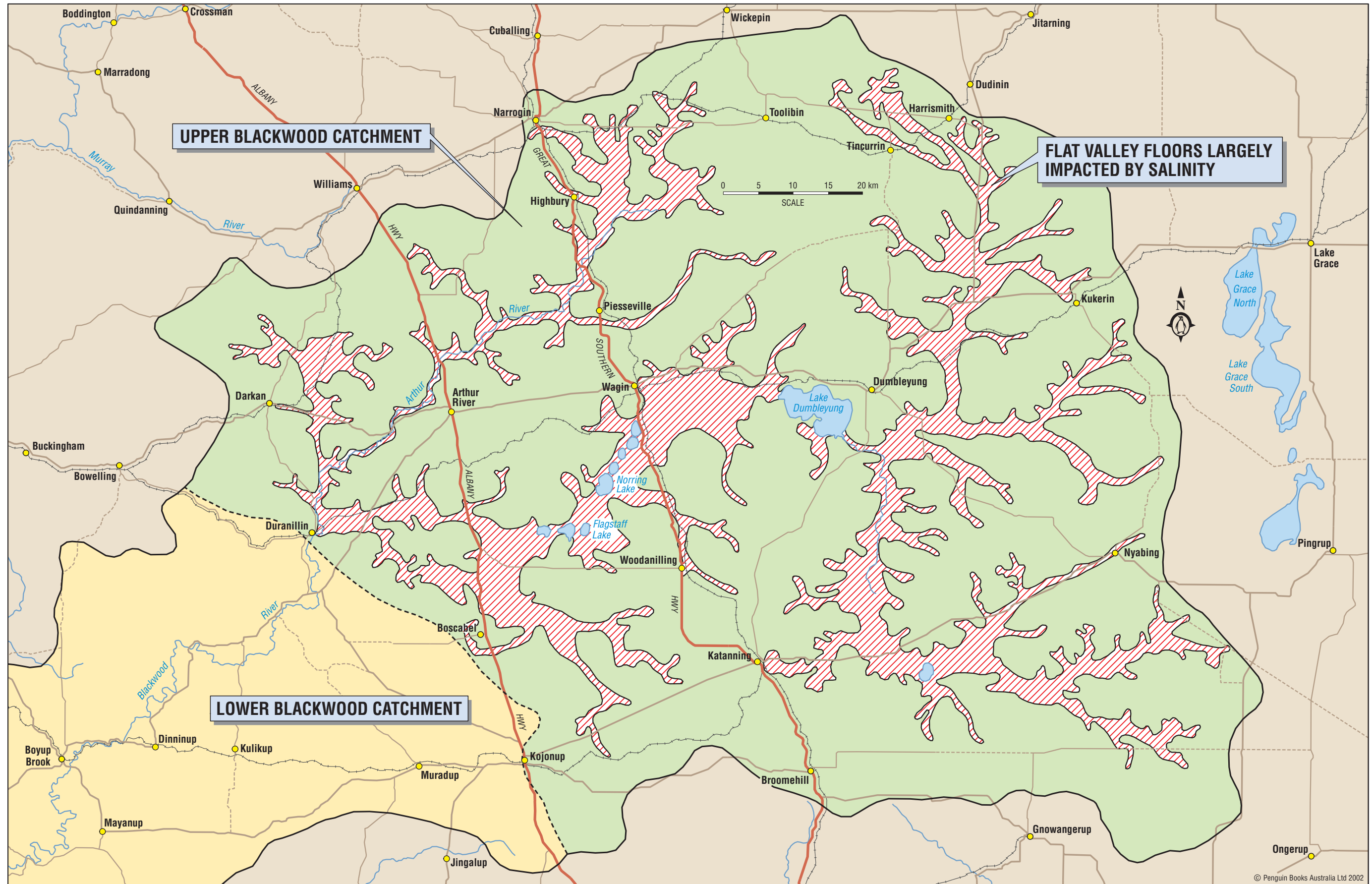
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Map 3



BLACKWOOD SALINITY AND HYDRO PROJECT MAIN TRANSFER CANAL ROUTE





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Map 4



BLACKWOOD SALINITY AND HYDRO PROJECT SALINE VALLEY FLOORS



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