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BLACKWOOD

CATCHMENT

CO-ORDINATING GROUP

Proceedings of the

Blackwood Catchment Drainage Workshop

Katanning, September 1993

Collated by G.J. Parlevliet

Proceedings of the Blackwood Catchment Drainage Workshop

Held at Katanning, Tuesday 14th September 1993

Collated by G.J. Parlevliet

The workshop was organised by the Blackwood Catchment Coordinating Group and the Katanning Land Conservation District Committee to ensure community involvement in the development of policies.

The drainage workshop is the first in a series designed to help the Blackwood Catchment Coordinating Group develop its policies for the Blackwood River System.

The next step, is the development of draft policies and Codes of practice for drainage in the Blackwood River system. These will be circulated to participants as they become available.

Please feel free to provide comment and suggestions on drainage and any other topic that may concern you.

Be assured that any policy adopted by the Blackwood Catchment Co-ordinating Group will have been developed with maximum community participation.

With many thanks

The workshop was organised by a sub-committee consisting of Norm Flugge, Chairman Katanning LCD, Russel Thomson, BCCG, Justin Hardy, Project Officer, NLP, Department of Agriculture, Katanning and Gerry Parlevliet, Adviser, Department of Agriculture, Pinjarra. The assistance of the OIC and staff of the Department of Agriculture, Katanning for handling the registrations and setting up of the venue is acknowledged. The Staff of the Office of Catchment Management contributed in many capacities including mailing out all invitations. Lyn Coleman of the Katanning LCD capably organised catering and ministerial transport.

In particular the speakers are gratefully acknowledged.

The large band of facilitators organised by Justin Hardy and Brian Lloyd allowed the day to achieve its end goal. Without this group the day could not happen. They include Justin Hardy, Brian Lloyd, Steve Garrad, Ned Crossley, Theo Nabben, Margaret Scott, John Montgomery, Carolyn Switzer, Jenny Crisp.

The Chairmanship of the workshop was ably carried out by John Montgomery and his ability to keep the day on schedule was appreciated.

Thanks to the Soil and Land Conservation Council for their support.

David Reid
Chairman

Blackwood Catchment Co-ordinating Group
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Boyup Brook, W.A., 6244

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Blackwood Catchment Drainage Workshop

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Welcome to Blackwood Catchment Drainage Policy Workshop

Bronte Rundle
Katanning Land Conservation District

Thank you Mr. Chairman, Minister Honourable Kevin Minson, distinguished guests, ladies and gentlemen, I would like to welcome you all along today. It is, I consider, a very important and a big day for this Catchment.

Firstly I would like to apologise for Norm Flugge, who is our Chairman for the Katanning LCDC. He is away on a trip which was organised by the Government Department for, I would say, very busy LCD Chairmen and that type of person to visit other states and share their knowledge. He did say that he would be thinking of us. I did offer to take his place, but he thought he would stick with the program the way it was, so that is what is happening.

Today we have eighteen Shires represented, I was just looking at the map and realising how far and how big an area this Blackwood Catchment covers. It has certainly surprised me a little, as I said. I haven't been that greatly involved with this Catchment at this point of time so it's a big job we have ahead of us and I am very hopeful that today we all approach it in a sensible and not a hostile manner.

Those of you that are from the lower portions of the Catchment I guess are feeling that we are dumping all our problems on you, but I tend to think we have all a heap of learning to do. There has been a lot of clearing done up this way, and as time has moved on, a lot of problems have been created, so let's hope at the end of the day we can give some firm direction to other LCD's throughout the state and that something really worthwhile comes out of it.

I don't think I need to say a great deal more, that covers it from my point of view. I feel Katanning has been part of the top, that is where everything begins. We are very pleased that you have chosen this venue in which to host this event, so without any further ado I will hand over to those who will carry on. Thank you.

Opening of the Blackwood Catchment Drainage Policy Workshop

Honourable Kevin Minson, MLA
Minister for the Environment

The Western Australian Government is committed to effective, sustainable development of our land and water resources and protection of the natural environment.

Most of us now recognise that the Western Australian environment has been damaged by human use. Although we did not realise it at the time, widespread clearing over much of the State's agricultural areas has led to a variety of problems. Waterlogging, salt-damaged soils, salt seepages and high salinity levels in streams and rivers (collectively known as sa!inisation) have degraded fertile land and important water resources. Loss of topsoil from wind and water erosion, and other soil conditions including soil compaction, structure decline, acidity and water repellent behaviour are other symptoms of land degradation in rural areas.

Land and water degradation costs the State several hundred million dollars annually. The causes of deterioration are diverse and, although individually these actions may not have much impact, when maintained for several years, they can have substantial and in some instances catastrophic cumulative effects. This has been the case in much of our agricultural area.

Past land-use planning has not always recognised the interdependence between land and water resources because it has been based on artificial administrative boundaries. In reality, most land and water uses are linked within natural boundaries, or catchments. Integrating activities within catchments is usually the most appropriate way of ensuring sensible planning and management by taking a broad systems approach. Sound planning for the future takes account of this broader systems view rather than focusing only on specific issues or parts of systems. It also takes proper account of the competing uses and of the need to take a custodial role in relation to natural resources.

Water is the common link between land uses and parts of the environment. It moves around the landscape and carries with it dissolved materials such as salt and nutrients, as well as particulate matter such as soil.

More effective long term planning and management are needed to ensure that development and use of our resources are compatible with environmental values, economic opportunity, socially responsible individual aspirations and long term community needs.

To date, there has been inadequate opportunity for involvement of the community in the management of natural resources in some areas, including cross links between the various State and local interests In addition, the community consultative processes have been inefficient or inadequate, and in many cases have not represented genuine consultation as the community input has had little or no influence on the agencies carrying out the consultation.

This is about to change. What is needed to work towards the goal of sustainable resource use is a process of community-based integrated catchment planning and review at the

regional level to identify priorities, coordinate activities, involve all land and water managers and users and enable progress to be assessed;incentives that can be applied at the regional level as appropriate to promote sustainable land and water use; state-wide policies to ensure that regional integrated catchment planning takes account of state-wide goals for environmental quality and other factors; and institutional arrangements that support local integrated catchment planning and action, that also take account of state-wide policies for maintaining socially acceptable environmental quality;

Integrated Catchment Management (ICM) provides a means for dealing with complex environmental issues and of delivering long term development and resource protection in the local and regional context. It is about community leading and government providing support to find an equitable balance between development and the environment at the catchment level. I want to see the BCCG used as the prime conduit for bringing your identified needs to government and to see clear demands being made for technical and financial assistance in addressing the priority land use problems.

Sustainable management of WA's natural resources - land, water and vegetation - is vital for the future of this State. It depends on private and public landholders looking after their land with a long term perspective and working with their community and government agencies to foster the productive capacity of these resources without causing their degradation.

To do this, people need to work together to identify the causes and effects, develop preventative or remedial actions and initiate and sustain these actions in the long term (in some cases in excess of 100 years). It is important that this work is soundly based, as I am concerned that large amounts of money have been wasted on poorly devised schemes, as well as by focusing only on a single problem issue (such as salinity) without consideration of other effects.

Efficient management of these resources also requires a coordinated effort by all those responsible for their management within a region, particularly within a water catchment area, so that the interactions between the resources are taken into account.

ICM provides a two pronged approach to planning and management. It takes a preventative, proactive approach of "anticipate and prevent", as well as a rehabilitation or "react and cure" approach to fixing existing environmental problems.

Integrated catchment management helps to coordinate diverse and inter-related interests and activities at a regional and local level, based on natural geographic units. The opportunity is there for landowners and the general community to be active and drive the process. The Catchment Coordinating Groups, such as the Blackwood Catchment Coordinating Group, can develop ICM strategies, and, supported by government agencies and landholders, can coordinate development of action plans, policies and activities at the local level. They can improve communication between landowners and the various management groups, for example by organising workshops such as this to encourage local people to identify issues and community needs. They can also secure funding and other resources. Support schemes and incentives are needed to help farmers and all members of the community to become actively involved in integrated catchment management and to carry out remedial works on their land.

The community's desire for custodial care for natural resources will carry a financial cost. Cost sharing arrangements need to be worked out, as it is not reasonable to expect a landholder to pay entirely for fixing past land degradation for the benefit of future generations without some general community assistance in doing so. The farmer currently suffering from over clearing and other agricultural problems is not necessarily the one responsible for carrying out that work and in many cases their land was cleared by a completely different family.

It is Government policy to fix the Blackwood. One of the mechanisms being used is the Blackwood Catchment Coordinating Group which is community owned and driven. One of this group's roles is to maintain contact with community and Landcare groups to foster interaction to ensure that all interests are considered and to communicate this information to me. Only then can I ensure that the state coordinating group (the ICMCG) is addressing the real community concerns and has the right agenda.

Government needs to know what the community sees as being priorities in the Blackwood, both at a local and a catchment-wide level. Then I can ensure that the government agencies are coordinated by the state coordinating forum, or ICMCG, to deliver the technical services and support needed to address your priorities.

Through developing local direction and strategies to reclaim water quality in the Blackwood, Government agencies can assist you in developing action plans and by delivering their part of the action - in other words, government agencies will be working in support of the community providing a public service!

I see good environmental care, delivered at the community level, as an important part of my role as Minister for the Environment. I am also looking for community-developed environmental policies.

This drainage workshop is innovative and is the first of a number planned over the next few months on issues already identified as vital by the community.

I am aware that the BCCG's next workshop will be looking at river and foreshore management and riverine vegetation issues, and clearly there is an important link with drainage for salinity. Like many aspects of manipulating our ecosystems, it is unfortunate that there is an associated environmental cost attached to the activity as that saline water drainage results in degradation of water courses, riverine habitats and vegetation, which can lead to severe erosion and additional salinisation downstream.

All rivers in the wheatbelt are now salinised, some so severely that they are now little more than drains themselves.

The solutions to these issues involve the community and government agencies working together in partnership and this is why I am so keen on ICM. ICM offers the best chance we have got of addressing our land and water degradation issues and to plan for a secure future, in an open, socially responsible and equitable way.

The community as the main landholders has the greatest stake in identifying the problem areas and implementing solutions. Government agencies should have the technical expertise to work with Catchment Coordinating Groups to develop suitable action plans.

These action plans include the excellent subcatchment and farm planning work already being done by the farming community but also include consideration of where properties sit in the context of the whole catchment.

The idea of thinking globally, act locally is particularly relevant to ICM think in terms of the whole catchment - look at the overall strategies for the whole catchment and develop approaches to act locally on your properties at the local level.

The Blackwood Catchment Coordinating Group is an important pilot group for testing out the ICM approach in WA. Other States have already made it a success and it is very important indeed that we achieve success here also. Another aspect is that I am looking at the restructuring of several agencies so that they can deliver a better community service and meet your requirements for technical advice and support to meet your needs.

The Blackwood approach epitomises the essential coming together of Landcare and the broader community through ICM and a whole catchment approach, to achieve sustainable land use.

I wish you a successful first workshop and look forward to seeing the outcomes, which as a farmer myself, I know will be useful and relevant.

Drainage in the Blackwood River Catchment

Gerry J. Parlevliet
Department of Agriculture
Pinjarra, WA.

The Statistics

The Blackwood River System is one of the larger river systems in the south west of the State. It extends from Nyabing and Kulin to Augusta. The catchment areas is 28,000 square kilometres and stretches over 300 kilometres from south west to north east.

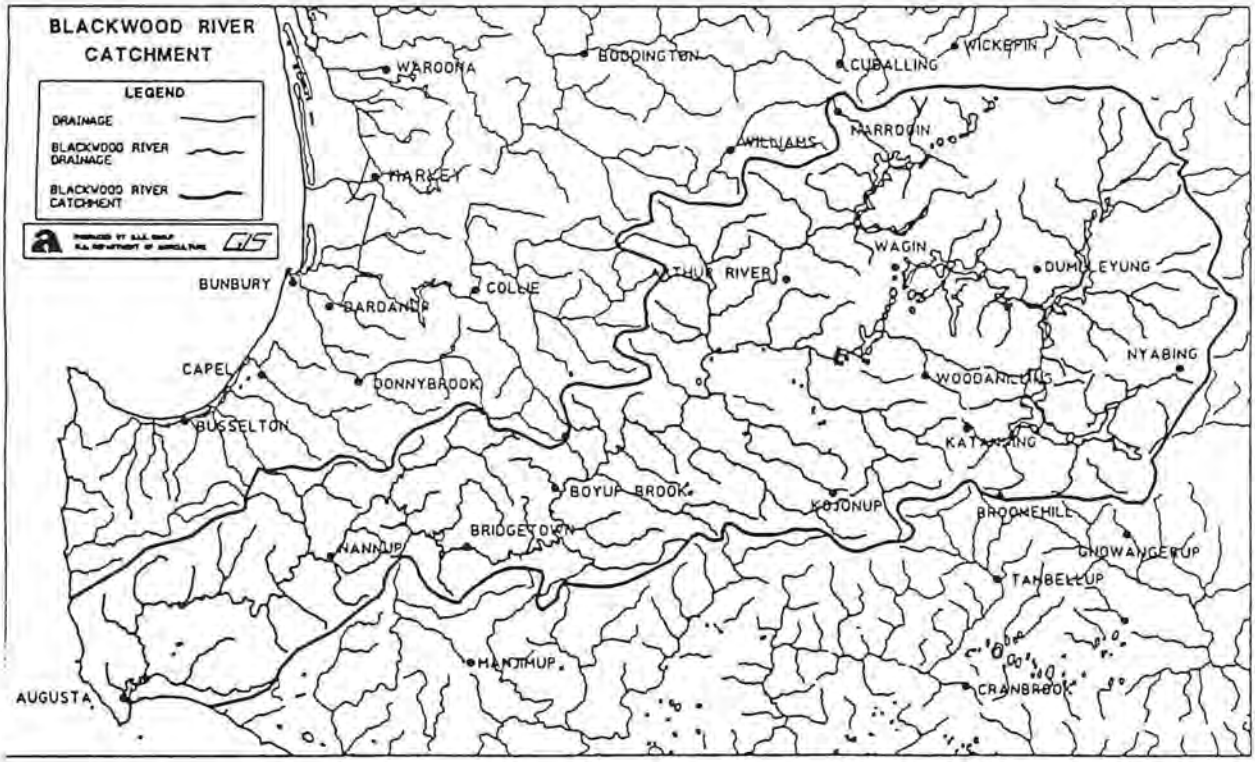
The rainfall ranges from over 1100mm to as little as 350mm.

The river flow has been measured at over 700,000 thousand cubic metres of water in a year. The flow will depend on rainfall and whether or not the lakes overflow. This figure is calculated for the 1983-1985 years. The lakes did not overflow in that period.

In the process the river carries about 1.3 million tonnes of salt per year.

The Drainage System

The Blackwood has some interesting features which can make it difficult to predict the consequences of drainage.



The rivers above Lake Dumbleyung are considered not to contribute to the rest of the river flows. The Coblinine River and Dongolocking and Meilup Creek drain a vast area but deposit it all into Lake Dumbleyung. The size of this lake and its capacity, as well as annual evaporative (seepage?) loss means the lake rarely overflows. The lake accumulates salt and silt which may be flushed in the occasional flood. The area above the lake is generally flat, poorly drained and most likely to benefit from increased water use systems of agriculture and /or drainage.

Flows from Lake Dumbleyung exit in the west and travel through the lakes system around Wagin and Woodanilling into the Beaufort River. This river is generally broad flood flats to the Albany Highway.

The Carrolup River and Carlecatup Creek drain the area west of Katanning and flow into the Beaufort.

The Arthur River has its origins in the lakes system near Lake Toolibin south of Wickepin. It than travels south west half way between Narrogin and Wagin is joined by the Buchanan River west of Piesseville, crosses the Albany Highway at Arthur River town, and joins the Hillman River which drains the northern parts near Darkan.

The topography in the area west of the Albany highway to Boyup Brook is relatively well drained and undulating.

The Balgarup River and Kojonup Creek flow from the south east near Kojonup to the north west.

The Arthur and Beaufort Rivers join at Moodiarup to become the Blackwood River. The Kojonup Creek, Balgarup River and Dinninup Creek join from the south east prior to the river reaching the Boyup Brook area.

The Gnowangerup (Scott) Brook joins south of Boyup Brook.

From Boyup Brook to Nannup the Blackwood River flows through steep landscapes. Lots of small streams and creeks join the Blackwood here. The next major water course to join the Blackwood is the Balingup Brook which starts near Boyup Brook and curves to meet the Blackwood south-west of Bridgetown. St John's Brook drains an area north and west of Nannup. The Scott River drains a flat sandy area along the south coast and joins the Blackwood at the Estuary.

Why Drain

It is fact that a large part of the catchment is farm land, towns are based on the river or its tributaries, major roads and railways cross the catchment, local roads further subdivide. Each of these activities can and does change the natural flow of the runoff. The altered flows can significantly impact on farmland, conservation areas, flow rates, and capital works.

Drainage is often instigated to protect capital works such as railway lines, roads and towns. Or the drainage may be aimed at significantly improving the productivity of farmland.

Landscapes that are generally flat, such as the upper catchment and areas such as the Scott River, have significant waterlogging during most years. The waterlogging has been shown to reduce yield by up to 50-80%. Surveys have also shown that nearly all paddocks are effected to some extent. In some cases the affect is to reduce access to paddocks; in others it is to reduce yield.

The Catchment produced about 600,000 tonnes of grain in 1991/92. It is not unreasonable to assume a yield response due to drainage of 20% across the catchment. That means 120,000 tonnes at about $100 per tonne or $12,000,000. Generally the 1.0 million hectares of pasture in the Catchment can benefit by more than 20%, which could allow an extra 8000 cattle ($3,000,000) and 250,000 sheep ($3,000,000) to be turned off and an extra 5,000,000 kg ($15,000,000) of wool cut. These estimates are conservative and don't consider the extra on-farm benefits of reduced salinisation, inundation and erosion, nor do the examples take into account off farm benefits.

Protection and prevention of salt prone areas can also lead to production improvements.

These benefits drive the need for on-farm drainage.

Off-farm consequences need to be balanced against this.

Types of Drainage

The majority of drainage systems used by farmers remove surface water. This means grader-, dozer- and excavator-made drains. The costs range from a few hundred to a few thousand dollars per kilometre. The drains are generally not grassed or vegetated, although some farmers have fenced them of and planted trees.

There is some interest in subsurface pumping to lower water tables

Trees have been shown to use more water than most pastures and these are often planted as living pumps. Improved agronomic practices are also advocated to use additional water in situ. These activities in the long run can reduce the need for drainage in many situations.

The surface and subsurface drainage systems all need an outlet into the Blackwood River system.

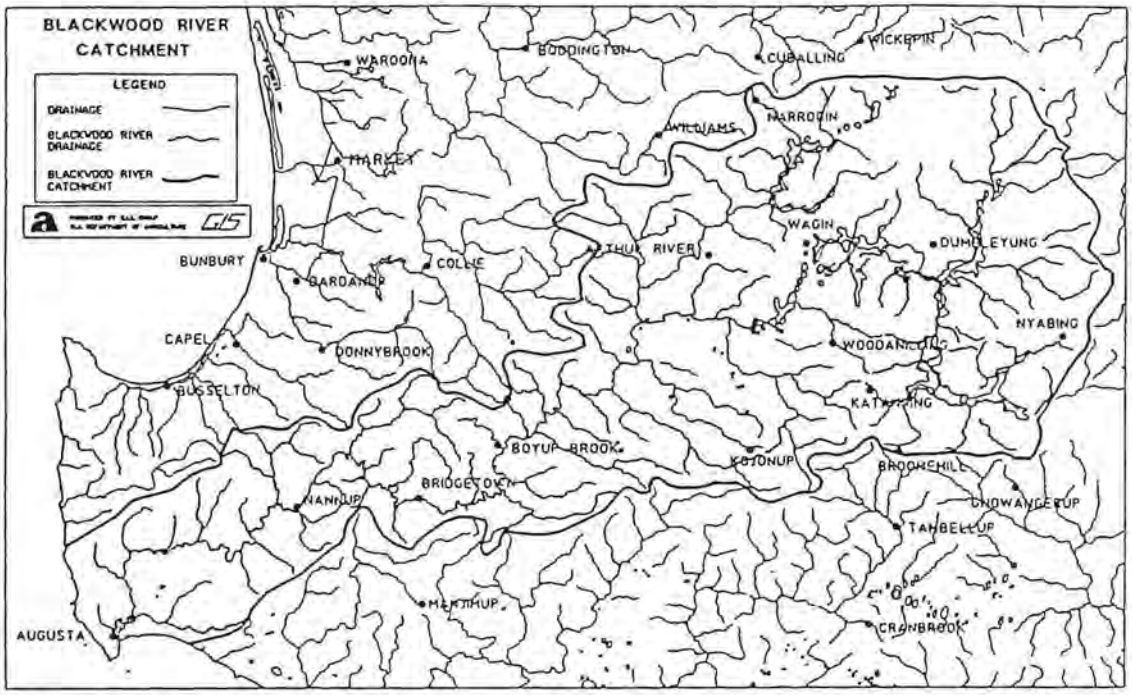
Blackwood Catchment Agriculture Statistics 91/92 estimated from ABS

	Hectares	Number	
Area of Holdings	1667552	1527	
Crops excluding Pasture	347829		
Crops and Pastures - Total Area	366151		
Land not available due to degradation	61200		
Sown Pasture and Grasses	996128		
Other Pastures Native	117291		
	Hectares	**Tonnes**	
Cereal Crops Total	288306	590416	
Wheat for Grain	155177	327568	
Oats for Grain	79600	164068	
Barley for Grain	53237	98335	
	Number	**Kg**	
Sales Sheep and lambs	1311830		
Sales Cattle and Calves	43740		
Sale of Pigs	58760		
Sale of Deer	290		
Sale of Goats	1036		
Sale of Horses	50		
Cattle Total	100800		
Deer	2004		
Donkeys	23		
Goats Total	3735		
Horse	910		
Sheep Ewes >1yo	2406800		
Sheep Wethers >1yo	1736410		
Lambs and Hoggets <1yo	1110880		
Total Sheep	5254090		
Sheep Shorn	5199800	26029160	Wool Produced
Sheep and Lambs Shorn	6217140	28104390	Wool Produced
Chickens for Eggs	14700		
Chickens for Meat	28560		
	Hectares		
Crop and Pasture Irrigated	1421		
Horticulture Crops Total	1426		
Vegetables Irrigated	156		
Fruit Total include grapes	1104		
Fruit Irrigated including grapes, nuts	770		
	Hectares	**Kg**	**Litres**
Land Treated with Herbicides	335200	97100	270900
Land Treated with Insecticides	58430	4680	18100
Land Treated with Fungicides	8800	9355	5430
Land Fertiliser applied	730180	85894000	
	Number	**Kg**	**Litres**
Treated with Dips	4997500	62445	142554

Why and how this farmer drained his land

Russel Thomson, BSc(Agric)
Farmer, Woodanilling

I would like to add my welcome to everybody here today especially to Katanning, one of the suburbs of Woodanilling which is nearer to the centre of the upper catchment of the Blackwood River.



I would like to give you a very brief insight into why we are deep draining by pumping and why I consider that we must not be discouraged from continuing to do so.

My father purchased "Kunmallup', which is located about 30 kilometres west of Woodanilling incorporating a lot of the river flats on the Beaufort River just before the junction of the Beaufort and East Beaufort rivers, in 1955. The Beaufort drains water from the Katanning-Kojonup area and the East Beaufort drains from Lake Dumbleyung and beyond. The farm was mostly uncleared and I can remember burning and ploughing White Dam paddock, the area I would like to concentrate on today, in about 1958. The country was wet in winter but certainly not salty to look at.

In the very late 1950's my father put about 30 miles of grader drains across the flats to reduce the winter waterlogging. These drains reduced the visual waterlogging from about 1 week after rain down to 1-2 days depending on the amount of rain, which was considered very successful at the time.

This is an aerial shot of White Dam Paddock taken 22/10/82 giving an overall view of the country we are dealing with. The slope on the ground is approximately 1.5 metres fall per kilometre down to the bottom left hand side and the soil is good grey sand over clay. The paddock is obviously in trouble. Since the early 1960's we have lost large areas to salt and as the years roll by we are losing more and are still losing the battle. We

This is an aerial shot of White Dam Paddock taken 22/10/82 giving an overall view of the country we are dealing with. The slope on the ground is approximately 1.5 metres fall per kilometre down to the bottom left hand side and the soil is good grey sand over clay. The paddock is obviously in trouble. Since the early 1960's we have lost large areas to salt and as the years roll by we are losing more and are still losing the battle. We have fenced off some 400 hectares around the farm and planted thousands of trees, with varying degrees of success. The puccinella and samphire look good along with the trees but I consider that the area is unlikely to produce any income apart from as a windbreak and a very small user of water. Our problem remains that we are still losing ground, we have very high and/or rising water tables and there is a large amount of saline water running off the saline areas every time it rains.

Now we will get back on the ground where I feel a lot more comfortable and look at a 44 hectare piece of virgin bush on our upslope side which is in real trouble.

As we get closer the older White Gums can be seen to be very dead and the younger ones are feeling the pinch.

If we now go 150 metres into the bush I would like you to observe the sorry state of the trees and the piezo flag in the demonstration piezometers in the foreground. I would like to give a quick explanation of the flag which was given to me by the Salinity Planning Advisory Committee in Shepparton Victoria a few weeks ago. The foam floats on the water and holds the stem above the ground when the water table is high. When placed in a public place the flag gives a very public message! I think that we in WA should make more use of this awareness-generating idea.

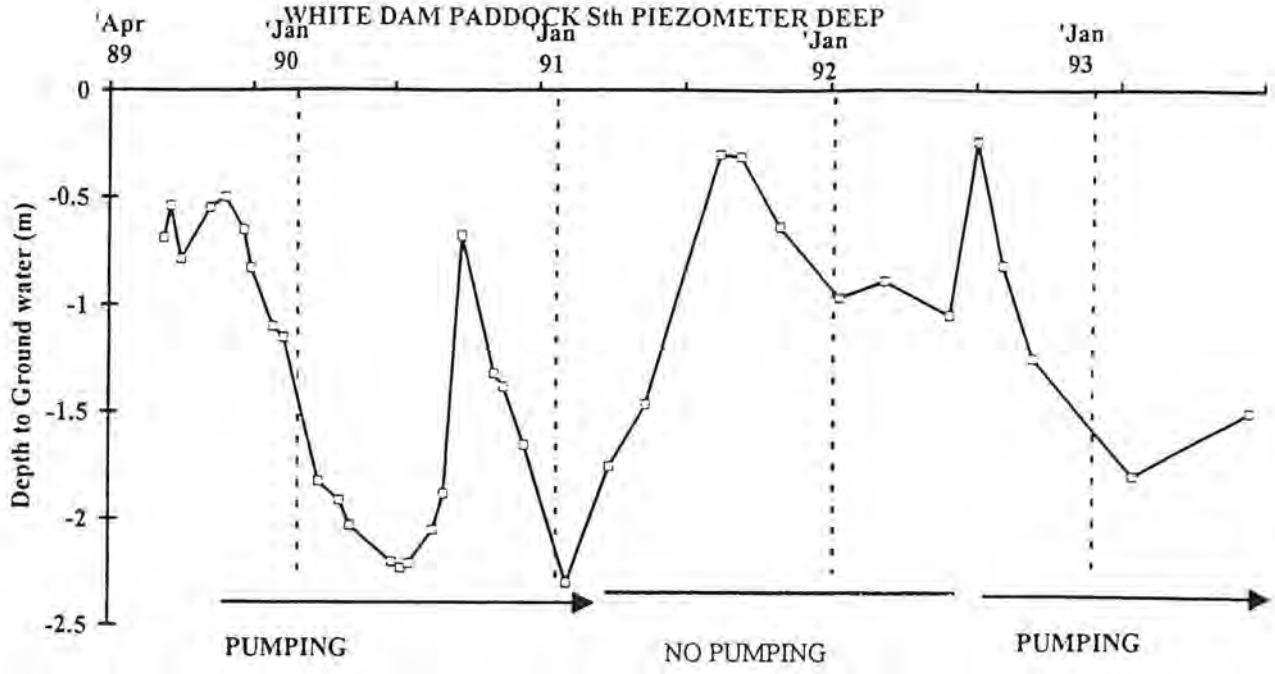
If you look at the flag you can see that even in the virgin bush we have lost or are losing the battle, with the flag well in the red.

If we now move out onto the cleared flats even the patches of Yates left many years ago are finding the going difficult, and the pasture has gone from clover to barley grass and even to bare ground in places. The water table is very high here now and at the end of summer is no more than a metre below the surface.

In 1989 we got involved in a scheme to finance a land reclamation project which included pumping to lower ground water levels. Some sites were more successful than others but I would like to give a few details of this one.

We are pumping about 4.5 l/ sec or 80,000 gallons per day from a 26 metres deep bore into a layer of very good water-bearing material. We have achieved a draw down of about 7 metres and are spending $3.90 per day or $1,400 per year on electricity. At this stage I am not making specific comments on the economic viability of the site but I want to continue the project to get some longer term results because I think that we will reclaim quite an area back into very productive land.

We are achieving some significant draw downs. The pump is located over 300 metres away right next to the Toyota. The flag is showing the water level to be at about 1.3 metres which is about 1 metre below what I would expect at this time of the year if nothing was being done. The pasture around the site has improved significantly and will continue to do so now that the water can move down through the soil profile and take any accumulated salts with it.



I have graphed the results taken from this peizo since April 1989 showing how the watertable depth has varied from summer to winter with and without pumping. I have only a short period of data before the pumping first started which is a real pity. I must urge anybody who is doing any drainage work to accumulate some background data before they start their treatment so that they can look back and see that they really are or are not achieving something.

It can be seen that over the first 18 month period until we stopped pumping due to a dispute between the contractors there was a major change to the water table. The pump was then off for about 18 months while the dispute was resolved. The water table level can be seen to have risen and then stay unacceptably high even through summer and then once we stared pumping again the major change can be seen. There is now barley grass and even some clover growing in the areas where when we started there was only patchy barley grass in scalds.

We are also using a multiwell system, in country which has a much lower capacity to yield water, with one pump in the middle of a nest of bores up to 500 metres from the pump. These results appear to be not as good but I intend to persevere for the time being. These systems will not work in all places and rely on many things being right to make it all happen.

In considering the effluent water and the disposal of it I feel that this may be a short term pain for a long term gain. Even in the middle of winter we have large volumes of relatively saline surface water running both onto and off the farm. If we do nothing then the salt will only get worse. Are we doing anything worse by pumping water into the

river than the farmer at the top of the hill who has cleared his land, just like us, and is now letting his excess salty water run out of his valleys into our flatter country? I consider not! I also consider that at this very early stage in our fight against salinity that all those having a go should be encouraged to do so in the hope of achieving a long term benefit for the whole of the catchment, and not be told that they can't try that. I am not saying that pumping is right, just that it appears to be working and as farmers at the bottom of the slope we need and must have the right to drain our land. If we don't, I consider that the system's life is in severe trouble.

I leave this last slide with you to ponder on. I thank you for listening to my story.

The Consequences of Draining into the Blackwood River

Robert Humphries
Executive Officer, WA Water Resources Council
PO Box 100 Leederville WA 6007

Introduction

Drainage is a necessary and well established practice in both urban and rural areas, and rural drainage in WA has been addressed in a comprehensive draft report to the Western Australian Water Resources Council and the Soil and Land Conservation Council of Western Australia. Although not well documented, the intensity of drainage in the Blackwood River catchment, built mostly for the control of waterlogging and salinity, is increasing in a somewhat ad hoc fashion. This paper briefly explores the benefits and costs of drainage, the relationships between clearing and runoff, the likely effects of drainage waters on the ecosystem of the Blackwood River, outlines what is known about the current condition of the Blackwood River and wetlands within its catchment, and suggests how drainage may be treated as a part of integrated catchment management planning.

Benefits and Costs of Drainage

The Rural Drainage Steering Committee (1992) stated that the objective of drainage must be the protection of the natural and built environment and sustainable uses of the natural resources. They recognised the catchment as the fundamental unit of drainage, and recommended that the currently declared coastal drainage districts in WA should be expanded to include the surface water catchment boundary. I support these principles, as they underpin the philosophy of Integrated Catchment Management, the core activity and focus of the Blackwood Catchment Coordinating Group. These principles are also compatible with the National policy of Ecologically Sustainable Development (ESD), and the State Government's Integrated Catchment Management policy.

Fausey et al. (1987) view drainage as a water management practice whose practical purposes are different for different regions. The objectives of drainage are generally to minimise risk (to property and crops), to improve efficiency by allowing movement on otherwise flooded areas, and to increase net income by avoiding or minimising the deleterious impacts of waterlogged or salinised soils.

The Rural Drainage Steering Committee (1992) stated the benefits and costs of drainage. These are summarised below.

Increased Agricultural Productivity

Drainage generally removes excess water from the soil and creates a well-aerated environment for plant roots. The roots of most plant species do not function normally in saturated soil, and cannot properly absorb water and nutrients in conditions of oxygen stress.

Waterlogging reduces crop and pasture production, and hence the carrying capacity of pasture and farm incomes.

Salt Removal

Dryland salinity is one of the most pressing agricultural and environmental problems in the upper Blackwood catchment. On-farm drainage, if well planned and constructed, can reduce the amounts of harmful salts in the root zone of plants, and reduce salt-induced soil structure decline and erosion.

Disease Control

Drainage reduces the availability of waterlogged land as habitat for various diseases of crops, pastures, humans and livestock. Organisms such as foot-rot, liver fluke, mildew, and various root rots of plants are reduced or eliminated by drainage. Waterlogged land is also ideal for the rapid growth of mosquito and midge populations, as the weakly-swimming larvae are favoured by the abundance of organic matter for food, low water movement and lack of predators.

Improved Trafficability on Farms and Elsewhere

Removal of excess soil water provides a soil layer dry enough for the passage of farm machinery.

Reduced Erosion

Well designed and constructed drainage reduces erosion by controlling the rate of discharge of excess water from the land, although poorly constructed drains are often a focal point in the landscape for erosion. Good erosion control keeps soil on the land, where it is needed, and results in lower turbidity and sedimentation of streams.

Reduced Construction Costs of Rural Roads

Rural drainage networks assist in the provision and maintenance of all-weather rural roads, and contribute to reducing the costs of road construction and maintenance. Positive multipliers include improved access for tourists and commercial vehicles.

Social and Economic Development

Another benefit of rural drainage is the development of the south west agricultural region, which would have been hampered without adequate drainage.

Urban Flood Protection

Rural drainage schemes provide flood protection for a number of urban areas in the south west, and some urban drainage water is discharged into major drains.

Effluent Disposal

Drains have been used, and are still used, to provide a vehicle for the discharge of effluents from intensive animal enterprises such as piggeries and dairies, and from some industries, particularly abattoirs. The benefits of this practice are now seriously under question, and it is rapidly becoming unacceptable to downstream water users and the community at large (Environmental Protection Authority, 1992).

Costs of drainage were identified by the Rural Drainage Steering Committee as:

Costs of Construction, Operation, Maintenance and Renewal

For the six coastal drainage districts in WA the Rural Drainage Steering Committee (1992) estimated that the WA Water Authority has a return on its drainage assets of -4.9%, and that the drainage system ran at a loss of about $4.5 million in 1990/91. Irrigation and rural drainage systems throughout the world tend not to pay for themselves, and the cost of drainage in the Blackwood catchment is unknown.

Costs of Over-drainage

Coastal plain farmers in south western WA often claim that drains remove too much water, and cause premature checking of crop and pasture growth in mid-spring, when the water level in main (or deep) drains has fallen below the pasture root zone. Some farmers in the Peel-Harvey coastal catchment have installed small weirs or check structures to retain higher water levels in the drains in spring.

Environmental Costs of Drainage

The environmental consequences and costs of drainage are complex, and poorly known for the Blackwood River and its catchment. The negative effects include increased runoff and flow velocities, increased catchment losses of salts, nutrients and sediment, and the impacts of these on aquatic ecosystems, loss of important wetlands by either draining or flooding, and changes to the aquatic plant and animal populations of the region. These effects are discussed in detail below.

Effects of Drainage Water Discharge on the Blackwood and its Catchment

The hydrology and biology of the upper and middle Blackwood River and its catchment are poorly known, although the inland parts of the river and its tributaries are severely degraded. Salinity is high, riparian vegetation has been removed or has died from waterlogging, trampling and grazing by stock and salinity, and the streams are polluted with sediment and nutrients (Olsen and Skitmore, 1991; Western Australian Water Resources Council, 1992). Hardy Inlet at the mouth of the river was the subject of an intensive study related to determining the effects of proposed mineral sand dredging in the estuary (Hodgkin, 1978).

Although artificial drainage is unlikely to be a primary cause of the river's ills in its own right, it is a contributory factor, and the likely effects of drainage water discharge are discussed in turn below.

Increased Runoff And Flow Velocities

Higher flow velocities may result when land is drained into natural watercourses and wetlands. This often causes bed and bank instability, which in turn contributes to the loss of quiet water habitats and loss of fringing vegetation as it is dislodged from the banks during floods.

Increased Catchment Losses of Salts, Nutrients And Sediment

The relationships between clearing of land for agriculture and increased losses of salt, nutrients and sediment are well documented. Extensive land clearing causes an excess of water in the landscape, a result of reduced evapotranspiration as deep-rooted, high water-using perennial plants are replaced with short-rooted annual crops and pastures which use less water for a shorter period of the year (Williamson et al., 1987; Schofield et al., 1988). This pattern is typical of most of the agricultural region of south west WA, and of much of the upper Blackwood catchment (see Figure 1).

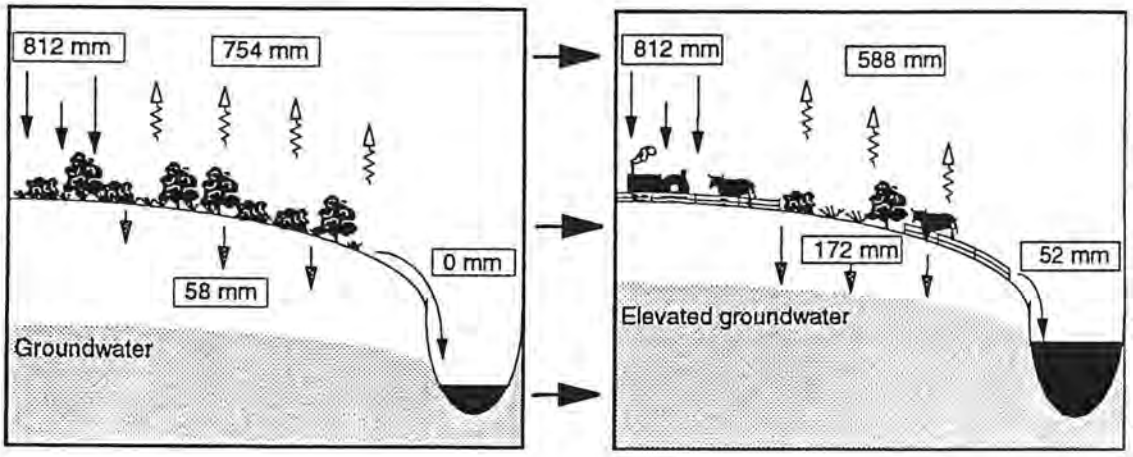


Figure 1. The water balance, or the relationships between evapotranspiration, groundwater recharge and surface runoff, are dramatically altered with the conversion of deep-rooted perennial vegetation to agricultural pasture. Diagram after Water Authority of Western Australia, (1992).

Bott (1993) comprehensively reviewed the information on clearing, runoff and its relationships with stream phosphorus concentrations and catchment phosphorus export rates for catchments in south western WA. His work (see Figures 2 to 4) shows that water loss rates increase markedly in catchments with more than 70% of their area cleared, and that phosphorus concentrations in runoff and phosphorus export rates follow a similar pattern.

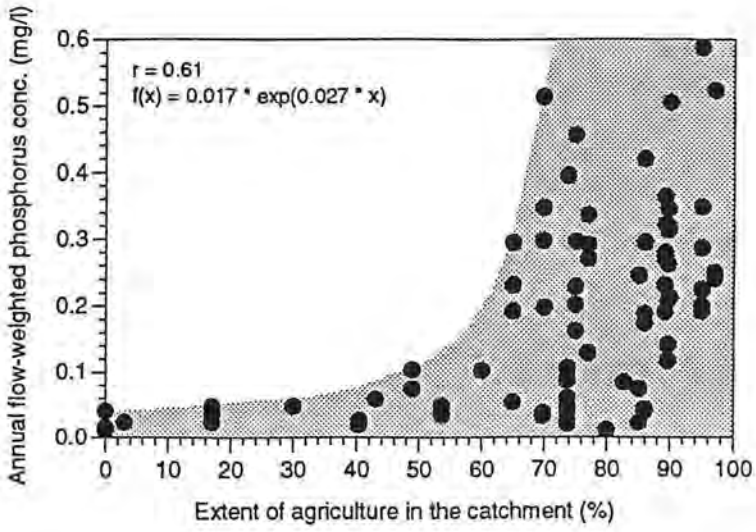


Figure 2. The catchments of south-western WA show a log-linear relationship between the extent (percentage) of the catchment developed for agriculture and the annual flow-weighted phosphorus concentration in streamflow. Phosphorus concentrations vary markedly between wet and dry years, and with increased agricultural development of the catchment, shown shaded. Vertically aligned points represent data from individual catchments. Figure from Bott (1993).

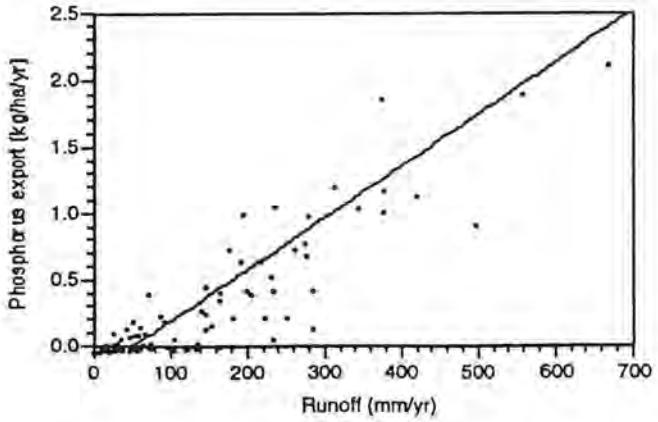


Figure 3. The catchments of south-western WA show a strong linear relationship between catchment runoff and the rate of annual phosphorus export. Figure from Bott (1993).

Similar relationships have been documented for salinity (Schofield et al., 1988, Schofield, 1990), and the link between clearing and dryland salinity in WA is well known. The environmental effects of the discharge of irrigation tailwaters have been examined by George (1990). While usually not a primary cause of increased runoff, drainage accelerates water movement from the landscape, and increases the losses of dissolved and particulate substances in runoff.

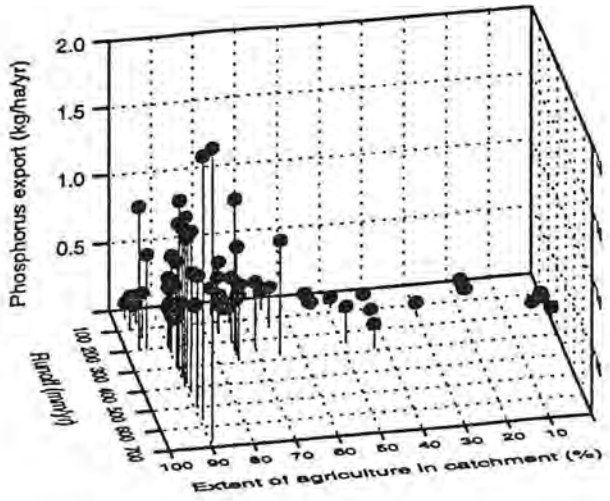


Figure 4. The catchments of south-western WA show accelerated rates of annual phosphorus export when broadscale clearing for agriculture exceeds 70% of the catchment area and the catchment is high annual runoff. Figure from Bott (1993).

Impacts of Salinisation on the River, Wetlands and the Estuary

Increasing the salinity of previously fresh, marginal or brackish inland waters has major deleterious effects on the usefulness of the water for human and stock water use, and changes the composition of the fauna and flora of water-dependent ecosystems (ANZECC, 1992). Morrissy (1974) reported a reverse salinity gradient in the Blackwood River, where the upper reaches of the river are far more saline than the middle and lower reaches. Despite this, it is certain that the upper reaches of the Blackwood were brackish before European settlement, as the upper catchment is poorly defined and has many salt lakes. It is clear, however, that the salinity of the river has increased as dryland salinity has worsened in the upper catchment.

The freshwater invertebrate fauna of the now brackish to saline upper Blackwood River has changed from one containing a rich assemblage of species, including the much-prized marron (*Cherax tenuimanus*) to one now dominated by salt-tolerant crustaceans and other invertebrates. Hodgkin (1978) reported that the brackish water copepod, *Sulcanus conflictus*, is abundant in the river upstream of Bridgetown, but is sparse below.

Marron are particularly sensitive to elevated water salinity (Morrissy, 1978), and have been made extinct by increasing river salinity over much of south west WA. Marron used to occur upstream as far as Kojonup, far beyond their present range. In general terms, large increases in freshwater river or wetland salinity results in a major loss of sensitive species, and their replacement by a limited number of salinity-tolerant species. The diversity of invertebrate species in an aquatic habitat is a good indicator of its state of health.

Saline runoff is generally of less concern when it reaches the estuary, as estuarine plants and animals are tolerant of wide fluctuations in salinity, and such variation is normal in estuaries.

Impacts of Nutrient Enrichment on the River, Wetlands and the Estuary

With salinity, nutrient enrichment or eutrophication is the major cause of environmental degradation of the wetlands of the south west (Government of Western Australia, 1992). Excessive nutrient availability in rivers causes growths of water weeds and algae, and often blooms of toxic blue-green algae (cyanobacteria) at times of low or no flow. Blooms of the cyanobacteria *Anabaena* and *Microcystis* have been reported from the middle Blackwood, near Nannup.

Large populations of aquatic plants cause a variety of adverse effects, including toxicity to animals drinking or living in the water, foul odours and deoxygenation of the water, kills of fish and other organisms and complaints by members of the public to government, who can do little. Most natural waters in WA are nutrient-poor, because of the age and natural infertility of the landscape, and are very susceptible to eutrophication.

Impacts of Sedimentation and Turbidity on the River, Wetlands and the Estuary

Sedimentation is a little noticed, but important cause of river and wetland degradation in WA. Loss of fine soil particles and their deposition in rivers causes the composition of the natural river bed sediments to change from a coarse to a fine texture. Many native invertebrate species are dependent on large spaces amongst river gravels, coarse sands and pebbles for their habitat, and are lost when siltation occurs. Populations of large crustaceans, fish and waterbirds dependent on the coarse sediment invertebrates for food decline or disappear.

Sedimentation also causes loss of the deep, permanent holes in our rivers, which are critical to the survival of both aquatic and terrestrial animals during periods of drought. Loss of such holes in the Avon River is a major tragedy, and has also reduced the usefulness and attractiveness of the river for people. The state of the major holes of the Blackwood does not seem to have been surveyed.

Farmers are well aware of the consequences of soil loss to themselves, but some do not appreciate that formation of new soil is an extremely slow process in the dry Australian environment. Accelerated soil loss not only affects waterways - it also compromises the long-term viability of farming.

Turbidity in water is caused by suspended microscopic particles, usually of clay, which sink out of suspension slowly and require little energy to maintain them in suspension. Changing a previously clear stream to a turbid one reduces the amount of light available for aquatic photosynthesis, and may reduce or increase nutrient availability. Permanent increases in turbidity cause changes in the structure of the original aquatic community.

Major sedimentation of estuaries also reduces the quality of the habitat for sediment dwelling invertebrates and the crustaceans, fish and bird species dependent on them.

Impacts of Pesticides and Toxic Heavy Metals on the River, Wetlands and the Estuary

There is no clear evidence of major deleterious effects from pesticides or heavy metals in the Blackwood system, although small amounts of herbicide from forestry activities are known to enter the river near Nannup, and some loss of herbicides, fungicides and insecticides from horticulture and broad acre cropping and pasture is inevitable. McAlpine and Van der Wiele (1990) found trace levels of the herbicides atrazine and hexazinone in streams draining areas being prepared for the establishment of pine plantations. At some of their monitoring sites some depression of the diversity and abundance of stream invertebrates was noted, and at other sites no adverse effects were noted, so the influence of these herbicides is unclear.

Kills of sedentary shellfish such as abalone in Flinders Bay have been reported at least once to the Environmental Protection Authority by Augusta fishermen. The fishermen attributed the mortality to pesticides entering the bay from the outflow of the Blackwood, but no samples of dead animals were submitted for analysis, and the scale of contamination necessary to cause such toxicity would be huge, and would have killed fish in the river itself. The most likely explanation for the kill seems to be a major fresh water outflow from the river into Flinders Bay. There is no evidence of heavy metal pollution in the Blackwood River, and no likely sources are known to me.

Loss Of Important Wetlands by Draining or Flooding

WA has a poor history of wetland conservation in the south west, with a majority of coastal plain wetlands lost to filling and draining for urban, industrial and agricultural development (Government of Western Australia, 1992). In the agricultural region, many wetlands have also been lost, and the survival of others, such as Lake Toolibin and Lake Dumbleyung, is threatened by rising water levels, rising salinity and sometimes eutrophication and sedimentation. The wetlands remaining in good condition are a major asset, and are vital refuges and habitats for water-dependent wildlife and native plants.

Deliberate draining of saline water into freshwater wetlands destroys them rapidly. The survival of such wetlands is also threatened by rising saline water tables, and sensible, planned use of drainage may contribute to their conservation.

Changes to Terrestrial and Aquatic Plant And Animal Populations

Changes to the natural catchment water balance by clearing and over-draining may in addition to accelerating the spread of dryland salinity, accelerate loss of soil moisture, and threaten the survival of remnants of native vegetation. These processes may also pose threats to the long-term sustainability of agriculture.

Clearing and modification of streamlines in most of upper and parts of the middle Blackwood has deprived native fauna of habitat corridors, and has probably threatened the continued survival of some species. WA has the highest known rate of plant and animal species loss in the world (Government of Western Australia, 1992).

Current Status of the Blackwood River System

The current status of the Blackwood River system is not well known, however the following observations can be made:

- Severe salinisation of the water of the upper Blackwood is apparent.
- Major loss of fringing vegetation is widespread in the upper Blackwood.
- The composition of the native aquatic invertebrate fauna has shifted towards salt-tolerant species in the upper Blackwood, and is probably unchanged in the lower reaches of the river.
- Blooms of toxic blue-green algae occur at periods of low flow in the middle Blackwood, indicating eutrophication of the river pools.
- Increased amounts of runoff, carrying increased loads of sediment, salt and nutrients into the river, now occur.
- The extent of sedimentation and loss of deep holes in the river does not seem to be known.
- The relative contribution of direct drainage to the problems of the river is not known.
- The middle and lower Blackwood are generally in good (although not pristine) condition, and still support the natural assemblage of biota.

Drainage and Integrated Catchment Management

Drainage remains an important tool for improving both agriculture and the environment. However, several considerations must be borne in mind when planning drainage if further damage to the Blackwood River, the wetlands and native vegetation of the catchment are to be prevented, and social or regulatory conflict avoided. Key considerations include:

- Recognise the catchment or subcatchment as the fundamental unit of drainage, so that the overall water balance can be considered in planning.
- Analyse and interpret local groundwater, rainfall and runoff data so that the local hydrology is adequately understood.
- Monitor to establish the rates of loss of water, sediment, salt and nutrients before new drains are built.
- Design detention basins or artificial wetlands to reduce sediment and nutrient losses if this is necessary.
- Recognise important ecological and community values that may be damaged by ill-planned or -executed drainage works. In particular, avoid damage to remnant vegetation, wetlands and nature reserves.

- o Carry out benefit-cost analysis of drains, and consider other options such as strategic tree planting or establishment of perennial pasture.

- o Consult with the BCCG, neighbours, regulatory agencies and the community as a standard part of the process.

- o Design drains to take account of the points above.

Acknowledgments

I appreciate the invitation from the Blackwood Catchment Coordinating Group to participate in this Drainage Workshop. Frank Batini assisted by providing me with the key points made in his talk at Dumbleyung. Geoff Bott provided copies of the Figures from his paper, and Jill Collopy assisted with logistics.

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The policies and regulations in place now which affect drainage

Kevin Goss
Commissioner for Soil and Land Conservation

I am going to talk beyond the topic I was given. Somebody who ought to know made a comment recently that there are three talks you prepare in a situation like this, the one you prepare before hand, the one you give on day and the one you realise you should have given when on the way home. Having listened to your groups I can tell you the talk I prepared has got nothing to do with the talk I am going to give, but hope the talk I am going to give is the one I believe worked when on the way home.

When I talk about Government policies and regulations I am going to concentrate on the Department of Agriculture's position given the concerns with drainage regulation under the Soil, Land Conservation Act. But first I want to deal with the attitude of Government to drainage and how we see good regulation and legislation operating. This will give a perspective on what we expect from the drainage regulation, which is different to the comments I've heard today.

Attitude to Drainage

Legitimate practice amongst other practices

There is real concern that Government has a general attitude against drains. Consistent with the presentations that you had earlier today from Bob Humphries and Gerry Parlevliet, drainage is considered to be a legitimate practise. There is no presumption against drainage, it is recognised that it has its place and its purpose.

Not always cost effective or successful

On the other hand drainage is not always cost effective, it is not always successful, it can fail the objectives that were held in the first place. On engineering and technical grounds it may not work and that is why good advice is very important. The cost of setting up and maintaining drains or ground water pumping may not be offset by the benefits that follow.

Best long term strategy not necessarily on-site

In dealing with the problems you have listed today, it is not necessary to deal with the problem on site. Catchment management may be the best long term strategy.

Deleterious off-site effects can occur

Finally, there can be deleterious side effects, adverse impacts or nuisance to others, whether they be other farmers or other authorities. Drainage activities need to be assessed on their merits.

Attitude to regulation

Legislation must be legitimate in eyes of the community

What about the use of legislation and regulations drainage?. It is the conviction of the Department of Agriculture and the way we handle the Soil and Land Conservation Act, that legislation can only work if it is legitimate in the eyes of the community. Good legislation sets up what is possible, not necessarily forces people into what they must do.

If you look at the Act, it establishes Land Conservation Districts and District Committees and the considerable expectations as to what they do. It also puts responsibilities on the Soil and Land Conservation Council, to work with Government to get some of the policies right, including drainage.

So good legislation can set the objective and enable things to happen. It also has to provide an environmental bottom line beyond which drainage practice is not acceptable. Whether we are dealing with existing regulations for drainage or whether we are looking at changing, we do so on the basis there is a degree of community support. Regulations are approved by parliament.

Consultation in drawing up regulations and guidelines

In establishing or changing regulations we try to consult as much as we can. There are limits but we have held regional work shops for the clearing guidelines and with drainage.

Decisions must be defensible on technical grounds

Any decisions that are taken on drainage must be defensible on technical grounds. There is a presumed right to drain. No-one is taking away the right to drain, that is not the issue. Our concern is with the impact of draining and that it does not go beyond an environmental "bottom line", assessed technically (not economically).

Use the regulation after attempts to resolve the matter by persuasion and community influence

Finally, under the Soil and Land Conservation Act, we use regulation after all other attempts to resolve the issue have been exhausted. Catchment management solutions are the highest priority in our response to drainage proposals.

Drainage policy

There is no formal Government policy for drainage. Bob Humphries referred to a policy project for rural drainage but that applied to Government managed drainage schemes on the coastal plain. However, there are certain principles that are very important when we look at drainage.

Objective known and achievable

Looking at what drainage can achieve in the Blackwood Catchment as a whole, the objective needs to be known and needs to be achievable. This is a fundamentally important matter for today's workshop.

It is very important to have that objective sorted out, otherwise what we are dealing with is options. We are saying will drainage or catchment management or whatever, give you these benefits and can give you these costs and you add them all up and you don't know where you are at the end.

If we don't have a commonly agreed objective we will find that people are making individual decisions, groups are making their own decisions but where is all this leading for the Catchment. For instance the Minister gave an objective, his was, that from one generation from now, the Blackwood would be fresh. Meanwhile, we are reduced to putting options before farmers and groups with no common outcome.

One of the most critical tasks for the Blackwood Catchment Co-ordinating Group, is to get a common agreement to what is an achievable objective for the Blackwood River basin. This has to be in terms of what is possible biologically and in regional economic terms. The objective has to be affordable within the tax base of Governments and feasible within the financial performance of farming or other businesses, and activities of local Government Authorities.

Priority for a catchment strategy

Any policy really has to integrate activities at the farm level as well as the catchment level. This is why Government agencies are supporting LCDC's. We give a priority to developing a catchment strategy and support the groups in doing this as far as possible.

Priority for agronomic treatments

We should be looking at drainage as part of water management. Our policy gives a priority to agronomic treatments; particularly deep rooted perennials, in the form of agro-forestry, trees or pastures, and also all options which increase water use efficiency.

Must not be deleterious to current and future uses, on-site or off-site

Drainage and any actions involving water must not be deleterious to current and future uses on site or off site. This is where legislation comes in.

Drainage legislation and regulation

I have noted the concern and pre-occupation with the Soil and Land Conservation Act where you submit a notice of intention to clear and there are 90 days for the Commissioner of Soil and Land Conservation to respond.

In reality drainage issues can come under common or statute law. Under common law legal action can take place where a nuisance is caused or damage occurs to other peoples' land. There are certain assumptions and one under common law is that there is a right to drain;

there is an acceptance that these sorts of farming practices that have occurred across the landscape have resulted in certain changes when it comes to salinity and sediments etc., a judgement has to take this into account.

There are specific Acts over and above common law where action can be taken at any time whether there is a drainage regulation or not. It is these Acts of Parliament that set that bottom line beyond which drainage impact is considered unacceptable.

Rights in Water and Irrigation Act
Land Drainage Act
Environmental Protection Act
Soil and Land Conservation Act

Drainage regulation

The drainage regulation that exists under the Soil and Land Conservation Act came into operation in June 1992. It states that owners or occupiers who intend to drain or pump for the purposes of salinity control or prevention of salinity must notify the Commissioner of Soil and Land Conservation 90 days before that intended activity.

The objective of this regulation is to ensure that consideration is given to down slope effects where drainage and pumping proposals are planned, to ensure that the potential off site effect is dealt with properly. It sets up a process of consultation with others. When that notice of intent comes in, it is distributed to local Government Authorities, to LCDC's, neighbours and other authorities such as the Water Authority and Department of Conservation and Land Management(CALM). It gives them the opportunity to respond and allows for an objection to occur.

The sort of activities coming within this regulation are any drains installed where the aim is to reclaim saline land or to prevent of salinity. Impact of concern include lowering the water table, intercepting water in large amounts or the creation of a large volume of effluent which could be saline.

Assessment

When it comes to assessment, the NOI is a means of ensuring good communication on the basis of what is planned, and its likely impact.

There is the question of whether the regulation is working. One measure is the degree to which the regulation causes a catchment management response. Another is whether the regulation is detecting the bulk of activity likely to cause off-site impact.

Since the regulation has been in place there have been 51 (9 from the Katanning district) notices of intent to drain submitted over the last year or so.

Conclusion

I will finish by going over some key points. In looking at regulation, in looking at policy to give some guidance, make some decisions and set that bottom line on drainage, we cannot do that in isolation of what is the key objective for the whole Blackwood Catchment.

But what is our expectation? Are we expecting to try to make the river fresh again, because that is an entirely different matter to dealing with a more modest objective of the Blackwood being held at some level of salinity. It is very difficult to look at drainage policy, ground water pumping policy and regulation and what guidelines we would deal with if we haven' t at least got objectives. This is a very important task for both the Blackwood Catchment Coordinating Group and the Government.

For these reasons catchment management considerations become so much more important. The kind of regulation that we have for drainage can only support what is the community "will".

I am asking you not to get too preoccupied with the drainage regulation. I don't believe there is a general presumption against drainage. It is a question of what is the drains' purpose, what is effective and that the activity does not go beyond a bottom line when it comes to the impact on the environment and on others. Thank you.

How can the community influence Government policy?

Charlie Nicholson
Member, Soil and Land Conservation Council
Environmental Protection Authority

What is policy?

I put to you that the first point to consider is whether Government policy is relevant, or can you get on and do what you need to do anyway, without waiting for government to come up with policies, or in some cases in spite of them? And might you have to, because governments are finding themselves short of resources and preoccupied with other things and find it difficult to coordinate their responses to rural crises and concerns?

I would also put it to you that the question is not how the community can *influence* government policy but how it can actually *make* government policy.

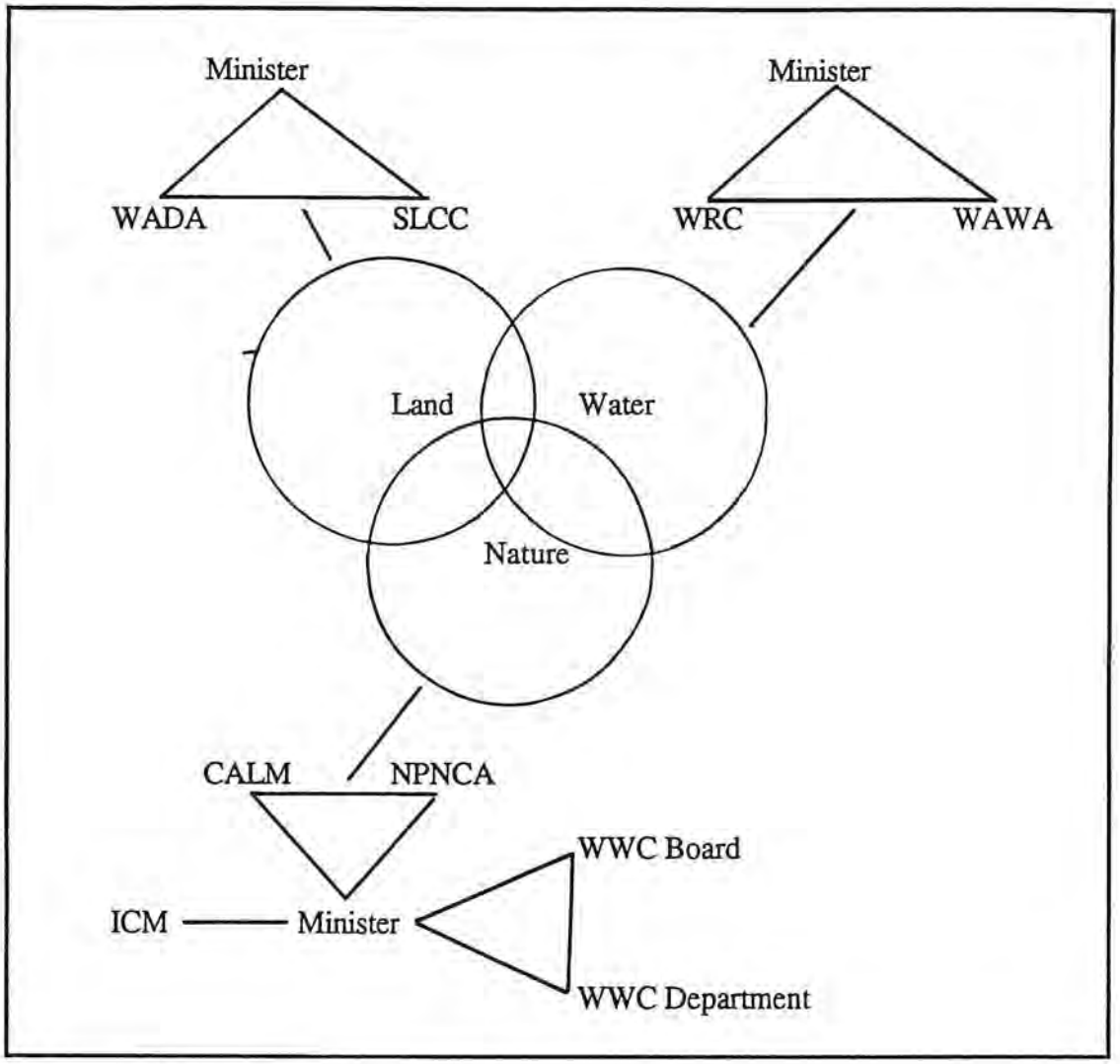
There a many textbook definitions of policy, but I'm suggesting Government policy is something about resolving conflicts between opposing parts of the community, or allocating resources where there are problems to be fixed or the system is not working properly or there are competing interests. Governments don't normally give any attention to formulating policies about things that are running smoothly, unless they want to take the credit for how well a community has organised itself!

Government policy is also something that operates at many levels: it is made on the run by everyone from the receptionist through to the head of the department to the minister. Every time you approach anyone in Government to help you they make a mini policy decision about whether or how they will respond, especially in relatively autonomous regional offices far from headquarters where it is important to keep the customer satisfied so the local member of parliament doesn't ask the minister embarrassing questions.

What I want to do is run through a couple of concept diagrams, to illustrate some avenues into government policy making circles. I am going to start with what I call the Three Ring Circus.

The Three Ring Circus

Imagine that the landscape is made up of
- a component that we will call the **Land** resource based on soil and its management and productive use;
- a component that we will call the **Water** resource covering any water from the point of rain falling through to rivers discharging into the ocean; and
- a component we will call the **Nature** resource, which covers anything to do with nature conservation, or natural ecosystems or "biodiversity" in today's jargon.



Note: SLCC=Soil and Land Conservation Council
WRC=Water Research Council
NPNCA=National Parks and Nature Conservation
ICM=Integrated Catchment Management
CALM=Department ofConservation and Land Management
WWC=Waterways Commission (Board and Department)
WADA=Western Australian Department of Agriculture
WAWA=Water Authority of Western Australia

Your farm would probably lie mostly in the Land ring; a conservation reserve would lie mostly in the Nature circle; a water supply catchment or a river or estuary would be mostly in the Water circle. But clearly there are places of overlap where the same land is used, say, for farming and water supply, or where the farming affects the quality of water which flows off it into a river or estuary.

You will see that there is an area of complete overlap. This overlap can be any piece of land owned or managed by anyone (including vacant Crown land which is owned by the crown but usually managed by neglect). Say it's your farm, where you are working out how to juggle soil conservation work, drainage and keeping a creek, wetland or bush remnant healthy. And still make a living.

Where in government do you look to find the framework of advice, resources or regulation to help you get the mix right for your land? And in this age we all now know that within a catchment you cannot make changes in one of these components without affecting another, and that this principle applies at any scale from paddock through subcatchment, district and region or river basin and State. It also means that all the parties in each of the rings, at all levels from local through regional to State and federal have to talk to each other. Which is where, at the regional or whole river catchment level, the Blackwood Catchment Coordinating Group have a key influence, but more of that later.

For each ring in the circus there is a *doer*, a government department, known in bureaucratic jargon as a resource management authority, responsible to a minister; and a *thinker*, a policy advisory council which has community and government department people on it which also reports to the minister; and a *decider*, the minister who is ultimately responsible for the money allocated to the department and for their activities, to you the electors through parliament and the government of the day.

The boundaries to what these parties are allowed to do, think and decide are always set by what is written into the Acts of Parliament which create them and describe their functions. In this sense the Act is highest expression of government policy because it is a government's will endorsed by Parliament and cast in statute law.

We have in the **Land** ring the Department of Agriculture (including the Commissioner of Soil and Land Conservation), the Soil and Land Conservation Council and the Minister.

You get an indirect say in land conservation policy through the representation on the Soil and Land Conservation Council (SLCC) which has a mixture of members from farmers, conservationists and local government and government (the Commissioner, Agriculture, Water Authority, CALM and EPA). The members are not there to represent special interests, they are there to give their personal best to the widest benefit of land conservation. The Council meets about five times a year and has an influence on the allocation of State and Federal landcare money. It is chaired by a farmer, Rex Edmondson, and has a staff of two: the executive officer (Roni Oma) and a secretary.

The Soil and Land Conservation Act provides direct links between you as land managers, the Commissioner, the Department of Agriculture and the Minister, through Land Conservation District Committees. The Minister obviously can't deal directly with 140 LCDCs. The Commissioner is the go-between, but even he has to use the Department as a filter, through Commissioner's nominees, so the Act doesn't give you a very straight run into the hallowed halls of democracy. Neither does the Act give LCDCs a direct link to the SLCC, although one of the Council's functions is to "coordinate the establishment of, and activities within, land conservation districts". The Council does have a direct link to the Minister and it has its own policy of encouraging LCDCs and other community land conservation interests to come together informally in regions to communicate and coordinate their activities so they have a more effective voice - strength in numbers. When the Department of Agriculture puts together its new system of operational programs for sustainable regions, and when the National Landcare Program (the former NSCP combined with water resource and tree funding) goes regional, the need to have your act together across the catchment will be pretty obvious.

For the **Water** ring we find the government department is the Water Authority of Western Australia which looks after what you drink from both groundwater and dam catchments, and what you put out the other end via the sewerage system, and some urban and country drainage. It also does our major water resource planning and protection with a special interest in the environment, especially wetlands affected by water supplies or drainage. The Water Authority is led by a widely representative Board of Management including a farmer, and has a number of local or regional advisory committees giving advice on water allocation and local management issues, so there is some community influence on how water policy is applied by the Department.

The Water Resources Council advises the Minister for Water Resources on state water policy on such issues as water conservation, development of water sources, water pricing policy, irrigation and salinity in the south-west, and rural water supply. The Council is chaired by the consulting hydrologist Dr Adrian Peck and has three staff led by executive officer Dr Bob Humphries.

The Water ring operates under eight Acts, including the Country Areas Water Supply Act, the Rights in Water and Irrigation Act, the Water Authority Act and the Land Drainage Act.

In the **Nature** ring the main government interests include the Department of CALM, the doer, which looks after national parks and nature reserves, forests, and has powers over the state's native flora and fauna on anybody's land. The National Parks and Nature Conservation Authority, the thinker, not only advise their minister (the Minister for Environment) on nature conservation policy but also are major landowners - the national parks and nature reserves are vested in them - so they are responsible for the management plans although CALM does the managing. This circle operates under two main Acts, the Conservation and Land Management Act and the Wildlife Conservation Act.

The Minister for Environment has another arm, the Waterways Commission which is a river and estuary management department under a board composed entirely of community representatives. The Commission has a number of Waterways Management Authorities such as Peel Inlet, Leschenault Inlet and Albany Harbours Management Authorities and the Avon River Management Authority which are also drawn from the local community. This messes up the Three Ring Circus a bit because it is a Water body but is connected to the Nature circle because we like to think rivers and estuaries are still natural environments.

There is another element which fits to one side of the Minister for the Environment but really deals with the areas of overlap between all the circles. That is the Office of Catchment Management where you find Dr Ray Wallis and Sally Humphries ready to advise large catchment groups which are forming to coordinate the groups within those catchments. They also look after a large group of senior government officers from many departments who are called together to sort out gaps and overlaps between their departments. They operate to the government's Integrated Catchment Management Policy, endorsed by Cabinet but not tied down in an Act. It is that policy responsibility which puts the Blackwood Catchment Coordinating Group under the wing of the Minister and brought him here to open the workshop today.

So in each of these areas you have a connection between a department, a representative council which has community interests in it, and a Minister. The ministers, being the ultimate policy deciders, have Cabinet, Parliament, their party and their electorates breathing down their necks to make sure their decisions keep everyone happy.

You can have access to the Ministers because they are put there by you through the political process. I'm sure you are well aware of ways to get to them through local members of the party, local MPs, and so on. So you can start making government policy anywhere in that political process. But being a good public servant my job is to help the minister get just enough from the public so he can make good policy decisions but not too much so that he spends all his energy on local issues and has none left for the big ones.

This is where we start focusing on where the Blackwood Catchment Coordinating Group fits into the policy - making hierarchy, and the job it can do to make it easier for the Minister and the Government to make important regional decisions rather than getting lost in local ones.

Where does the BCCG fit ?

I will use a table or matrix and start filling it in. The world out there is very complicated and I have found this a useful way to make a bit of sense of it all. You might find it interesting to add to it yourselves to see the possible connections between the Group and other bodies in the region or catchment doing things which influence the environment.

	Land		Water		Nature		Etc.
	Community Group	Government agency	Community Group	Government agency	Community Group	Government agency	
Landuser	Farmer	WADA extension officer					
Local Group	Sub-Catchment Group	WADA					
District Group	LCDC	WADA District Office					
Regional Group	?	Regional Office	?	Regional Office	?	Regional Office	
State Group	SLCC	Commissioner and Director General	WRC	WAWA	WWC Board NPNCA	WWC (dept) CALM	
National Group	NLAC	DPIE					

Let us start across the top with those same three major areas of land, water and nature and start adding other things such as landuse planning, developments, tourism and so on which affect the way you use land in the region.

Coming down the side we can put a whole lot of levels to which you belong in a sense: starting off we are all farmer, land owner or similar, then we get into groups such as LCDs and then onto regional, State and national levels.

Just coming down the Land column we will see that we can split the column between what is a community or volunteer activity, and what the corresponding level is in government. The idea is that at all those levels you the community want to influence what

the government does, so you can quickly work out what community body you have, or might need to form, to provide a counterpoise to or partnership with government to guide it in your direction. Now you might be thinking, "Why don't we simplify it all and save some money by giving half these levels of government the chop", but I hope you find they are all useful people giving you a real service with valuable information, ideas and resources.

You see that it starts to fall out into levels. In the Land column you have:
- Landowner level :farmer - Department of Agriculture extension officer;
- District level: LCDC - District Office;
- Regional level: Regional Liaison Committee?: Regional Office.
- State level: Soil and Land Conservation Council influencing the Commissioner and the Director-General (at least we'd like to think so) and the Minister.
- National level: National Landcare Advisory Council, which has a WA representative for local government and farming, advising the Department of Primary Industry and the Federal Minister, particularly on national landcare funding.

Fill in the relevant community groups in each of Water, Nature, Planning and other columns which balance the government representation at each one of those levels, and therein lie your opportunities to influence government policy.

Now who ties all these district and regional bodies together to link what they do across the catchment and in each of their special fields of action? It should be clear that your own coordinating group is the central linking body at a regional level between what you would regard as the local and district and people levels putting landcare into effect on the ground, and what you would regard as the more remote people at State level who you are trying to influence to see things your way and to provide the services you need on the ground.

So don't be put off by the apparent complexity of government and its policy making. Take this as a three-quarter time pep talk before you go into the final session of developing drainage policy for your catchment. I'm saying that you are in the middle and can take control of the game to influence what those below you (State and Federal government) are doing for the benefit of those above you (your LCDs, Shires, community groups and landowners), so get out there and do it!

Develop really good catchment planning with everyone involved so the government will sit up and take notice when you come back with something that says, "we know what we want to do in our catchment, here's our plan, this is what we are going to put into it, this is the assistance we need and these are the sort of resources we need". If you can act together over the whole of the Blackwood you will have the support of the urban community as well and it will be a lot easier for government at all policy levels to step in behind to help get it all done. Then you will have given real meaning to the Macquarie Dictionary's fourth definition of "policy" as practical wisdom.

Blackwood Catchment Coordinating Group

David Reid, Chairman
Blackwood Catchment Coordinating Group

Firstly I would like to thank the Soil and Land Conservation Council for a donation of $1000 to our group to help offset partially some of the costs today.

Secondly I would like to thank the Katanning LCDC which has organised the day. I believe that this is the way that our group should work and it is a chosen path that the people on the ground have the say in giving the directions to the BCCG; we are purely there to provide the support and the sponsorship. Also I thank those there in the group and including the local Department of Agriculture, John and others who assisted; lastly and not least to all the speakers that have performed here today.

My role is to let you know where we go from here and the role of the Blackwood Catchment Coordinating Group. I would like to preface my remarks on what Kevin Goss said when he laid down the challenge to the Catchment Group. I would like to say to Kevin that I believe that within catchment management now there is a willingness to accept that we are all part of the problem and a very real deep determination to look for and seek a solution to it. That is the community taking on board the issues and I believe that the spirit that you have shown in coming to this workshop today has reinforced that. I just wonder about the other 80% or the 70% or 50% of community. Hopefully, if they haven't got the same conviction as you people today to tackle the problems, that you might convince them in the future. That is certainly your role and ours.

Yesterday late in the afternoon Owen Dare and I were still in Wagga and I want to tell you a little story to lead into my comments. In Wagga, a rich rolling farmland with a 28 inch rainfall, magnificent country, cleared over a hundred years, a few years ago the water table was 50 to 90 feet below ground level; now it is within two meters and less of the surface. It has been rising for a number of years at half a meter a year. Owen and I were privileged to spent the day with CALM officers. I was going to ask initially if there were any urban people here who own under 5 acres? Landcare doesn't just stop at 500 or 1000 acres. Everyone lives in a catchment.

What Owen and I saw yesterday in the town of Wagga, $200,000 homes being salt affected and their gardens dying with salt scald coming out, leaching out of a recently constructed cement drive. We went then to the show grounds and here a show was due some six weeks away, a third of the show ground was dead and as bare as a salt patch in Dumbleyung and Katanning. They thought that because a couple of West Australians were there, we had the instant panacea of the problems and they actually offered Owen on the spot life honorary membership if he could cure it within six weeks. The question, where are we and where do we go from here is asked by an increasing number of people across Australia.

Just looking at the solutions and the BCCG and where the BCCG fits in this situation: I think that I would have to say thanks to Charlie Nicholson who did a fine job of saving me a lot of time by painting that picture, because, to me, and our committee I think that we know how we fit into the picture. We must take on board the results from this seminar today, it is our job now also.

The BCCG is totally community driven, it operates on a consensus point of view and if we have a problem we will back off and talk it out and wait until we have that consensus before we go ahead. In that way we who own the problems will be involved with the solutions to those problems.

I know that it is dangerous to come back from other lands and think that you have all the answers to the problems, but wherever we went in our short tour of Queensland and New South Wales, we did not see another group with as much on the ground horse power as we have here in West Australia.

If I may sell you my concept of landcare: it is not going to be solved by Government, it is not going to be solved by agencies, however good and committed they are, it is going to be solved in this battle by the ground troops, as all battles are solved. I say to you that in WA we have the finest salt ground troops in Australia.

In summary, Kevin made mention of a number of objectives that we need to take on board as the Blackwood Catchment Group, I think that is a very valid point and we will do so. In the past we have been virtually starved of resources, and also manpower. We were advised today that the group has been successful in getting funding for a co-ordinator and I believe that from now on we will be able to do the tremendous amount of collation of material that is necessary to start building the integrated catchment management plan. It is not going to happen without your continued support. I think that, with that, and together with the coordination that the co-ordinator will bring and with adequate resourcing, we will be able to get the data to set the objectives that are valid and achievable. I believe that with the combination of those things I am optimistic that we can make a step towards introducing a high level of efficiency to catchment management planning in WA.

To summarise, I do understand that some of you are unsure about just what the Blackwood Catchment Coordinating Group is and its role. I don't want to alarm you at any time that we going to come in with policies, there will be plenty of opportunities for you to respond to the findings of today's workshops. When they have all been considered by the Blackwood Group, we will then take them on board as a set of best bet options, best health practices or maybe even codes of practice which have community support for tackling this issue of drainage that we addressed today.

Mr Chairman thank you for the opportunity, ladies and gentlemen thank you for attending our first workshop. There will a number of others on different subjects later in the year and we hope that some of you will be interested enough to attend those too.

Blackwood Catchment Drainage Issues Workshop
an executive summary

Rex Edmondson, Chairman
Soil and Land Conservation Council

Have you ever tried to summarise all that butcher's paper in ten minutes? We are going to give it a go. You will find that I may jump around a little, but I will try to keep it under the headings that you have listed for your workshops so as to get some continuity.

You can see by the group that you are in that there are literally hundreds of issues and I'm only going to touch on a few because I couldn't write them all down well enough and there are so many of them.

Some of the concerns on the river and the catchment: some saw there was a concern that there was a difference between the river and the catchment, or some saw it as a statement. There seemed to be a lot of concern around all the groups about the lack of vegetation on the river bank and the continuing decline in that. These were general threads running through it.

Sustainability popped up everywhere and I guess that applies to wherever you go in this State. There were concerns about bureaucratic decisions being made on drainage in the lower part of the catchment, and I read into that it is without consultation. Loss of remnants right across the catchment, weed invasion into the vegetation is an area that needs dealing with. Lack of substantial data on the river itself, I thought that was a good point, there is a large flow developing into the river and can it cope? Loss of recreation value on the river and the concern was that the community didn't really understand or perhaps at this stage were not prepared to take the responsibility. Loss of aquatic life on the river.

Under the heading of problems, once again I tried to find a thread running through there. There was a lack of willingness for a minority to participate in planning and the development of this process and integration. Waterlogging is a problem in the higher areas, further back up the catchment. The need to understand the big picture, I think that is a good point. There was some concern about drainage design and the consequences of drainage. The good point was made that there are winners and losers in all this, the environment within the farming population itself. Understand the source of the problems, there are solutions other than drainage. Cost of implementation of course came up everywhere. The landscape complexity from the top of the catchment to the coast. Some were concerned about the lack of technical information on planning and design. Regulations need a better definition. There was only one group that mentioned that there was a lack of shire co-operation.

Some of the goals for the next twelve months and the next five years, I haven't got them spelled out exactly which they are. Gather and coordinate the existing information. I would be very surprised if there are not heaps of information available, farmers always complain that all these files on research are sitting on dusty shelves somewhere. I'm sure that this applies to this part of the world as well. Promote discussion on who pays and the equity issues involved in that. Implement and initiate from today's workshops the issues and I will have to quote Theo Nabben, "bloody well get on and do it". Don't get

side tracked, establish a long term plan, set up a monitoring network, I think it would be pretty important in this case. A lot of education is required on the problems and the issues, another very important area is catchment management and planning right across the area. Need for understanding of the whole of catchment process, underground and on the surface, therefore education at all levels, need for neighbouring catchment groups to maintain their co-operation for the long haul. I don't think that anyone would doubt that it is a long haul. Another couple of aims here, how to harness the community's participation in the future by enough people. That needs to be a lot broader than it is. Lack of information on each of the river systems, presuming they are saying there that they saw that as a goal to gather some.

As you can see from that there is a broad range of goals. It always strikes me as amazing how we wack up groups like that and they all sort of head down the same path and when you see the make-up of some of those groups it also is quite amazing that they all head in the same direction. Everybody in general realises the problems and the concerns irrespective of what part of the community or society you are coming from. All of those running down a similar track and therefore that also says, with that basis to work from, this afternoon's workshop session should start to pull everything into shape and come up with something very meaningful by the end of the day.

Blackwood Catchment Drainage Policy Workshop
an executive summary

Rex Edmonson, Chairman
Soil and Land Conservation Council

There were some interesting discussion points raised as I went around. One of the things that came to the fore was monitoring. The monitoring discussed was quite broad from the common old piezo. through to the electromagnetic surveys.

Establish the Blackwood as a gazetted drainage district.

A couple of the groups were discussing actively lobbying for funds that didn't come through here. One that was fairly consistent was that NOI's (Notice of Intention to Clear) don't look at the big picture. Group consultation needs to be much more prevalent rather than the focus being on the individual, which the current method does. Someone felt that the current legislation tends to block not help.

Some of the specific statements:

To gather more objective information on the effects of drainage in the Blackwood catchment to date.

The Blackwood Catchment Group to present the future objectives they arrive at for the catchment. This affects what guidelines for the NOI are acceptable.

1. To continue to construct and communicate with the community about: the management strategies; implementation of the strategies, resources and funds available to make these strategies and for all the extremities and areas of the catchment to avoid duplication and provide education awareness.

2. The BCCG must develop policy that encourages development of integrating catchment management plans from farm scale through catchment to regional scale via a full community consultative process involving LCDC's and other stake holders. Drainage is but one element of an integrated catchment water management plan. The right to drain is conditional on fitting into the catchment plan.

3. Outline the goals and work towards them within twelve months.

4. Employ a small team of catchment co-ordinators.

5. More active lobbying for funds

6. Resolve the group to get a wider plan developed to take something constructive to our groups, inform them of the bigger picture.

7. Initiate and emphasise the need for catchment coordination by LCDs and others.

8. To Drain Or Not to Drain: still debatable. Other methods of drainage just one strategy in an overall plan

9. Need to be clear about catchment objectives before deciding policy for drainage; e.g. education and communication and facilitation.

10. The objectives are to restore hydrological balance to the catchment.

11. Have a local catchment plan for drainage.

12. The need to implement the solutions.

The points have been made and it's up to the Blackwood Coordinating Catchment Group to take it from there. You have heard the views and all the points will be drawn up in due course into the proceedings and will be sent out to all of you. And where to from there?

Context of workshop discussions

Justin Hardy
NLP Project Officer
Department of Agriculture, Katanning

Today is a terrific opportunity to share a vast range of ideas and experiences on drainage and develop one strong voice to represent the managers of the Blackwood River and its catchment.

We have representatives from 18 shires (some parts of), and that many potential LCD's to help draw together issues and recommendations on drainage that can be used to develop policy and management in the Blackwood Catchment.

To do this, we are divided up into nine groups for two workshops, firstly the issues, after lunch the recommendations. Each session lasts one hour only, so please be as clear, concise and open-minded as possible.

For yourself, what is the one most important natural feature of the catchment, and why?

Note from editor.

The results of the workshops and the individual comments made by participants are recorded in the following tables.

Important natural feature of catchment	Reason
All of it	operates as whole system, all important
Native vegetation	
Bushland Flora and Fauna	Ride and walk through
Severe over clearing and loss of vegetation in Upper Catchment	
Lack of vegetation in the upper catchment	Has major impact on all of the catchment and its economic and natural value
Ridges	Vegetation flora and fauna
Natural vegetation/remnant vegetation	Gradual decline of these. There must be a balance
Remnant vegetation and timber	Important natural economic resource
Wetland and River vegetation	loss of wetland, habitats
Vegetation and drainage requires upgrading in creek ways	silting up
Wild and scenic qualities of the river	
River System	
Natural Water Courses	Maintain native flora and fauna of each area
Bockaring Creek	Main drainage
Catchment	because of its future possibilities for sustainable land use
Largest catchment in south west WA	some of my land is severely affected by salinity
River	To get rid of excess water
River and its diversity	It is the drain
The river as a whole and its hydrology	the maintenance of the interaction between the land and the river and vice versa
The Blackwood River	Important part of Southwest ecosystem and tourism (e.g. marathon)
The Blackwood River	It's the most common feature and the "artery" of the catchment
Blackwood River	Water is life - everything
Coblinine River	Sustainable farming
Coblinine River	To drain the area
Dumbleyung Lake	If it wasn't for this the Blackwood's problem would have been more than it is
Dumbleyung Lake	Not an obstacle, should be regarded as an asset for the Blackwood River
Lake systems, particularly eastern area	scenery and important flora and fauna habitat
Drainage system	unifies whole area of catchment
Chains of lakes and shallow valleys	They form a buffer/pivot between excess water and salt from upper catchment flowing into main river
Scott River and Hardy Inlet	Area mining could impact, valuable resource
First order catchments	Both for the cause and the solution of the problem
Ecological and Biological Diversity	
Ecology	Sustainability, productivity, identity, quality
Maintain an sustain ecosystem	Degradation and water quality
Diversity, Beauty	Maintain attractiveness of catchment for agriculture, tourism etc.
Lifestyle and loss of same	loss of life style

Ecological variety	survival
Water quality-support native flora and fauna	maintain natural heritage for future generations
Healthy functioning balanced ecosystem/water balance	This is basis of environmental and productive uses of land
River Environment	Important ecosystem under strain, need to protect and accommodate sustainable agriculture
The variety of natural vegetation/fauna along the Blackwood	The wide range of unique ecosystems that are essentially linked to each type and dependant on the complex
The diversity of plant forms within Catchment	For living with:- leads to farming variety
Farmland	
Landscape, not rivers	Provides an income for a lot of families, river doesn't to same degree
Good farmland going salt	
Good soil types for farming	Good present and future potential to support farmers and other people
The farming land	It provides the dollars
Resource	because it is a resource
Natural resources drainage system	To maintain Agricultural system
Water Balance	
Changing groundwater profile	The forcing function in many degradation process
Catchment runoff and water-tables are too high	This is the basis of Dryland salinity and waterway degradation
To lower water level in the catchment area	To get land back for agriculture in Blackwood area
Water Balance	Sustainability of farming, quality of life
Water	Amount of runoff
Maintenance or restoration of hydrology cycle(in widest sense)	if this occurs, proper land management is occurring
Catchment equilibrium	hope for new generation
Degradation	
Increasing Salinity(2)	Over Clearing
Stopping the salts spreading of the river	destroys the quality of land and water
It has been made saline, change in salinity	because of over clearing
Silting/sedimentation of minor creeks	Are they choking water flow and contributing to salinity? need answers
Shows signs of increasing saline discharge	needs work
Salt degradation to the catchment	because it effects the whole ecology of the area
Water Quality	
Water, water quality	overall gauge of health of the river
River water quality and natural drainage	maintain and return while providing for multiple use
Water quality habitat for breeding fish species	Top of food chain so declining fish stocks represents sad river
Aesthetics	
Diversity of regions river flows through	distance river covers north to south
Beautification of the Catchment area and drainage system and water use	To allow for water usage and bird life and sustainable agriculture

Lower recreational area	important for quality of life
Scenery/natural	diverse from northern end of catchment to south
Beauty	
One third advisory district	

What concerns do you have for the River itself and the Catchment areas.

Concern for River

Degradation Water Quality
To control and prevent further deterioration of the quality of the river environment
*maybe the water is getting more saline because of catchment area is degrading
water quality enhanced people won't live or use a brackish drain
pollution inflow(2)
leaching of fertiliser
deteriorating water and environmental qualities of the river due to silt, nutrient and salt
lack of data about the river
of river drainage quality
toxic algae(2)
Increasing Salinity(23)
Salinity/water quality(14)
erosion of banks
erosion
Eutrophication P treat(10)
Silting(16)
not enough basic inf. available to implement plans i.e. sedimentation(2)
potential for increasing degradation if we don't get our act together
Flora and Fauna, Vegetation
flora and fauna loss(14)
loss of capacity to handle change in environment
Biological health
reduced aquaculture population(2)
loss of ecosystem(5)
loss of biological systems in river
Salinity loss of natural life(3)
loss of micro organism in the river
NOTE loss of diversity and activity of aquatic fauna by all the major problems of salinity/nutrient/sedimentation/turbidity(2)
loss landscape value
the effect on the ecology
changes in aquatic life on river
Health of the river ecosystem1
Siltation loss of deep pool summer habitat(2)
aesthetics of it(2)
Corridor value
Floods and drainage
concern that river gets turned into huge drain
caution with farm water drainage
Waterlogging
effect of agriculture on peak flow
continuity of flow
Drainage and flooding of surrounding areas
Increase community costs due to increased runoff

increase flooding frequency and flows
Community, recreation, tourism
multiple use water supply, recreation, tourism
loss of recreation value beauty(6)
community asset
tourism(2)
increase use of the river by people for recreation(2)
Social, tourism through our forest
quality of lifestyle along river
maintain life
affect on community health
loss of social value
community restrict use of river for non economic resource
General
economic use
Weeds(2)
indicator of catchment problems
changes brought about by land clearing and its consequences-no quick fixes, very diverse. It has changed particularly in the upper creeks but no panacea needed
dam fresh water
stream bank protected from erosion -loss of vegetation
Salt discharges will be carried by the river changes will result in the hydrogeology short term that may result in frantic and confused reactions
None-by fixing the catchment the river will take care of itself
education
hydrologic cycle
loss of production
Changing of the river and its environs and the impact this has(2)
impact from catchment land use
physical development in built-up areas i.e. subdivision
concern that physical river takes precedence` over catchment

Concern for Catchment(number of times mentioned)

Degradation
multitude of degradation issues
increased erosion(2)
broad acre degradation must be halted
prevent soil erosion
increasing losses of salt, nutrients, sediment3
erosion(9)
soil quality
Salinity(15)
rising water table(8)
degradation of the area and the consequences increased runoff (3)
reduce runoff
That salt will deteriorate land further if not drained properly
salt, sediment, nutrient and other pollutant inflow
control of water
destruction of our soils
has the degradation of the lake and river system already gone too far to reclaim by natural means - or we need more radical action
flooding
sedimentation of minor creeks(2)
Co-operation, willingness to correct situation
getting 100% involvement from all farmers in catchment
note call for volunteers
Motivation to get people to join catchment
Apathy(2)
Integration and planning
lack of total data set(2)
multi agency approach-talk but no commitment or move to allow it
need regional appraisal to understand what is going on at catchment scale
need for regional management to catchment scale approach
Integrated approach for total drainage
integration of planning(2)
Right to Drain
need right to drain, concern that not being allowed to export our unrequired water eg rising water table (2)
The reluctance to allow drainage from the lake system
not permitted to drain saline land
Restrictions on drainage, red tape(2)
Water Balance, efficiency
Agriculture system developed to use all rainfall on site
balancing water equilibrium to sustain farming(2)
Agricultural productivity
decrease in available agricultural land(2)
loss of productive farming land(10)
farmer productivity - sustainable agriculture
Maintain farm land for production of food resources
Increasing Salinity and affect on agric productivity(2)

Vegetation, Flora and Fauna
loss of valuable natural remnants of flora and fauna(10)
dying lakes, rising water killing remnant vegetation
loss of natural vegetation(15)
maintain and increase vegetation area
Corridors and networks isolation of
increase in animals, plant pests
loss of biodiversity species
landuse practice and impact on terrestrial vegetation both natural and commercial
effect of salinisation on remnant vegetation(2)
Farm viability and sustainability
Profitability of agriculture improved to allow farmers to take action
economic pressures on farmers stopping sustainability(2)
loss farm resources
availability to help manage the land of system
economic pressures on farmers limit ability to implement sustainable agriculture
economic constraints(2)
allocation of money
Need to Drain
water management antagonism
Lower catchment dictating upper catchment
Preserve upper catchment
preserve drainage system
drainage of upper catchment areas
focusing on the river and flowing streams can divert attention from dealing with the sources of excess water and salt from higher in the land profile
drains changing land form (eroding)
drainage
bureaucratic decisions made on future drainage
increasing drainage into tributaries by drainage works and the resultant discharge of increase amounts of water
drainage on the flatter areas (lower down) is needed because those on the upper areas are not using water efficiently enough to help those in lower area(3)
lack of technical advice
General
aesthetics
lake quality
fresh water for human and stock consumption
Weeds
complete lack of information (on such things as the height of Dumbleyung lake overflow due to silting
changes in micro climate(2)
not simple, understanding of the problem capacity to loss the ball, how the issue is driven
legislation
Wetlands and lakes accumulate salt vs. economics
Land management and sustainability
sustainable landuse practice and management of the catchment(4)
balance economic and ecological sustainability

inappropriate production and sustainability
changes in landuse
overall reducing options for long term use
long term sustainability of whole system(2)
maintain a viable ecosystem
Education and awareness
ignorance of effect of past practices
To raise the level of awareness in the community to the importance of landcare as a total package in sustainable agriculture
responsibilities of landholders, towns people in catchment ,water use
Socio-economic
increasing land degradation, loss of farm and community viability
maintenance of communities in catchment(2)
farming and social disruption(3)
Loss of economic viability of rural area
to be able to farm and live safely in catchment
economic impact of change production loss
the community people

What are the drainage management problems you have experienced

Degradation
Erosion-sedimentation(3)
Eutrophication
Salinity
degradation of vegetation
Salinisation of drainage network in mid and lower catchment
Water use and reasons for excess water
Increase runoff and siltation
increased Clearing
Lack of on farm utilisation of rainfall on farms
Management of increased runoff flow
Inappropriate past practices
Water harvesting
Drainage design
Where do you start - experts
engineering solutions cost money, false economics
Drains not installed on contours (bad design)
Water ways being diverted by the incorrect placing of shire roads and culverts
Lack of fall for effective drainage causing more problems than they save
Insufficient technical information
bad planning of some drains and lack of money to fence of trees and salt bush will have to work with Dumbleyung group
Towns - introduction of treated waste/stormwater
General
overall picture of water movement
The apparent obvious treatments -drains or trees on hills often do not work
Excess runoff from farmland causing erosion onto edges of existing drain and creeks causing bare areas which are susceptible to salinity
little experience increased salinity of water bodies
drainage seen as short term solution
Drains seen as the solution - one way to treat
Rising ground water killing vegetation etc.
sectarian approach (often too narrow view)
Inadequate, uncoordinated, inappropriate, lack of awareness of consequences
People see river as more important than catchment
man made barriers i.e. roads, railways causing waterlogging of previously dry land
Farmers are restricted by legislation as to their options for alleviating drainage problems
Experienced soil erosion and wash away after violent summer storms
Uniqueness of land
Regulation of water on steep slopes
lack detailed knowledge of hydrology hence source of water input(2)
the fact that drainage is still at the experimental , individual level
Landscape got well drained allowing increased water discharge to build up in the sumps
Upslope farmers doing drainage and pushing water downstream without notification or consideration
Landscape is complex. I believe there is a need to understand hydrology and salt storage in a catchment prior to implementing drainage

Siltation of first order tributaries
controlling water in upslope-holding water up high-hard to slow down
Groundwater-drainage- farm paddock scale, need to know regional ground water system
Concern re drainage from upper catchment areas
Cleaning of Bockaring creek
Deepening of Bockaring creek
Drain maintenance
Drainage is the problem
Why drain
increased groundwater levels
increased saturated areas
increase surface water
Inundation of land
excess runoff
effect of rising water table on nature reserves (and passive attitude to this)
Loss of production
Loss of stock water
increased flooding
Waterlogging water table rising(2)
Rising water table > landslips, waterlogging and loss of vegetation origin and effect in different places
Waterlogging losses of pasture and crops(15)
Recharge of groundwater systems
Waterlogging and need for drainage to reclaim areas producing sustainability
Waterlogging from water out of gravel
Salt
Consequences of drainage
erosion through changing natural drainage
increased drainage=increased problems for bottom of catchment
Increased siltation/soil loss/nutrients
Erosion caused by drainage
control runoff with regard to fencing and roads(5)
Constraints
money(3)
Size of problem
no incentive for upper catchment
Not enough money to solve problem
Capital cost of drainage and maintenance
Disposal of drainage water
pumping of groundwater to creeks and rivers
no coordination of the storage or disposal of salt
Resistance to effluent in river
Drainage into nature reserves
Pumping into nature reserves
pump effluent is very obvious
no where to run/divert water which is entering farm accumulating through annual rainfall, rising

Lack of access to defined drains
where to drain excess water
Drainage saline effluent -disposal
no sink for water except river
Disposal of saline water(5)
Band-Aid approach trying to dispose of water without addressing utilisation and balancing water cycle
Discharge of excess water from neighbouring places
Pumping of saline water into system
Information and technical expertise
Awareness of increased salinity
awareness of pros and cons of drainage is lacking
Education controls of drainage at this stage seems vague
Lack of knowledge of current drainage network and its hydrology
lack of information(2)
Lack base line information
Lack of seismic surveys (eg dolerite dykes)
Lack of technical direction
picking the right solution
Not enough experience to solve problem
Getting correct advice about how where and why to put drains
Catchment integration and planning
co-operation of farmers (5)
need to plan drainage systems on catchment basis (controlling high rainfall events
need to integrate management to understand the big picture
lack of involvement by one or two members in the catchment
Total participation required for surface and ground water drainage
Ad hoc approach to drainage without adequate knowledge of hydrology
lack of ICM?consultative approach to drainage
Not enough integration of catchments to solve problem
one persons drainage solution increases the problems of another person downstream, MANAGEMENT AND COORDINATION IS THE START OF A SOLUTION
No catchment context for assessing individual NOI's
Lack of integration catchment to catchment within the Blackwood
coordination between neighbours(2)
Convincing public of need for overall planning
Lack of integration of drainage farm to farm
Starting at the top of the Catchment
Impact on Neighbours
drainage onto farmer neighbours especially CALM
Each person responsible for water management
Lack of concern for neighbours selfish
unmanaged drainage has severe effect
Controlling neighbour water siltation
local authority/farmer co-operation(2)
Neighbours involved with different concerns

Government Agency coordination
Inability of commissioner for soil conservation to coordinate govt depts i.e. Westrail, DPUD etc.
Construction of works no coordination between agencies eg Westrail/farmers/shire
lack of communication between agencies
CALM/EPA being concerned as to effect but not having direction

What are drainage management problems that you believe will in future prevent sustainable management

Disposal of Drainage water
will pumping be allowed
View that problem is "exportable"
Disposal of water
Effluent disposal from pumping(2)
Education, Awareness
training landholders-knowledge gap
Education
changing attitudes
lack of educational facilities
Education to understand
Knowledge, expertise, techniques
Lack of knowledge data effects of drainage(2)
Information has to be correct 1st time(2)
Lack of objective knowledge knowledge-> failure of management efforts
Lack of information and research
technology
Lack of experience to solve problems
understanding issue/sustainability
Constraints
funding for fencing
Lack of hands on personnel
funding for research
Economics/finance
The costs financial to the farmer, environmental to the community
Cross subsidisation
Lack of resources govt/individual education - publicity
The lack of money to help overcome these problems(11(eleven))
Lack of support for farmers/groups to make best bet decisions
More support for farmers(2)
Limited finances/resources (farmers/govt) to instigate remedies
Compensation for uncleared land
Recognition of causes
Water not used following removal of natural vegetation has mobilised salt in landscape
Tree plantings could die as the originals are doing
Rising water tables
Solutions
Lack of systems that utilise sufficient water to prevent rising water tables
Rehabilitation of gravel pits
The water the land is meant to have is being taken off it and wasted in drainage - whole system of farming needs to be changed
Government
Legislation forcing of(2)
Regulation without fundamental sound knowledge will cause community dissent
lack of appropriate government support and advice

Uniform government intervention
Over legislation - curbs forward thinking
Legislation restraints - if not considered carefully - uninformed political pressure
General Community benefit, equity issues
ownership of catchment to all not just a few
Parochial interests
Competing primary objectives between stakeholders
Gulf between upper and lower catchment votes
No goals set for retaining farmland, how much
What is to be sacrificed
addressing equity issues between all interests
Management of drainage system -responsibility - no system at present
Apathy(2)
Lack of community coherence/agreement on priorities and action
Lack of broad govt/community support for change
Lack of will to confront hard questions-> failure
Lack of management structure and resources for drainage
We are all new at trying to solve BCCG problems and in hindsight we will realise where we went wrong or right
Payment of rates by wider community who pays who implements3
Changing farming practices - costs, research etc.
Costs vs. benefits in current agriculture downturn
guideline for clearing to be changed
Catchment planning and integration
Catchment planning - lack at all levels
Lack of a whole system view
Working from catchment to catchment
?no boundaries in catchments
Lack of catchment planning - appropriate solutions to use water
need for integration
The lack of resources put into technical support to catchment groups
Landcare funds given to corporate initiatives rather than catchment groups
Cost of implementing catchment plans
Individuals getting grants for landcare work opposed to catchment groups(2)
Boundaries of Shires
Failure to integrate drainage management (i.e. erosion control, waterlogging control, water resource management)
Monitoring
Lack of monitoring to see results
Not enough monitoring (information)
not recognising overall trend early enough
Co-operation
getting all farmers working in a overall co-ordinated plan(3)
getting farmers to work together
Landholder coordination-lack of co-operation will mean inadequate design so poor performance
Upper slope coordination
Lack of social/legal systems that allow and ensure co-operative management

How to get landholders doing "their bit" to benefit others(2)
Uncoordinated approach to research planning and implement between all landholders eg towns/farmers govt agency
Coordination of co-operation from everyone within the catchment due to costs involved with little prospects for increase in income
Lack of co-operation(2)
Inability to maintain coordination within and between catchment groups(3)
lack of coordination(4)
Lack of community/govt coordination to deal with it.
lack of controls to get the non-supportive landholders to conform
lack of action
Concerns
increased salt levels in wetlands and rivers
Waterlogging and subsequent spread of salty area
Over drainage outlived use
In time the drainage from the upper catchment area
expensive short term change
Over clearing
Impact on River hydrology
water movement
Lack of understanding of hydrology (on-site) i.e. understand the resource
Lack of information on hydrology and salt storage in order to implement most effective drainage(3)
unmanaged vs. managed drainage
data on hydrological effects of drainage
effect of drainage on peak flow

Ways BCCG should approach these issues

Next 12 months

Catchment Planning, ICM,
Encourage and support set-up of ICM scheme on a sub-catchment
Overall planning
Work toward clear goals with in all group from top to bottom of catchment
Catchment planning management
Catchment management planning will address many of the issues raised in our group
coordinate catchment approach
Develop management structure(2)
coordinate whole catchment approach to water management and other issues and get resources
good plan management
catchment groups overcome apathy
initiate ICM plan for catchment(2)
Support of catchment groups
promote group formation
meet with and talk about the need for ICM plan with all landholders (LGA, farmers, Govt agencies etc.)
Education and awareness
Encourage and support education on drainage
Sponsor education awareness by examining what is happening
education awareness of responsibilities of catchment land holders
Request development of specific TAFE course for landcare
spread of knowledge - newspapers TV
education-school/attitude(3)
Education awareness
educate particularly to apathetic
Publicity(4) (TV radio etc.)
understand existing drainage network and hydrology -public education
major education program all facets from regional to catchment scale2
coordinate all bodies i.e. landcare groups and govt agencies to isolate their own problems with drainage and education of people in the catchment area
Research and Monitoring
Monitor existing water quality to compare in future years and change good or bad
Encourage and support research and monitory work by LCDC's in upper catchment2
Initiate appropriate monitoring to detect hotspot/measure fluxes
Start monitoring program like oyster harbour farm based hydrological studies,
monitoring
promote research and resource assessment
Understand existing drainage, groundwater stream water hydrology sediment
what is happening and why
lack of knowledge
further research in catchment dynamics
More people-co-ordinators available (on farm)
State of the River System and Catchment, goals
Decide what state they/we would like to see the Blackwood River in then use this to decide on future work

Clearly identify problems within and sources of funding available in/to catchment
Work towards clear and defined goals without deviating, set up monitoring system
needs to define its goals(2)
identify problems
prioritise tasks that can be readily achieved
coordination and defining responsibilities and setting goals
Clear definition of drainage
establish what the problem is and set priorities
Identify problems
Project implementation
implement micro solutions to micro problems
get a project co-ordinator for development plan
Encourage better farm practices
provide technical advice
start tree planting program on all non arable land, study correct species
try to use rainfall within area
Systems that remove water at major sources through water harvesting need to first identify detailed hydrology
Clearing bans
Agency coordination
Encourage and promote a coordinated agency approach on research, extension, technical support
have one agency to direct the Blackwood
coordination of priorities agency LCDC and other groups(2)
Become recognised by govt to be able to coordinate the allocation of funds and research
lateral thinking
Community Involvement
All individuals and organisation as possible to be involved
contact with community
Open discussion with all affected landowners
needs to obtain the confidence of catchment landusers
Workshops
Whole catchment consultation and expert involvement
Give the people of the catchment the vision
Collate and disseminate information
Coordinate info of approaches required bring back consensus
gather existing info(2)
collect ideas from other states
plan to collect necessary scientific information
survey main river system
BCCG to coordinate and collate current data condense it into 5 pages and circulate5
Examine define and research first order catchment problems, hydrology, piezometers monitoring water quality and rate of stream flow monitoring
Facilitate collection collation and transfer of information to and from LCDC(4)
Baseline data set(3)
local workshops to share information
discussion and share info(2)
Determine the existing drainage pattern (map it)

coordination of information and extend(3)
Resources and Funds
try to get correct resources financial, professional
funding sources(3)
resubmit NLP proposal(GSWA, WADA, BCCG)
more equal funding WA produces large % of export earnings Blackwood is equally as important as Murray system in the ES where most of the money goes
lobby government for assistance to landholders in the form of straight out assistance and tax benefits
govt to pay for and install piezometers 2 per farm encourage interest
Dollars
General
to encourage co-operation
Learn to crawl (not to govt)
Role of landholder and role of govt
establish policy/rules for interim
LCDC's assess drainage in their area
economic benefit of approach CSIRO
Make the community aware of the problem and the solution concentrate on people who are currently apathetic
Divide into 3 sections Blackwood below Lake Dumbleyung, LAKE, Area above lake
try to stop people doing the things that cause the problem
lobby for increase tax incentives for landcare
economic advantages
effective lobby group
target catchment groups to encourage them to get non-members to join LCDC's and participate
get out onto farms and have a look at catchment

In next five years

Catchment Planning, ICM, integration
Encourage and support having 3 integrated catchment schemes in 3 subcatchment
Encourage group catchment management and co-operation
Farm planning into catchment planning integration of water vegetation flora, fauna soil climate and people
Encourage landholders to do a farm planning workshop set goals and make a start on their own properties
Foster subcatchments to exist and grow in their own right
Develop ICM
coordination/planning/management to maintain everyone on direction
Develop ICM drainage strategy/policy (cover all values
Develop catchment maps
"seeding" catchment interest groups
develop a concrete 5 year plan encompassing all collated data/information
Develop long term plan2
Obtain agreement on ICM drainage strategy
implement ICM drainage strategy
coordinate catchment management and agric management

long term plan
Complete the ICM for the catchment
prepare regional/catchment maps and data bases for BCCG2
interpret ICM for all the landholders - what each landholder needs to do to do their bit for the whole catchment
General
Encourage and support Employ training
Develop policy on who might go -river or some farmers
Farmers should address problems of present owned land before buying more land
Realisation that a major change to farming practice is required for agriculture to be sustainable in this catchment
Establish an authority (fully funded) to manage catchment development and implementation of plans of landholders eg farmers towns people, local and federal agencies
who pays
revise or refine legislation/regulations
Lobby group
marketing
sponsor moves for projects
lobby govt for more money as it is a social problem
to improve past mistakes
seek sponsorship
Research and Development
Find the equation or master plan to long term equation in terms of water balance
define areas where research is necessary
more research
Identify and research problems and solutions
Provide and extend sustainable management techniques
form research group
develop research mechanism into different drainage solutions
more research(2)
research effects of drainage on river/monitoring
involvement and input of scientific info
Research and information guided by Decide what state they/we would like to see the Blackwood River in then use this to decide on future work
research into alternative agricultural practice eg alternative crops, agro-forestry
Establish research and demonstration projects involving drainage and revegetation based on above research (water quality, water flow monitoring)
collect scientific information data set(2)
Monitoring
monitor further degradation and rehabilitation
form monitoring group
review monitoring
monitor(2)
Education and awareness
develop and promote TAFE course on landcare
farm scale demonstration farms
Identify success and advertise success and failures
maintain interest

catchment sporting events
progress on other programs when they become newer
More education and motivation
education children and schools i.e. ribbons of blue
Tee course
continue education
community education programmes
incorporation into schools in BCCG areas
disseminate info
build network of successful approaches
Field courses studies etc.
Seminars with any new knowledge
learn to walk
Project implementation
higher water use crops
alternative agric business/marketing structures, catchment co-op business within current farming structure
Promote production systems that balance the water cycle and protect existing natural ecosystems
implement tasks
produce with less P
put into motion a management system that will maintain a balanced and economic situation within the catchment area
Goals
Work towards an achievable outcome
set goals which can be achieved i.e. revegetation strategies
implementation of goals
overall goals to be carried out
Coordination
cross agency coordination
coordinate all relevant groups -community and govt.
coordinate whole catchment approach to water management and other issues and get resources
coordination of priorities agency LCDC and other groups
demand regional responsibility/autonomy with funds (fed and state) take charge of all dept and their regional programs
more equal funding WA produces large % of export earnings Blackwood is equally as important as Murray system in the ES where most of the money goes
coordinate all ideas from different groups

The community develops strategies and policy to handle drainage issues (workshop results)

Drainage problems already experienced

Community and motivation
***How to harness the community in the catchment to solve problem(emphasis on communication between community
The learning curve (30 years for me to wake up) motivation to invest in the future
political decisions not in long term interest (need suitable structure to resolve
everybody's (organisations) working on different boundaries (not catchment.
there are options/room to move
need to clarify role of LCDC
Hydrology
increased rate of runoff(400% W-drains)
increased frequency and higher magnitude of flooding
surface runoff MRD gravel pits
upslope farmer drainage without authority/consideration
Getting water off the flats eg Dumbleyung, Beaufort River
waterlogging on farms
waterlogging on farms
eutrophication eg Peel-Harvey, Blackwood too?
saline discharges farm to farm, farm to stream
money$$$
Apathy
complexity of landscape run-off affecting fencing roads
lack of vegetation in landscape
over clearing
Technical Assistance
picking the right solution
site specific solutions
lack of technical direction
Regulations
considerations of not draining salt area not included**********(not formally ED)
Confusion over what needs are for NOI, what requires NOI
number of people are not lodging NOI's
Downstream effect not known at local scale
winners/losers for decision makers who don't know full picture
more user friendly system
make regs. more clear
Monitoring
need provision of monitoring impact in regulations

Current policies and regulations affecting drainage

Acts, Laws and regulations effecting drainage issues
legislation uninformed, political pressure
all the different acts
Statue law
WAWA policy in declared areas
Rights in Water And Irrigation Act (needs reporting of all drilling enforced
Riparian rights
Land Drainage Act-people need to know about these
Effluent Control Act people need to know about these
Soil and Land Cons Act salinity drainage regulations
Soil and Land Conservation Act
Notice of Intent to Clear
NOI's drainage, 90day application for all govt, neighbours, LCD to use
Notice of Intent
Common Law damage to neighbours
Common Law
Common Law
list of common law items (5 of them)
Town Planning Schemes (with planned part of towns
EPA Act
EP Act major proposals
EPA policy on lakes(coastal wetlands, Dunsborough
MRD no application to drain (ref. EPA crf)
local govt act
Specific Comment
regulations should be forced to consider down stream effect
People need to know about these
encourage drainage without looking at consequences
effect of no drainage (currently neglected)
landscape complexity
$$$ apathy
clearing affects drainage
Over clearing
Specific Applications
Damage to roads by drainage LGA requires farmer to pay
overloaded culvert by farmer drainage -farmer pays
not allowed to alter existing water course or discharge point
there's a policy on land owners intent
excavation not permitted below 0.5 metre without permission
pumping - approval needed
Inadequate culverts no LGA responsibility

When should the regulations be used

Consultation, Communication and Co-operation
To bring about consultation
co-operation, communication and consultation should occur prior to initiation of regulation
Where individuals and community interest clash
where catchment group has non-complying members
when community consultation process breaks down (rather community's ability to resolve it
if catchment communication has proved inadequate
Catchment Plan
ideally in catchment plan with neighbours
have a local catchment plan 1st and then put in NOI
drainage strategies for where catchment with others (integrated) strategies
Specific situations
as` a last resort
specify a bottom line eg for faecal pollution
some of the currently unregulated drainage must be looked at too eg drains < one metre deep, fresh water (later note this would make it less flexible
any time effecting natural flow, current salinity levels i.e. pumping, deep drains, other banks and drains(not all agree)
when drainage creates problems downstream or to local authorities
when effluent disposal involved
When intention to drain
necessity of individuals
drainage or pumping that deals with salinity
development of potential 'point sources' in catchment
Comment on NOI's
90 days too long from NOI to approval
People not submitting NOI confused by regulation
common law should be considered before NOI
use NOI as at present
Assessment Considerations
does anyone have knowledge to give correct decision on correct drainage plan
assessment should include what may happen if land is not drained
must be interpreted appropriately to the case guidelines taken as law
people applying the law need to put more emphasis on the intent of the law
to make sure all aspects of a proposal are considered nature land water (with best technical advice)

How effective are current regulations in Blackwood Catchment

General
very effective
very flexible
effective on drainage but not so effective on water use (hi on-site)
Do we know?
remove the them and us attitude avoid demarcation
regulations are too restricted need to encompass all waters
Right to Drain moral issue
case by case assessment NOI co-operative with whole picture... significance of many not considered
LCD local rep often too close to the issue to take hard decision
surprised how some draining of run off is necessary
need to model natural system (original) with well developed treatment
Regulations seen as stopping rather than helping/changing effort
NOI's
NOI not related to depth of drain
how many put in a NOI (lack of awareness
Insufficient details of NOI
NOI not well defined
BCCG
the BCCG needs an objective better guidelines for NOI
BCCG needs to have it driven by people (i.e. co-ordinator)
Technical Assistance
list of people to approach in drainage issue
have required demo/design
regulations ineffective when the land conservation technical knowledge is not there
Tap the experts and ask the right questions
Planning
assessed and considered in light of farm and catchment plans
build in incentives to encourage Farm Plan

What areas of regulation(policy) need more work advice to BCCG

Water use efficiency
define a water management plan in which drainage strategies work with other management options
drainage has a place code of practice for wateruse on site within catchment (all players)
policy to use more water on-site[
Slow down water movement along whole Blackwood system*****
promote use of water on-site
get so good with our water use on-site that we can do away with the drain.
look for productive opportunities to utilise water-Ag production small scale
Catchment Resource Inventory
Need more information on effectiveness on what is happening
show economic benefits of good land management
emphasise need for monitoring impact of drainage(comprehensive monitoring)
encourage ground water monitoring piezo, monitor bores $*/catchment funding
farm monitoring program. one per farm minimum over whole catchment i.e. ROB
encourage EM and magnetometer surveys, catchment group demo, funding on regional, LCDC basis for equipment
Satellite monitoring over w/c of saline land
hydrogeological survey for whole catchment
Catchment Planning
create whole catchment plan beginning in Upper catchment
plan approach to catchment lobby long term plan
drainage is but one element of proper IC management need to discuss
regulation/policy should consider NOI in context of catchment plan
need incentive to promote catchment approach ?compulsory farm plans?
ICM plans(set of nested plans) developed by full community consultative process should be enforced by legislation
The right to drain should be conditional on fitting into catchment plan
Policy to encourage development of integrated catchment management plans from farm scale, through subcatchment scale to regional scale by full community consultation process. drainage is but one element of IC water management plan
recognise trade-off on catchment scale and barter with solutions according to the catchment plan
Potable water supply
identify fresh ground water supplies over catchment to utilise
community water supply
Collate and Disseminate Information on Blackwood Catchment
publish relevant data
document successful system/project/farmers in catchment
collate neighbour success stories
provide info
Specific suggestions
encourage tree planning to ?%, to make farming more equitable, a reafforestation goal, farmers with bush vs. farmers cleared
identify problems of landscape
Education and Awareness
education schools and adults

increase community awareness
target catchment groups, ag dept
Education strategy- what works etc. how to do communication
foster and encourage co-operation
Improve communication- newsletter short (so people read it) info on issues as they arise-expressed short and simple
Info from BCCG on how they fit in the big picture
include all stakeholders
demonstrations show by example
increase scope of solutions
vary approach young old male female extension
encourage people living in upper catchment to see Augusta end and vis versa
promote lateral thinking
Role of BCCG
Lots of people/depts involved in BC, need to state structure/roles/objectives of each smaller group
lobby effectively
market BCCG and approach
seek sponsorship
BCCG to assist in providing full picture/info on impact who wins/loses/consequences etc.
BCCG to foster total co-operation between agencies
need leadership / big picture
BCCG Objectives
First need to know what acts are
Are Acts adequate for BCCG objectives?
BCCG to aim for highest achievable objective(plus 10%)
continuously review BCCG objectives with public input
set series of milestones along road to achieving objectives, make these known and when they're achieved celebrate.
community should demand that these milestones be set (i.e. x% of catchment revegetated by 199?
Let poli's, agencies know your milestones and plans
Coordination and integration
encourage /promote integrated agency approach
initiate and emphasise need for catchment coordination via LCD's others (re drainage including collecting local picture)
Get EPA (or whoever to assess the effect of drainage to date on waterway and estimate further requirement to handle it if more drainage takes place
maintain continued consultation between groups, even just amongst neighbours)
change the traditional, non-catchment based boundaries that we now have to see if we can make them work better
encourage all shires to appoint a Coordinator (a Claudia Hadlow) to commit all ratepayers to participate in decisions
Policy and Regulations
are all geographic areas in Blackwood catchment actually covered by regulations
Reg/policy to achieve greater length of Blackwood Banks fenced

Development of guidelines an information re drainage
not just bureaucrats, we all had a say
would have liked a statement discussion of overall aim eg farming land optimise production and river salt -free rivers
To drain or not to drain debatable other methods, just one strategy in overall strategy. Need to be clear what catchment objective is before deciding policy for drainage*****
Publicity of regulations to LGA, LCD, Landholders, subcatchment groups
simple and easy to read, clearer definitions of drainage
simple and easy to read awareness of responsibilities Landholders have under regulations to know the definitions
inter communications between govt depts
establish and circulate guidelines
formulate guidelines from the subcatchment group up
need co-operative /coordination of policy/regulation makers to develop info bulletin/farmnote for BC and replace old one
policy makers and regulators need to coordinate to provide a correct information brochure on regulation/legislation dealing with drainage in Blackwood catchment
NOI assessment
technical area dept responsibility
philosophy/policy of the legislation public awareness
NOI assessment only individual drains not the system
A format exists for dept work but there isn't one for self assessment
the drainage NOI does not lead into the other management options or group consultation (i.e. focus too much on ?
current regulations ineffective - too local in scale/scope
response to damage, problem too slow, leg. need to use its teeth
regulations develop via Consultation wit neighbours, EPA etc. get consensus
Need to flush out principles etc.
clarify interpretation of regulations
Regulations recognise drainage has a place
Examine cost/impact of not draining vs. draining
agreed principles(consensus) drainage has a place
be strategic in works/effects, start at top of catchment

West Arthur Submission to Blackwood Catchment Co-ordinating Group on Drainage, November 18, 1993

The West Arthur LCDC has real concerns with the *ad hoc* approach to land drainage in the management of waterlogging and salt affected land in the West Arthur LCDC. Draining land results in larger flow rates in watercourses (creeks, streams and rivers). Without proper, coordinated drainage planning these increased flows are likely to cause waterlogging, inundation, erosion and salinity problems in downstream farm land and streams.

We submit that the Blackwood Catchment Coordinating Group has an important role in promoting community commitment to planning and coordinating drainage proposals in a catchment approach that accounts for increased flow rates due to drainage.

In addition we request that the Blackwood Coordinating Group lobby the Department of Agriculture of WA to approve only those drainage proposals which are designed to minimise adverse impacts on downstream landusers and waterways.