

# **Shepparton Irrigation Region Catchment Strategy**

## **Achievement Report**

**1990/91 to 2000/01**

**Shepparton Irrigation Region Implementation Committee  
Goulburn Broken Catchment Management Authority**

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## 1 Summary of Achievements

The Shepparton Irrigation Region Catchment Strategy (SIRCS) is a 30 year plan to protect and enhance the natural and productive environment of the Shepparton Irrigation Region (SIR). We are currently 10 years into the 30 year plan.

### 1.1 Highlights of Progress Towards Long Term Outcomes

Activity	Progress towards Plan completion	% of 2020 Target Achieved since start of the SIRCS in 1990
Area protected through Surface Water Management Systems	630.9 km of Surface Water Management Schemes constructed	52%
Reduce Phosphorous loads from surface water management systems by 50 % by 2016	84.5 tonnes of Phosphorous removed	100%
Controlled disposal of salt equivalent of 10.8 EC at Morgan by 2020	2.48EC of salt disposed	23 %
Area Protected by Private Pumps (non horticulture)	23,920 ha protected	46%
Area Protected by Horticulture Private Pumps	770 ha protected	77%

### 1.2 Highlights of Biophysical Achievements

Activity	Progress towards Plan completion	% of 2020 Target Achieved since start of the SIRCS in 1990
Construction Primary Surface Water Management Systems	481 km constructed	41 %
Number of Reuse Systems constructed	2,610 systems constructed	49%
Area covered by a Whole Farm Plan	2,256 Whole Farm Plans covering 154,705 ha	41 %
Private Pumps installed (horticulture and non horticulture)	116 pumps installed	53%

### 1.3 Highlights of non Biophysical Achievements

- Inclusion of the catchment community at all levels of decision making.
- Integration of all Shepparton Irrigation Region Catchment Strategy (SIRCS) Programs (particularly the Environment and Waterways Programs) to achieve multiple benefits and to ensure efficiencies in investment in natural resource management.
- Flexible and adaptable programs to respond to seasonal and funding cycles.
- Strong involvement from all partners in the catchment, especially Local Government.
- National and international recognition of the SIRCS as an innovative and successful strategy that achieves long term and significant environmental, social and economic outcomes.
- Inclusion of Cultural Heritage issues within each of the programs, especially the Surface Drainage Program.

### 1.4 Summary of Investment to Date

There has been substantial investment in the SIRCS over the past ten years by governments and particularly the catchment community. The following table summarises investment known to date. It is difficult to track the funds spent on individual programs due to the continual change in guidelines from Funding Bodies and to changes in reporting requirements. However the total funds expended implementing the plan is accurate.

<b>Program</b>	<b>Total Cost 1990 to 2001 (2001 \$,000)</b>	<b>Estimated Benefit Cost Ratio**</b>
Surface Water Management	\$57,560	1.20
Sub-surface Program	\$28,953	2.63
Farm Program	\$22,876	1.33
Environment Program	\$4,031	***
Waterways Program	\$13,363	0.61 or 2.28****
Program Support and Monitoring	\$21,871	
<b>Total</b>	<b>\$148,654</b>	<b>1.42</b>
<b>Community Contribution (estimated regional community and landholder expenditure)</b>	<b>\$383,030*</b>	

*Source: Program Annual Reports*

\*derived from a survey of farmers within the SIR and from records of government administered assistance programs

\*\*Source – Economics of the Shepparton Irrigation Region Catchment Strategy, Mike Young, 2002

\*\*\*Included in the Farm Program

\*\*\*\*program economics provides a range of benefits that are dependent on time sensitive assumptions

## 2 Introduction

The Shepparton Irrigation Region Catchment Strategy (SIRCS) is a 30 year plan to protect and enhance the natural and productive environment of the Shepparton Irrigation Region (SIR). The SIRCS (formerly the Shepparton Irrigation Region Land and Water Management Plan) is into its eleventh year of implementation (2000/01).

The SIR is located in Northern Victoria (see figure 1) and is part of the Goulburn Broken Catchment. It is intensively irrigated with approximately 317,000 of its 500,000 hectares being irrigated. The major agricultural industries are dairying, and stone and pome fruit production, which support a large food processing industry. The SIR uses around 1.5 million megalitres of water annually, depending on seasonal allocations.

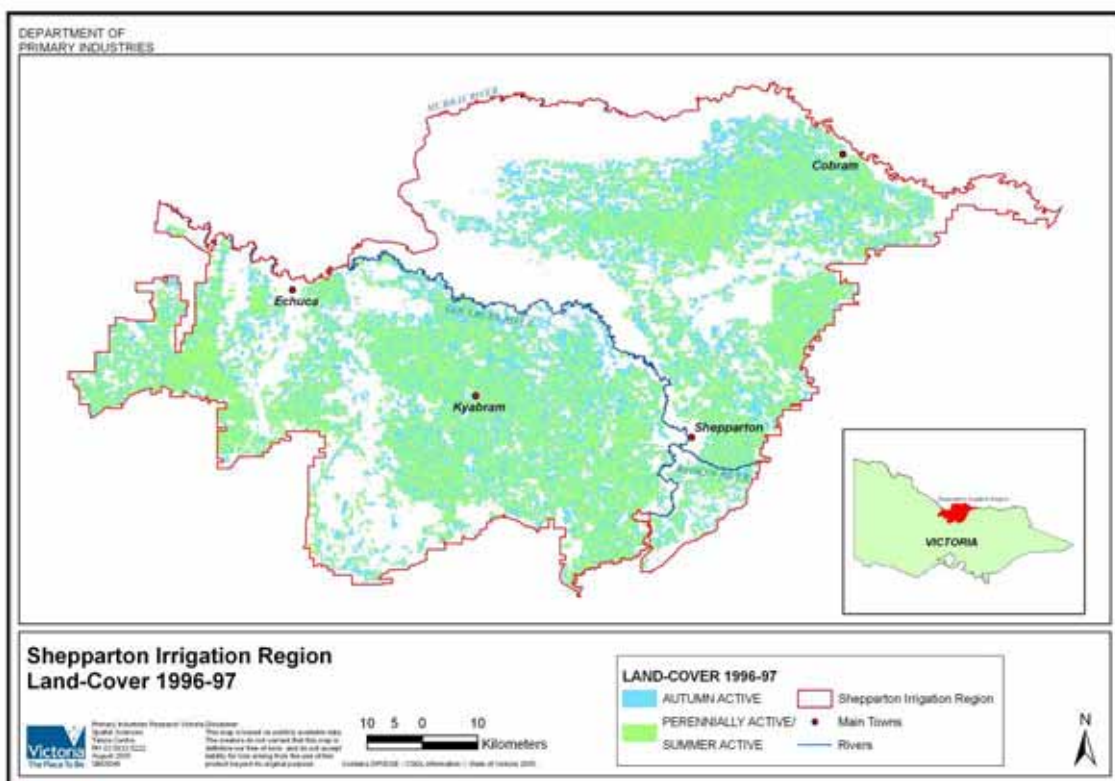
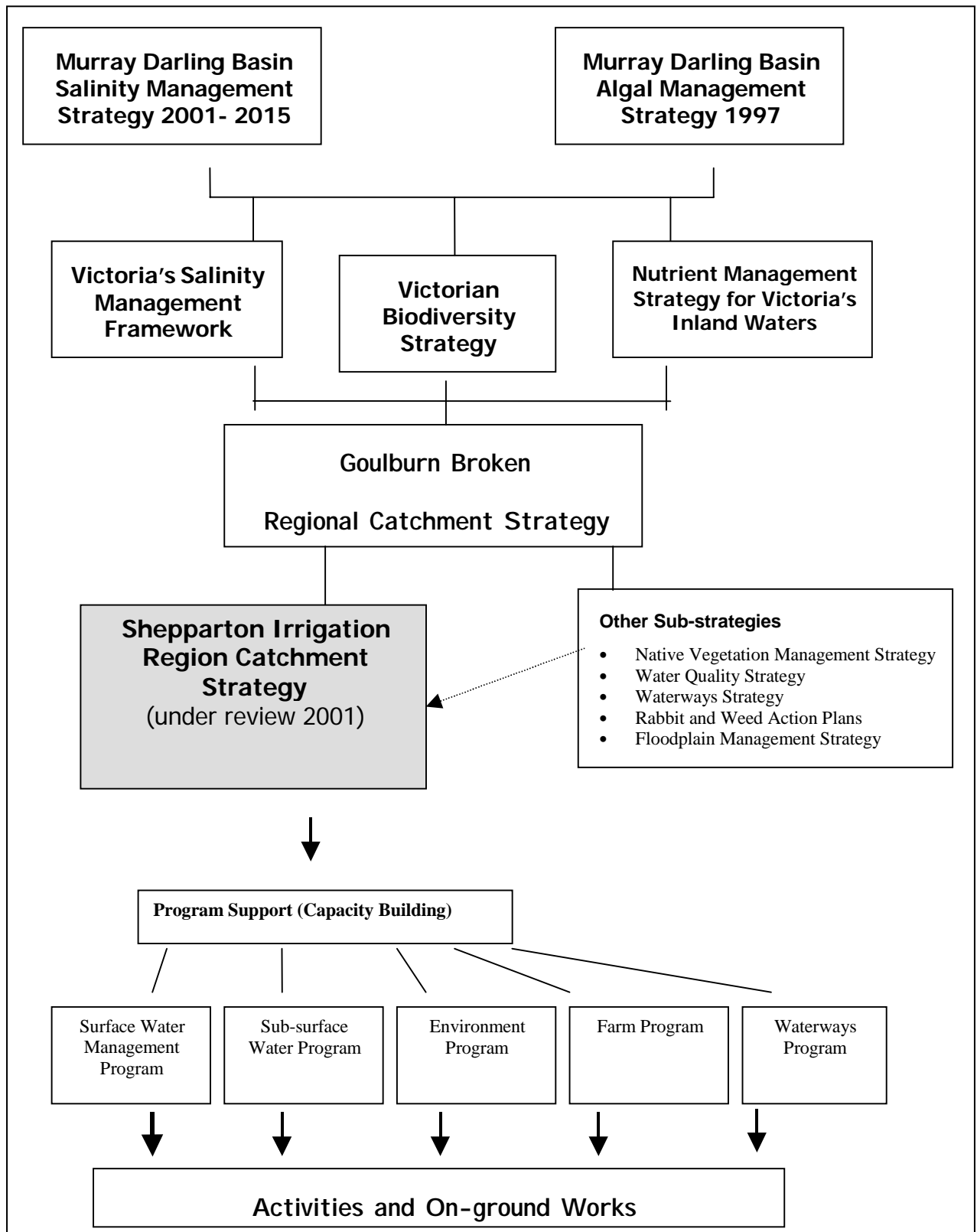


Figure 1 – SIR Location

The relationship between the SIRCS, the Goulburn Broken Regional Catchment Strategy and other relevant strategies is shown below.



In 2001 the Shepparton Irrigation Region Implementation Committee (SIRIC) undertook a ten year review of the entire strategy. One of the elements of the review was a description and quantification of the achievements for the last five (and where possible the last ten) years. This document is a summary of the achievements for each of the programs, and for the first time includes an assessment of progress on the longer term outcomes for the strategy (SIRCS).

It should be noted that most of the works undertaken as part of implementation of the strategy result in multiple benefits for other natural resource management issues. This is particularly true for biodiversity, water quality, river health (waterways) and pest plants and animals. Similarly other Goulburn Broken strategies that are implemented throughout the catchment have positive impacts on the SIR. The SIRCS has deliberately embraced integrated natural resource management throughout all sub-programs in recent years because of the multiple benefits that can be achieved and efficiencies in investment.

It is worth emphasising that the figures of environmental works contained in this report are mainly those that are funded through incentive schemes. There is a significant amount of other works that are undertaken that are funded entirely by the individual landowner. From the 1997 Irrigated Farm Census carried out by Goulburn –Murray Water (G-MW), the amount of trees planted in the catchment that year was over 680,000 which is over double the amount recorded through the SIRCS incentive schemes.

This report looks at the achievements for each of the SIRCS programs, namely:

- Surface Water Management Program
- Sub-surface Program
- Farm Program
- Environment Program
- Waterways Program
- Program Support (or Capacity Building Program)

For each of the programs the following information will be provided where available:

- Program Objective

For most of the programs, the 1996 objective and the 2001 objective are shown. It is interesting to note the shift in thinking from a single focus to a broader, more integrated approach to natural resource management in such a short period of time.

- Biophysical Achievements

These are the measurable, mostly biophysical achievements for the past eleven years of implementation of the SIRCS.

- Other Achievements

These are the other generally non-biophysical achievements. Often they include innovative approaches to natural resource management and demonstrate the adaptive management approach of the SIRCS.



- Outcomes Achieved

For the first time at a catchment scale, the Goulburn Broken catchment is attempting to work out the longer term (5 years and more) outcomes being achieved by the implementation of plans and strategies. These figures will be continually updated and tested to ensure that the information is as accurate as possible and so that the information can be used to make more effective decisions.

- Investment

The amount of funds spent on implementing the program is estimated based on information from annual reports. The difficult thing to cost is landowner contribution to implementation.

- Assumptions

It is important to document all the main assumptions that are used to reach conclusions about how works are leading to higher level outcomes. The assumptions that have been used by the program give an indication of the degree of confidence that implementation works are achieving long term outcomes.

### 3 Surface Water Management Program

The Surface Water Management Program also includes water quality achievements.

#### 3.1 Program Objective(s)

##### 1995

*To provide by the year 2020 a surface drainage service to the 268,000 hectares of the SIR which is currently undrained. Currently 183,100 hectares is undrained which is 35% of the area. (1995)*

##### Updated in 2001

*By 2020 improve the health of natural resources and reduce the risk to investment in the SIR by providing an appropriate surface water management service in areas where the total benefits, (including economic social and environmental) exceed the costs.*

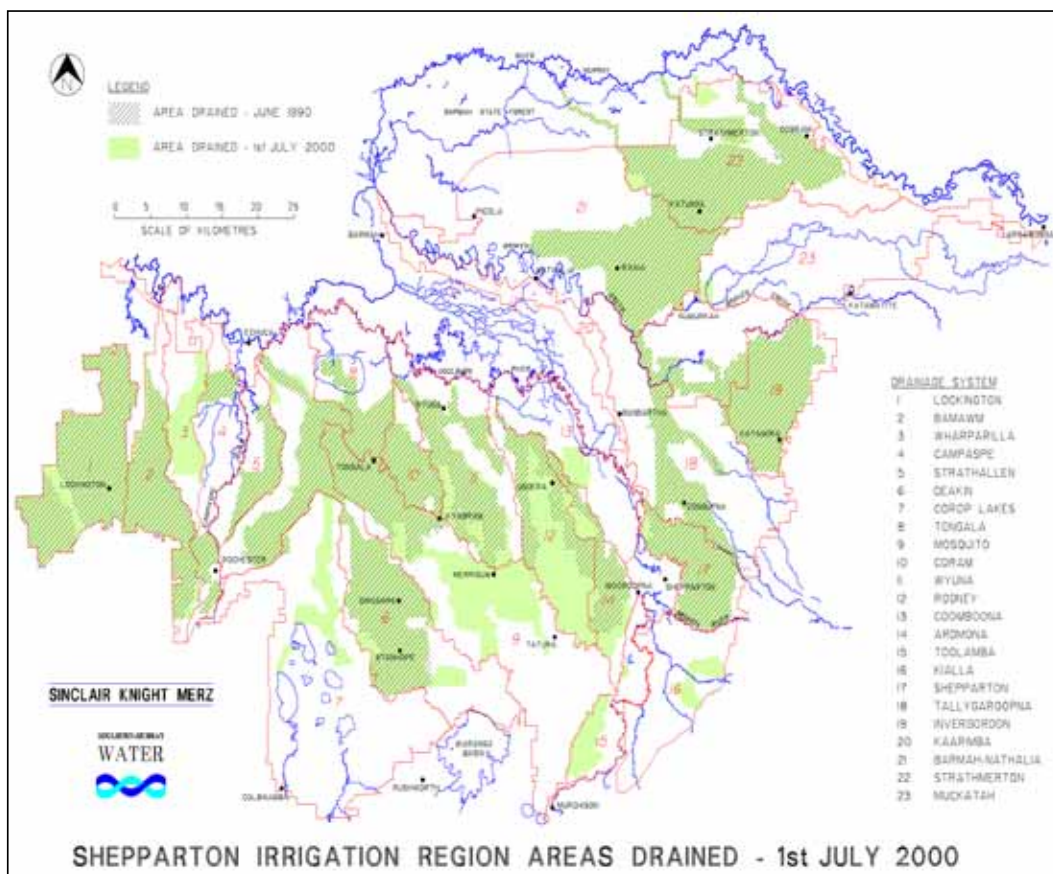


**Figure 2 – Rodney 1/6P Community Surface Water Management System, Completed 1995, Stan Nixon, John Poppa, and Jim Kay**

### 3.2 Biophysical Achievements

Implementation Works	Total to 2000/01	End Strategy Target (2020)	% of the Strategy Completed
<b>Primary</b>			
Primary constructed (km)	149.9	338.9	41%
<b>Community</b>			
Community constructed (km)	481	2,102	22%
<b>Area Drained (primary and community)</b>			
Area drained (ha)	64,810	469,140	52%
<b>Nutrient Removal Schemes (high flow diversion storages)</b>			
Number	13	200	7%
Volume (ML)	2,315	30,000	8%
<b>Reuse Systems</b>			
Number	2,610	5,360	49%
<b>Remnant Vegetation Assessment (ha)</b>	10,876	42,246	26%
<b>Wetland Assessment (ha)</b>	4,532	15,139	30%
<b>Protection of remnant vegetation (ha)</b> (includes protection from sub- surface drainage)	4,704	target to be set next review	
<b>Protection of Wetlands (ha)</b> (includes protection from sub-surface drainage)	3,995	target to be set next review	

Source: SIRCS Annual Reports and SIR Surface Water Management Strategy Review 2000

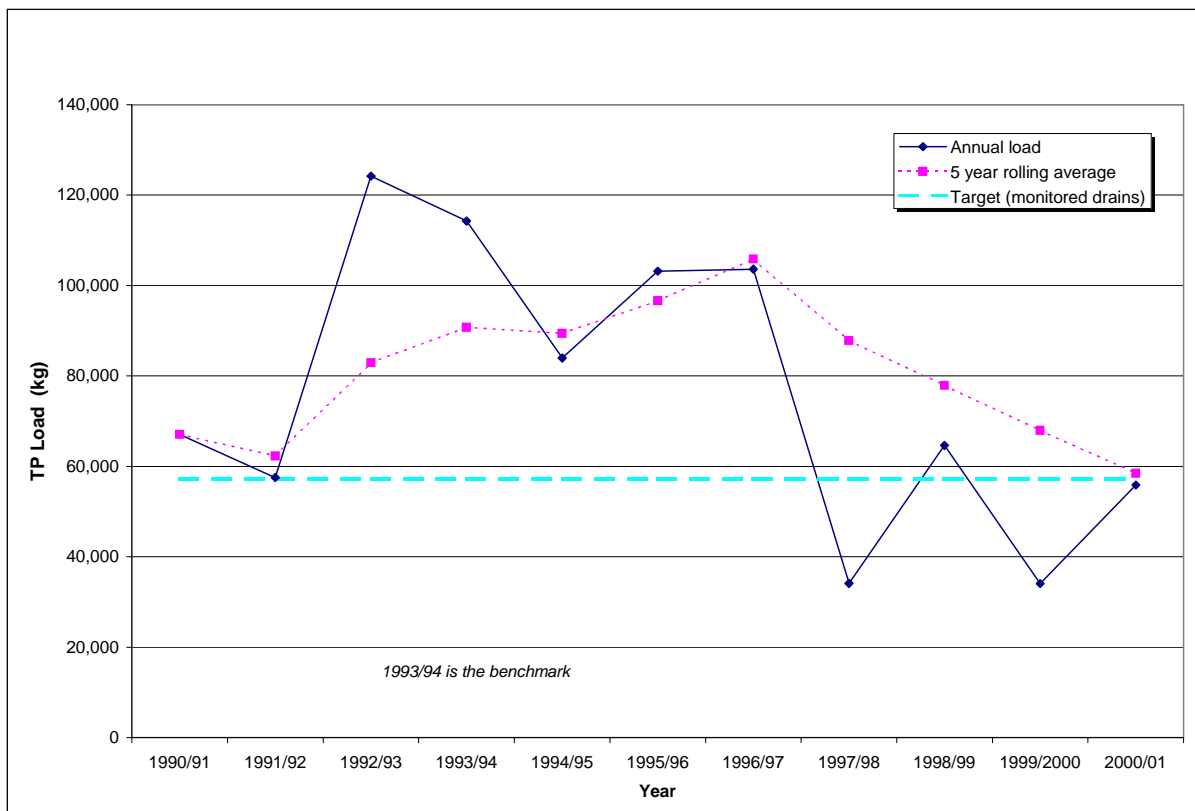


**Figure 3 – Areas Drained as at 1 July 2000**

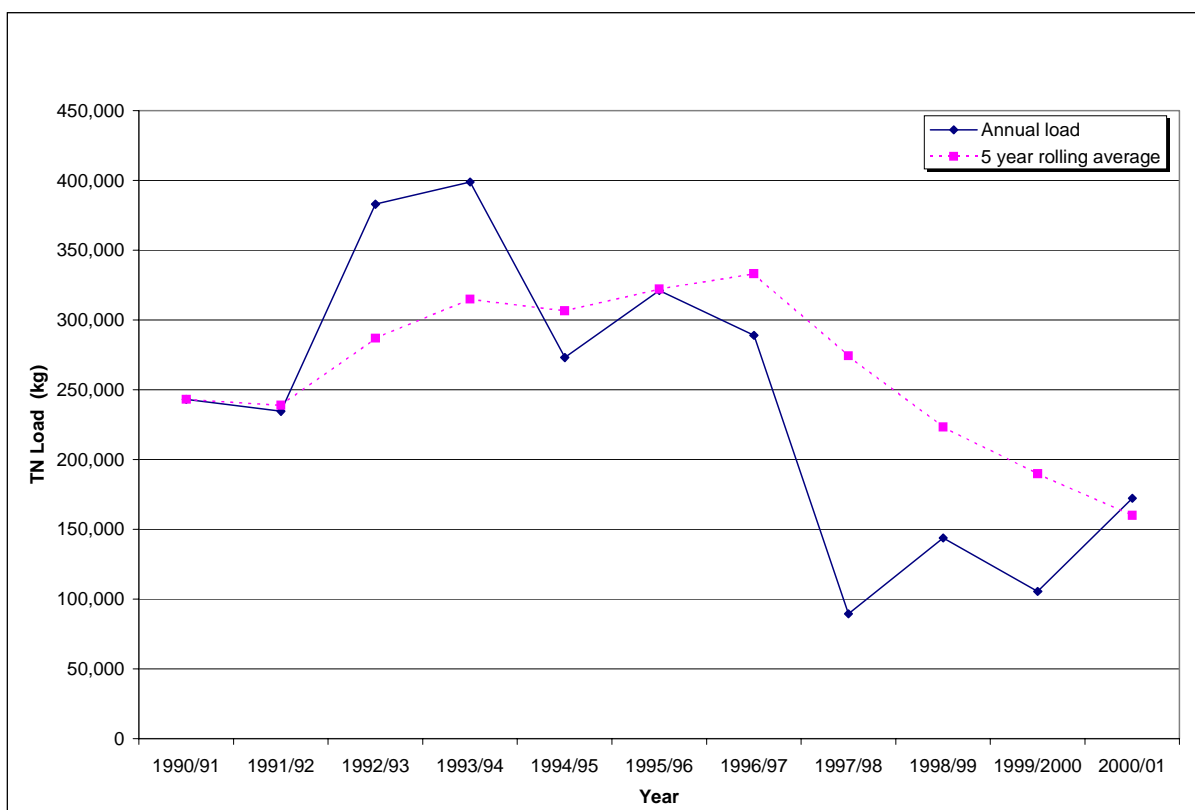
### 3.3 Other Achievements

- Involvement of the community at all decision making levels to ensure a community driven and supported program.
- Level of community support assessed and used to prioritise works.
- A multi-criteria prioritisation process developed and used.
- Development, production and adoption of a new Environmental Assessment Procedure for Integrated Surface Water Management.
- Provision of staff to undertake Environmental Assessments.
- Inclusion of cultural heritage evaluation into the program.
- Improved management and design of surface water management systems to achieve a multiple range of interrelated outcomes. This includes using and protecting natural features (including remnant vegetation and wetlands) to minimise the export of nutrients and sediments to rivers, directing water to wetlands and retardation of runoff to minimise downstream flooding.
- Reduced level of service of new Surface Water Management Systems from 1:10 to 1:2 year rainfall event.

- Inclusion in the program of retrofitting to achieve environmental and hydraulic benefits.
- Provision of more appropriate wetting regimes for wetlands.
- Flexibility in the program to respond to changes in demand from the community and seasonal conditions.
- Revision of the implementation arrangements for Community Surface Water Management Systems (CSWMS) resulting in G-MW becoming the responsible authority for (CSWMS) from October 1998.
- Change of method of calculating surface drainage charge from water right based to water usage in 1992/3.
- Adoption of nutrient modelling and the establishment of a pilot project which led to the development of the Goulburn Broken Water Quality Strategy.
- Inclusion of Goulburn Broken Water Quality Strategy objectives in the Surface Water Management Program.
- Development of Drain Management Plans to promote Best Management Practices.
- Development of Drain Diversion Strategy and associated Plans to increase and better manage the level of drain diversion.
- Development of incentives for high flow diversion storages. These storages reduce the amount of nutrients entering our rivers through drainage flows during large rainfall events and ensures that this water is stored and used productively.
- Managing drainage diversions to reduce nutrient and salt loads being exported from the SIR (see figures 4, 5 and 6).
- Research projects including nutrient and sediment load reduction in drains.
- Improved documentation of processes, guidelines and responsibilities.
- A formal audit of the Surface Water Management Program.
- Improved monitoring and reporting processes.
- Revised costings and economics for remainder of program.
- Arrangements for cost sharing with Local Government to take account of the benefits that surface water management provides to infrastructure such as roads and public buildings.



**Figure 4 - Total Phosphorus loads from Monitored drains in Goulburn-Broken catchment (Deakin, Rodney, Toolamba, Murray Valley 6)**



**Figure 5 - Total Nitrogen loads from Monitored drains in Goulburn-Broken catchment (Deakin, Rodney, Toolamba, Murray Valley 6)**



**Figure 6 - Flow from Monitored irrigation drains (Deakin, Rodney, Toolamba, MV 6)**

### 3.4 Outcomes

The following table lists outcomes that were sought at the start of the Shepparton Irrigation Region Land and Water Management Plan and the Goulburn Broken Water Quality Strategy.

Surface Water Management Program Outcomes	At Start of Plan or Strategy	At the end of the Plan or Strategy	Current Status	Current Change in Condition since start (% of target)
Increase the area of land protected through surface drains from 35 % to 100 % of the SIR by 2020 (or 286,000 ha)	183,100 ha	469,140 ha	247,910 ha	64,810ha (52%)
To reduce phosphorus loads from irrigation drains by 50% by 2016 (WQS goal)	169 t	84.5 t	84.5 t	84.5 t (100%)
80% of farms to have reuse systems by 2016 (SIRCS and WQS goal)	1250	5,360	2,610	1,360 49 %



**Figure 7 – Mosquito 23 Community Surface Management Scheme**

### 3.5 Investment to date

<b>Surface Water Management Program</b>	<b>Total Cost 1990 to 2001 2001\$</b>	<b>Unit cost</b>
<b>Primary surface water management systems – construction and remodelling costs</b>	\$27,686,454	\$ 177,000 / km*
<b>Community surface water management systems – design and construction grant cost only</b>	\$12,250,628	\$ 67,800 / km*
<b>Drainage Nutrient Removal Schemes</b>	\$280,204	\$16,016
<b>Protection of Wetlands (ha)</b>	Included in above	
<b>Protection of Remnant Vegetation</b>	Included in above	
<b>Total</b>	<b>\$40,217,286</b>	

Source: SIRCS Annual Reports



*\*Source: SWMS Review 2000 - this nominal unit cost does not include several drains which had extremely high costs for exceptional reasons*

### 3.6 Assumptions

- Total SIR area (dryland and irrigation) is about 586,000 ha.
- The area of land protected by a Surface Water Management System is 104 hectares for every km of drain constructed.
- Surface Water Management Systems reduce accessions to groundwater by 11.5 %.
- The 13 constructed Drainage Nutrient Removal Schemes intercept 5,185 ML/year, equivalent to the removal of 11 tonnes of phosphorous per year and 0.96 tonnes of nitrogen per year at current capacity.
- The Surface Water Management Systems are designed to provide for a 1:2 year rainfall event.

#### A Threat To The Whole Community

This is a story about how a group of landowners within the Mosquito depression, came together to change the future of their catchment. Salinity can impact anyone; it doesn't matter who you are or where you are situated in a catchment. This story explains how the community by working together, moved forward to help reduce the impacts of salinity by improving land and water management.

This catchment has had a long history of drainage disputes and failed private drainage schemes. During flooding events, some farmers patrolled their farm borders to ensure neighbours did not divert floodwater onto their properties. This history demonstrates the difficulty in managing drainage in this area, and the challenges met in successfully achieving this surface water management system. Ray Burns who is a landowner in the Mosquito Depression says "the real problem in the catchment is that roads turned into rivers".

1993 was a wet year in the Mosquito depression and it highlighted the salinity and waterlogging effects of the lack of surface water management. Within the catchment different enterprises were being affected in different ways. Dairy farmers had their paddocks underwater for months, killing productive pastures. Tomato growers had trouble planting due to the water sitting on the paddocks and lifestyle farmers found it difficult to move around their small blocks. The community realised that it was up to them to tackle their drainage problems.



*Figure 8 - Location of the Mosquito 8/24P Catchment*

In 1993, landowners occupying most of the catchment met to discuss the problems in the catchment and look at possible solutions. Support was provided by a Department of Primary Industries Community Surface Water Management (CSWM) program extension officer. The catchment is a large one of 1426.8-hectare catchment, of which 813 hectares are irrigated.

This meeting was full of differing opinions about which direction the water drained, who had the biggest problem, and who was responsible. At the end of the meeting it was decided that the community must work together and tackle the problem head on. The community members had the local knowledge as they live and work in the catchment. At the meeting it was agreed that investigating a Community Surface Water Management System (CSWMS) was the best option available to look at reducing the problem. The 90% incentive through the Department of Primary Industries (DPI) made it accessible to produce a detailed plan to explain the landowners options.

### **How the Community tackled the problem**

Over the next 5 years the landowners in Mosquito 8/24P drainage catchment planned how they as a community could improve their catchment and the future of the land and water quality. Many issues were addressed during the consultation process. An engineering company undertook a survey of the catchment and designed a proposed system.

As the drain design progressed the landowners were looking at the best position for the drain to enter and leave their property. Landowners covering 36% of the catchment decided to have a whole farm plan completed for their property. The whole farm plan gave the landowners the opportunity to look at their property as a whole and examine how the drain could enhance their own internal drainage system. The improvement of the drainage adds value to the property. Ray Burns, a landowner in the wider Mosquito catchment, notes "Landowners don't have to do anything to make the drain work, each farm has its own outlet. You close the outlet if you want to divert the water back to your on-farm recycle system or open it when you want the water to go down the drain".

The Mosquito 8/24P CSWMS drains into the Goulburn - Murray Water Mosquito drain 24. This then outfalls into the Murray River. The landowners in this catchment have worked together to reduce the high level nutrient run-off from entering the drainage system. The water quality is assessed for phosphorus, turbidity, conductivity and pH. The drain and river is monitored regularly and especially after rainfall events where there are high levels of run-off and nutrients entering the waterways.

Within the catchment there were several low areas. A 4-hectare site was being used as a drainage re-use system and was maintained as a near permanent waterbody. The landowner of the property knew it was a low area and it was a good spot to hold all the farm's drainage and rainfall runoff. Through an environmental assessment undertaken as part of the CSWMS investigations, the area was identified as a wetland.

As a group, the landowners discussed how the degraded wetland could be restored for the benefit of the environment and the catchment. The wetland was important to waterbirds as a drought refuge. The best management option was to install a beached spillway to maintain the appropriate water regime for a temporary wetland. Native trees and shrubs were also planted along the edge of the wetland, to enhance the site.

Within the catchment landowners wanted to protect the remnant Grey Box stands. The trees were beginning to look stressed from being waterlogged for extended periods. To protect the trees root systems the drain would be constructed at least 3 metres outside the dripline of

the Grey Box trees. To enhance these trees the area would be fenced to protect from grazing and additional plants to revegetate the area.

As well as protecting the existing trees, many of the landowners decided to plant trees/shrubs along the new drain to form a corridor. The trees were local indigenous species and were planted up to 3 rows deep. This corridor will be very important for birds and other animals. The landowners believed that the trees/shrubs made the drain look more aesthetically pleasing while enhancing the environment.

### **Conclusion:**

The investigation and construction of the CSWMS gave the group of landowners a reason and mechanism to work together on a common problem. They had a shared interest in making their properties more sustainable by improving the drainage. The drainage system also increased landowner management options on their farm and increased confidence in investing in farm works. This has reduced waterlogging and associated salinity problems, which effects all community members in many different ways. "The drain has allowed more of the farms to be under a larger area of permanent pasture as you can drain the paddock when it is wet" (Ray Burns, landowner Mosquito catchment 2004).

The construction of the Mosquito 8/24P CSWMS is an example of landowners in a community questioning their own farming practices and working together to improve their sustainability. The landowners took responsibility for the catchment's and the people's futures. The community worked together to achieve their goal of improved drainage and ensuring a healthier catchment and a sustainable place to work and live. "CSWMS are a fundamental success to the future of the dairy industry" (Ian Bertram, landowner in the wider Mosquito catchment 2004).

### **Facts & Figures Table:**

Drain Name & Number:	Mosquito 8/24P
Drain Outfall:	Goulburn – Murray Water Drain Mosquito 24
Number of Landowners:	20
Length of drain:	9.5 Kilometres
Area of catchment:	1426.8 Hectares
Irrigated pasture in catchment:	813 Hectares
Location of catchment:	Between Colliers, Springvale, Girgarre East Roads and Midland Hwy, west of Tatura, Victoria.
Survey design started:	1993
Cost of Survey & Design:	Approx- \$24,000
Completed construction:	November 1998
Constructed by:	PR & MA Pearce Pty Ltd
Cost of Construction:	Approx- \$360,000

Environmental Assessment (EA):	Undertaken 1993
EA undertaken By:	Rick Webster of Ecosurveys Ptd Ltd
Features Identified in EA:	Wetland 2 remnant Grey Box woodlands.
Tree Grants Processed:	6300 plants, 1 to 3 rows along 80% of drain length.
Whole Farm Plans:	4 Whole Farm Plan's were developed in the 8 years prior to the CSWMS construction and 5 were developed in the 3 subsequent years. Whole Farm Plan's now cover an area of 290 Hectares of irrigated catchment, or 36% of catchment.

### **Drainage Nutrient Removal Incentive Scheme – April 1999**

The Hunter family have a dairy farm just east of Kyabram where they run a milking herd of about 350 cows. During the last couple of years the availability of water has become an issue. The Hunters managed this by working to a water budget, along with planning of fertiliser use and grazing rotations to maximise water that was used.

The Hunter partnership decided to investigate ways of increasing the amount and security of water available to their business. The home block had undergone many changes during the last 20 years including: laser grading; improved drainage; reuse to 100% of the home farm; ground water pumping systems; and some automatic irrigation has been installed. They investigated all of the options available to them, weighing up the pros and cons of each.

The partnership decided to construct an above ground storage on their outblock where they graze heifers and dry stock, cut hay and occasionally grow crops. The 200 ML storage allowed the water right to be transferred to the home property, and improved the irrigation management and flexibility on the outblock.

The SIRCS provides an incentive for construction of these systems because they are an effective way of reducing the amount of drainage water leaving the catchment. The diversion of this water requires a High Flow Diversion Licence from Goulburn-Murray Water.

This drainage water is usually high in nutrients which may cause problems such as blue-green algae in other parts of the catchment. The SIRCS has a target of reducing irrigation drainage nutrient outputs by 50%. The benefit the system provides to the landholder is the extra water and flexibility of irrigation management.

The storage was designed on the outblock in conjunction with a Whole Farm Plan to create an irrigation system which allows water to be delivered to the whole block and then drained to the reuse constructed with the storage. The capacity was chosen according to a cost benefit analysis, doubling the size does not double the cost due to the fixed costs of infrastructure, such as pumps and pipes.

The partnership investigated the risks of constructing a storage and believe the main ones to be: insufficient drain flows; overcommitting of drain; and storage failure.

In order to celebrate the achievement of the Hunters and the other landholders involved in the Drainage Nutrient Removal Incentive Scheme, Minister for Agriculture and Resources, The Hon. Patrick McNamara visited the Hunters outblock to present the incentive cheque and to see for himself the works.



***Figure 9 – Hunters' Storage 1999***



***Figure 10 -Brays Swamp on Mosquito Primary Surface Water Management System 24***

## 4 Sub-surface Program

### 4.1 Program Objective(s)

**1995**

*To, where possible and justified protect and reclaim the SIR's land and water resources from salinisation through management of the region's groundwater.*

**Updated in 2001**

*The overall objective of the Sub-surface Program is to protect and reclaim the SIR's land and water resources from salinisation where possible and justified.*



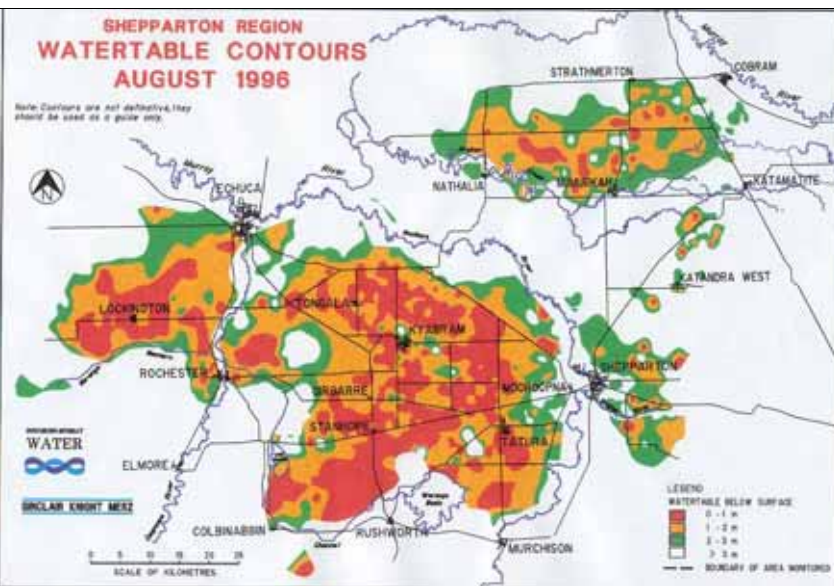
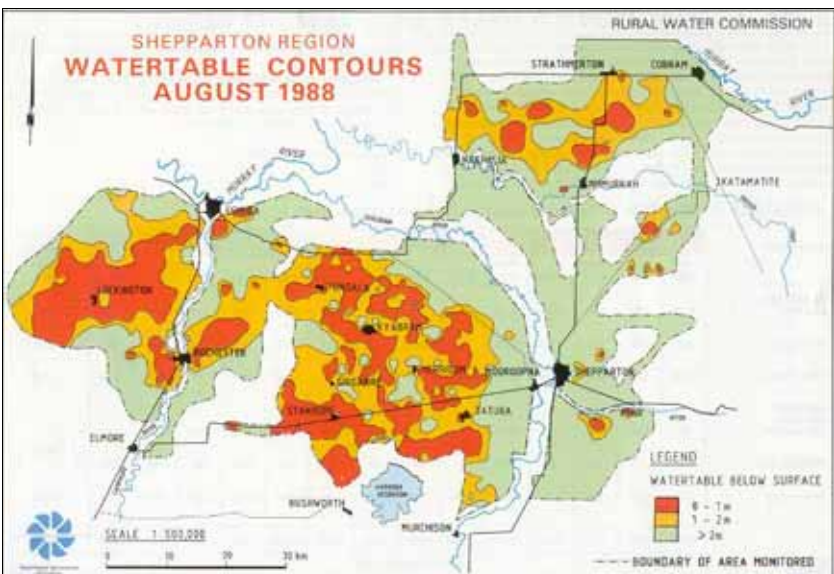
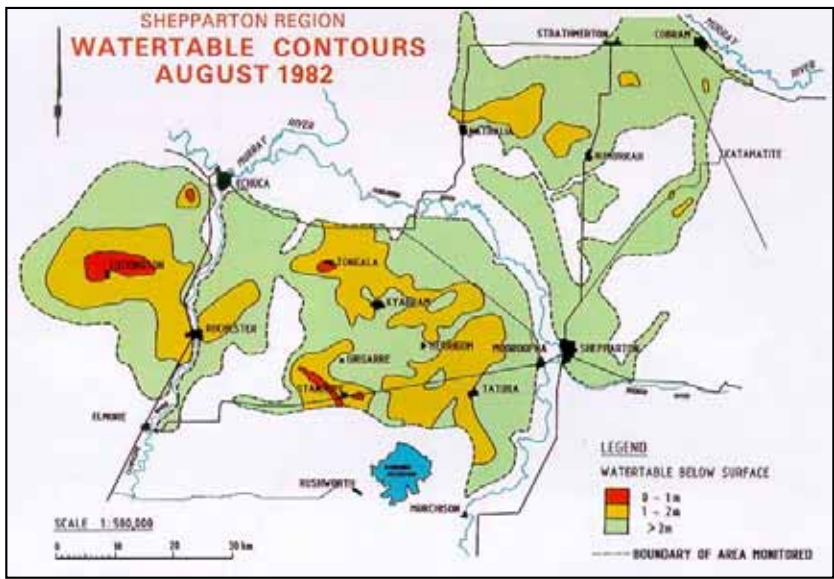
**Figure 11 – Farm Exploratory Drilling**

## 4.2 Biophysical Achievements

Implementation Works	Total to 2000/01	End Strategy Target (2020)	% of the Strategy Completed
<b>Private broadacre</b>			
New Private Pumps (no.)	196	365	54%
Area protected (ha)	23,920	51,500	46%
Upgrades of existing	63	95	66%
Metering (no.)	685	765	90%
Volume of groundwater pumped for irrigation (ML)	48,900		
<b>Private horticulture</b>			
Private Pumps (no.)	20	50	40%
Area protected (ha)	770	1000	77%
<b>Tile Drainage (ha)</b>	15.9	300	5 %
<b>Public</b>			
Public Pumps (no.)	26	425	5 %
Area protected (ha)	4,200	85,000	5 %
<b>Evaporation Basins</b>	0	50	
<b>Potential SDA (EC)</b>	2.48	10.8	23 %
<b>Protection of remnant vegetation (ha)</b> (includes protection from surface drainage)	4,704	target to be set next review	
<b>Protection of Wetlands (ha)</b> (includes protection from surface drainage)	3,995	target to be set next review	

Source: SIRCS Annual Reports and SIR Sub -Surface Water Management Strategy Review 2000





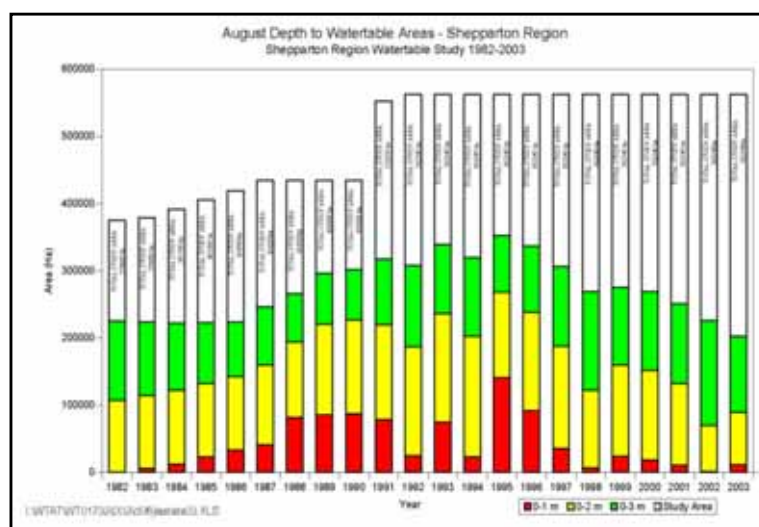
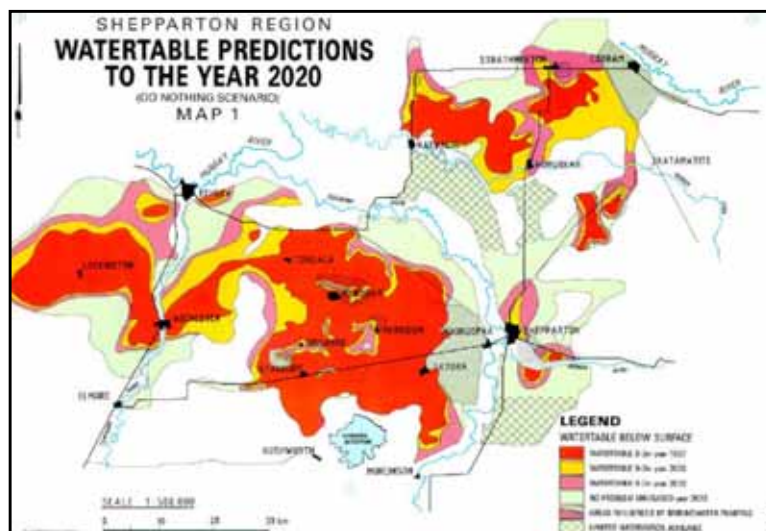
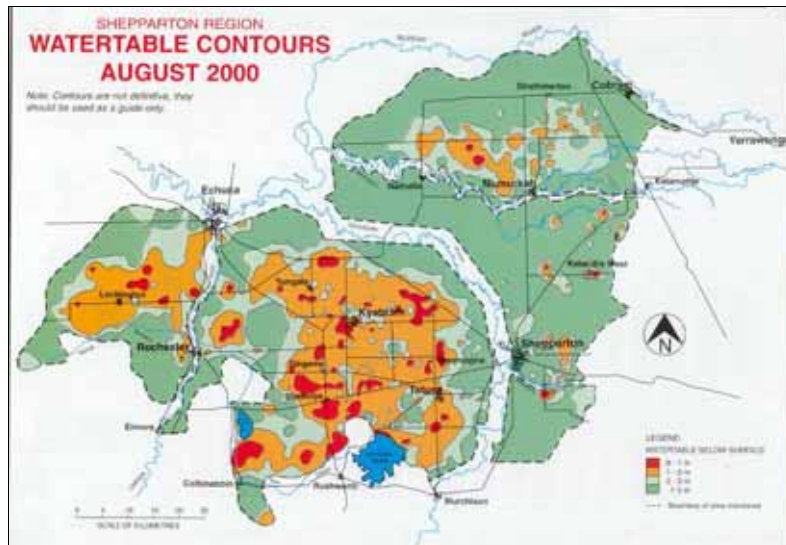
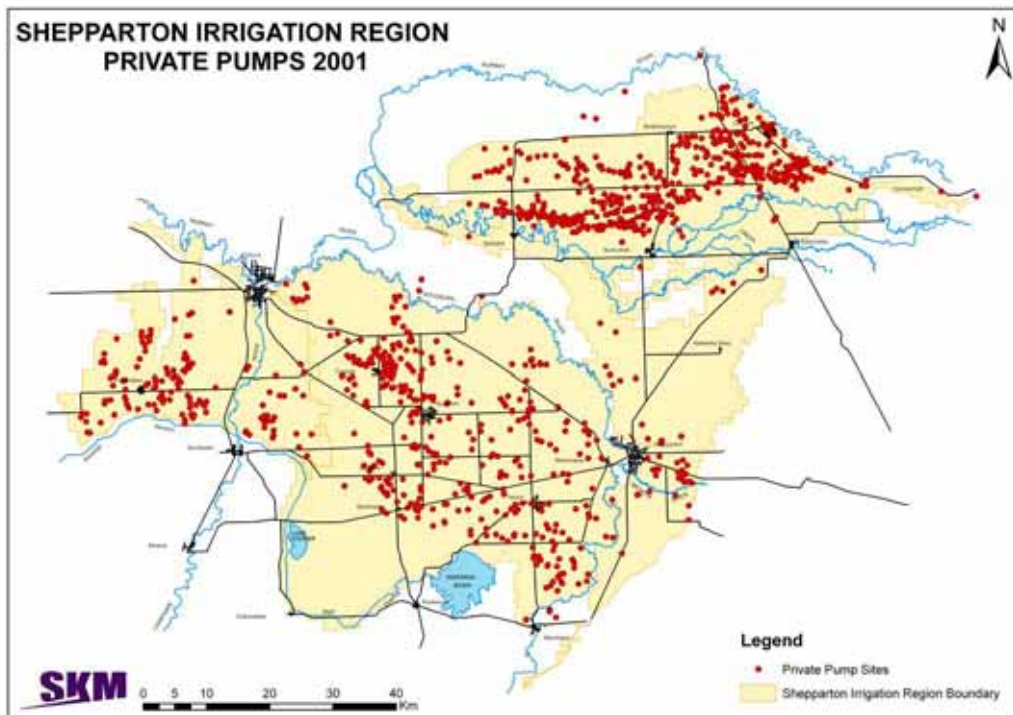
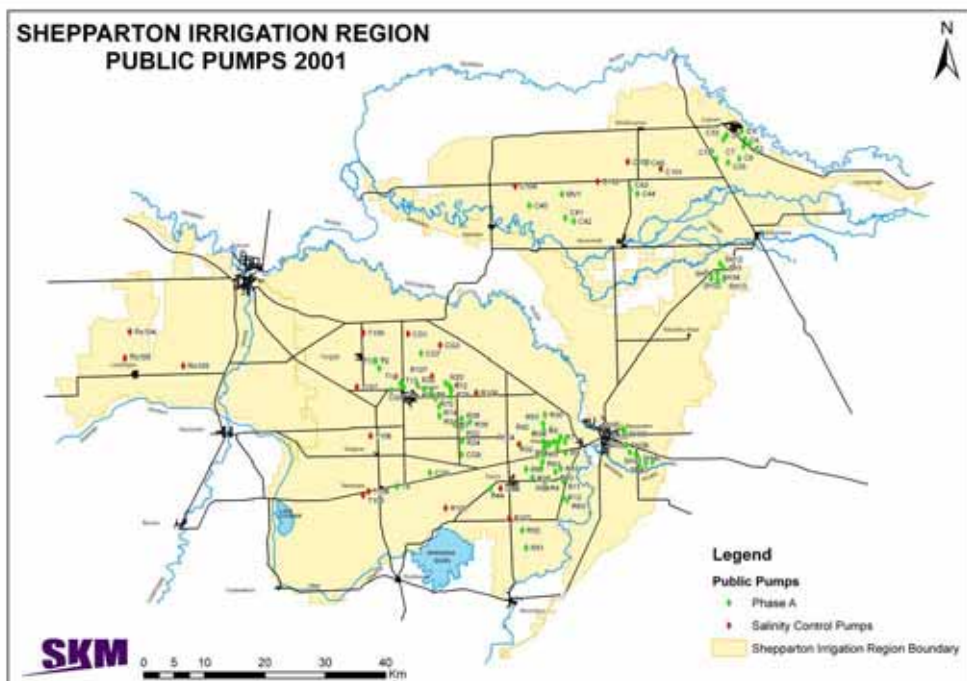


Figure 12 – Maps showing Groundwater Contours in the SIR over time



*Figure 13 – Private Groundwater Pumps installed in the SIR*



*Figure 14–Public Groundwater Pumps installed in the SIR*

### 4.3 Other Achievements

- Development of a Groundwater Management Plan (GMP).
- Implementation of GMP began in 1999 and included meter fitting program, private pump monitoring, development of new licence conditions and renewals, drainage resource assessments and a communications program.
- Flexibility in the program to respond to changes in demand from the community and seasonal conditions.
- Arrangements agreed to for cost sharing with Local Government for the operation and maintenance of public pumps.
- Adoption of 'beneficiary pays' tariff structure for sub-surface water management in the Murray Valley, Central Goulburn and Rochester Areas.
- Economic evaluation and performance review of the Girgarre Salinity Control Project (Benefit Cost Ratio of 2.45) and enhancement of the Girgarre basin through environmental and wetland works.
- Establishment of a 'Serial Biological Concentration' trial at Undera and saline reuse trial at Mt Scobie.
- Development of Salt Disposal Guidelines for the Goulburn River and the region's surface water management schemes.
- Development of operational procedures based on real time flow conditions for disposal of groundwater to the River Murray and Broken Creek.
- Audits on the Farm Exploratory Drilling Scheme (FEDS) and public pumps sub-programs which were generally positive.

### 4.4 Outcomes

<b>Sub-surface Program Outcome</b>	<b>At Start of Plan or Strategy</b>	<b>At the end of the Plan or Strategy</b>	<b>Current Status</b>	<b>Current Change in Condition since start (% of target)</b>
Providing protection to 137,800 ha land from high watertables through sub-surface water management by 2020.	36,370 ha	174,170 ha	65,275 ha	28,905 ha (37%)
Controlled disposal of salt equivalent to 10.8 EC at Morgan by 2020.	0.093 EC	10.8 EC	2.48	2.48 EC (23%)

#### 4.5 Investment to date

<b>Sub-surface Program</b>	<b>Total Cost to 2001 (\$2001)</b>
<b>Regional private pumping program</b>	
New - construction	29,382,151
Upgrade - construction	1,353,356
<b>Regional public pumping program</b>	
Construction	3,970,060
<b>Grand Total</b>	<b>34,705,567</b>

Source – SIR Annual Report

#### 4.6 Assumptions

- 1 megalitre (ML) of water pumped protects 1 hectare of land.
- Figures used to calculate 1 EC rise in the River Murray at Morgan are 6,800 tonnes/EC for the SIRCS, 6,500 tonnes/EC for the private pumps and 6,000 tonnes/EC for the public pumps. (It is also assumed that if the works had been in existence before the Murray Darling Basin Commission's 1975 – 85 benchmark period that discharges from drains would follow a similar pattern to that shown by existing drains and discharges from public and private pumps would be scheduled to hit specified target flows in the Murray River).
- Figures used to calculate salt loads from surface water management are 0.0022 EC/km Primary Surface Water Management System and 0.00024 EC/km for a Community Surface Water Management System.
- For protection to remnant vegetation an average of 0.5 ha per public pump was used.

## 5 Farm Program

### 5.1 Program Objective(s)

1995

*To reduce groundwater accessions, soil salinisation and waterlogging on farm.*

**Updated in 2001**

*To improve land management practices on private land in the SIR, to protect and enhance the environment, to improve economic viability and to help rural communities make informed decisions.*



**Figure15 – Farming in the SIR**

## 5.2 Biophysical Achievements

Implementation Works	Total to 2000/01	End Strategy Target (2020)	% of the Strategy Completed
<b>Whole Farm Plans</b>			
Number	2,256	5,250	43%
Area covered (ha)	154,705	375,000	41%
<b>Reuse Systems (no)</b> Water Quality Strategy Goal	2,610	5,360	49%
<b>Landforming / Lasergrading (ha)</b>	137,474	106,000 target to be updated next review	Not applicable
<b>Farm Drains (ha)</b>	111,420	106,000 target to be updated next review	Not applicable
<b>Coordinated Control of Priority Pest Plants (ha)</b>	50,000	200,000	25%
<b>Control of Rabbits (ha)</b>	4,000	8,000	50 %
<b>Control of foxes (ha)</b>	4,000	15,000	27 %

Source – SIR Annual Report

Note: WFP numbers include 1986 – 1990





### 5.3 Other Achievements

- Providing support and resources to Landcare Groups particularly through the Goulburn Murray Landcare Network (GMLN).
- Strong links with the Ethnic Council of Shepparton and District.
- Close working relationship with the three councils and other public authorities (eg. Vic Roads, G-MW).
- Development of Local Area Planning process. Local Area Planning (LAP) is a means of delivering strategic planning aligned to the GB RCS sub-catchment (Landcare group) scale continues to gain momentum. This project is a joint activity between the GMLN, DPI and the CMA with eight LAPs progressed through 2000/1. The first of these, the Cornella LAP and the Wyuna LAP, have now completed and the plans launched. Drafts were widely circulated in the community and among agencies for feedback prior to finalisation. Invergordon and Nanneella Landcare Groups are also well into the process, and four other groups have commenced. Working closely with all SIRCS Programs and contributing to the implementation of other Goulburn Broken strategies such as Water Quality Strategy, Native Vegetation Management Strategy and the Weed and Rabbit Action Plans.
- Development of fertiliser Best Management Practices.
- Contributed to the development of the Weed and Rabbit Action Plans.
- Change of focus of the Farm Program from mainly salinity to include nutrient movement, water quality, biodiversity, pest plants and animals, wetland management, native vegetation and sociology.
- Regular reviews of the Whole Farm Planning process in 1991, 1995 and 2000 including surveys of landowners.
- Contributing to the change in attitudes of landowners to environmental considerations through the environmental assessment process, incentives, regulation and enforcement, and Statutory Planning Referral process.
- Participation in the development of Rice Growing Guidelines.
- Participation in the development of Salinity Controls on tradeable water entitlements – maximum water use limits depending on farm layout and access to drainage.
- There have been numerous improvements to the way that the Farm program operates and these include inclusions to the Whole Farm Planning process (earthwork planning controls and natural drainage line use, dryland WFP).
- Number of WFP undertaken each year continues to rise.
- Research and development projects such as improving farm management practices, groundwater management principles, guidelines for use of saline water, looking at burnout in Landcare participants, decision framework development (Bayesian networks), increased water use efficiency in agriculture and greenhouse gas reductions. (The entire list of research is extensive and comprehensive).
- Farm Program staff are part of a continuous improvement process.

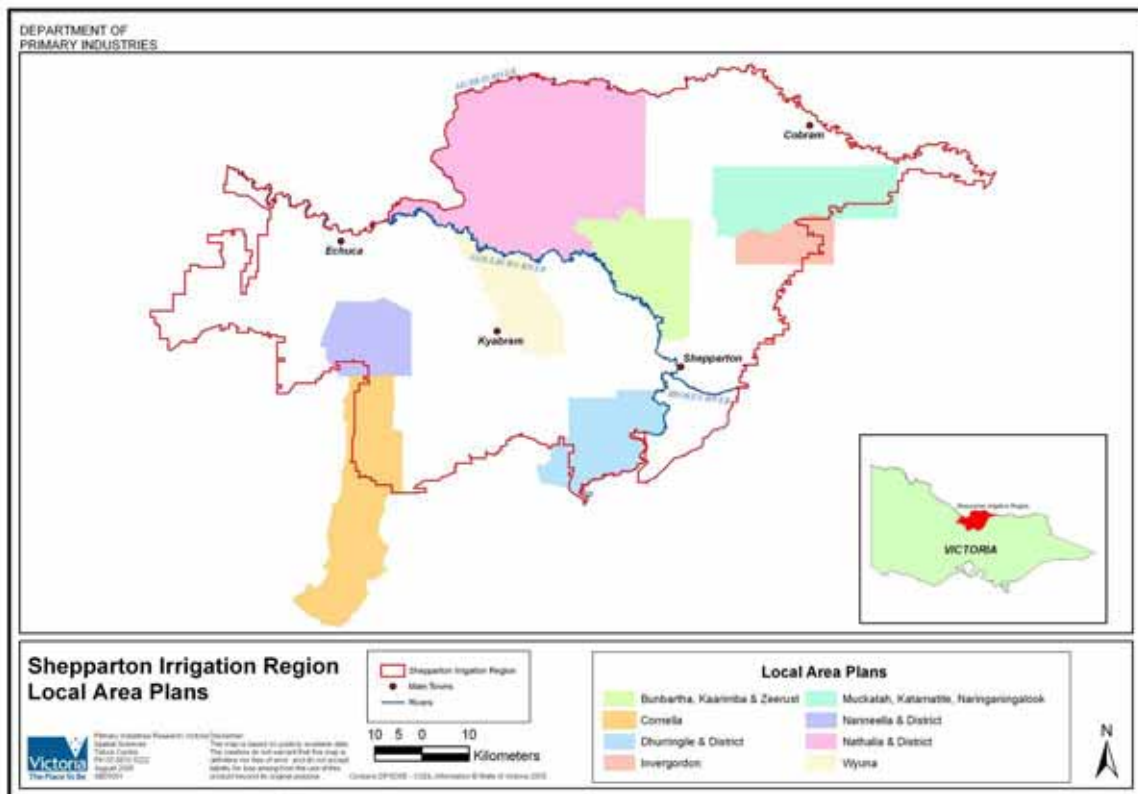


Figure 18 – Local Area Plan Areas

## 5.4 Outcomes

Farm Program Outcomes	At Start of Plan or Strategy	At the end of the Plan or Strategy	Current Status	Current Change in Condition since start (% of target)
Irrigated land within the SIR to have a Whole Farm Plan	36,030 ha	375,000 ha	154,705 ha	118,675 ha (41 %)
Development of 9 Local Area Plans by 2004	0	9	1.8	1.8 plans developed (20 %)

Source: Farm Program Review 2002

## 5.5 Investment to date

<b>Farm Program</b>	<b>Total Cost 90/91 to 00/01 (2001\$)</b>
<b>Whole Farm Plans grant cost only</b>	3,824,991

Source: Farm Program Review 2002

## 5.6 Assumptions

- There is a reduction of 17.5 % of accessions to groundwater on the average farm laid out in accordance to a WFP (including laser grading 10 % and installation of farm drainage 7.5 %).
- The installation of a farm drainage reuse system saves 0.67 ML per hectare of drainage and intercepts 0.4 kilogram / ML phosphorous, 1.6 kilogram / ML nitrogen and 300 kilograms salt / ML annually (on an average area serviced of 60 hectares).

### The 2000th Whole Farm Plan in the Shepparton Irrigation Region

The Smith families moved to Picola, north of Nathalia from Gippsland during 1985 as they were interested in expanding and wanted to move to a larger irrigated property. When they first arrived on the 604ha property it was operating with three dairies milking about 100 cows. A large part of the farm was used to grow lucerne hay. They increased their herd of cows and decommissioned two of the small dairies building a rotary dairy in 1990. They now milk 500 cows.

#### Whole Farm Plans

Shortly after purchasing their property, the Smiths started laser grading some of the land to improve irrigation on part of their original property. After this original work they became aware of the Whole Farm Plan Incentive Scheme and decided to prepare a WFP for a section of their original property. The development of this plan showed them that this initial work did not easily fit in with options for future work on the rest of the property. They have begun implementing the works outlined in the whole farm plan and will redo some of this earlier work in the future.

This experience showed the Smiths the importance of taking a holistic approach to works, rather than focusing on one section of their farm. This includes land-use existing environmental features, proposed native vegetation planting's, laneways, irrigation system, crossings, pumps and re-use systems - all to be incorporated into the WFP. All of this information can be used to plan a strategy for works, prepare costings and budgets and plan the implementation of the works.

After completing the first plan for the southern half of the original property, they have since prepared a second WFP for the northern section of their farm and have done some of the work on that part of the property.

## The 2000th WFP

In 1999 they purchased another property of 265 ha and one of the first things they did was prepare a third WFP - the 2000th in the SIR.

The latest plan prepared by the Smiths has given them a variety of options for this new property. The existing channels, drains and laneways will be changed to improve the efficiency of irrigation and a reuse system and an above ground storage have been included to collect the drainage from the property. This system could be linked to the reuse system on the original farm.

The Smiths have been undertaking environmental works on their property, including fencing to protect remnant vegetation and have revegetated many areas, including corridors as part of the Superb Parrot Project. There are areas on their WFP designated for planting native trees and shrubs for biodiversity benefits, shade and shelter and farm forestry.

The WFPs prepared by the Smiths are a good example of the ways in which WFPs have changed. Initially they were focussed on the engineering and hydraulic aspects to provide landholders with an understanding of the implications of irrigation works such as bays, slopes and water movement.

Whole farm planning now takes a broader view of the property, especially environmental, nutrient management and economic aspects. Landowners are encouraged to consider how their property fits into the local environment and how their works and practices will impact on others in the Goulburn Broken Catchment and the Murray Darling Basin.



**Figure 19 - Minister for Conservation and Environment, Sherryl Garbutt at the presentation of the 2000<sup>th</sup> Whole Farm Plan Incentive Scheme Cheque**

## 6 Environmental Program

### 6.1 Program Objective(s)

1995

*To protect and, where possible, rehabilitate the natural environment of the region from loss or serious damage from high watertables and salinity.*

**Updated in 2001**

Not updated as the Review recommended that the Environmental Program be fully integrated and strengthened into all SIRCS programs.



***Figure 20 - Kinnairds Swamp showing planted wetland and terrestrial plants***

## 6.2 Biophysical Achievements

Implementation Works	Total to 2000/01	End Strategy Target (2020)	% of the Strategy Completed
<b>Remnant Vegetation Protection (fencing)</b>			
Public (ha)	510	target to be set next review	
Private (ha)	428	target to be set next review	
<b>Protection of Wetlands</b>			
Public (ha)	2,725	target to be set next review	
Private (ha)	289	target to be set next review	
<b>Native Vegetation Establishment*</b>			
Area (ha)	4,569	14,000	36%
Number plants	3,208,700	9,800,000	33%
<b>Tree Planting**</b>			
Tree Growing Incentives (ha)	402		

Source: SIRCS Annual Reports

\* as reported as being planted by landowners in the Goulburn-Murray Water Irrigation Census

\*\* incentives paid by the program



*Figure 21 – Corridor Plantings on a Sandhill at Koyuga*

### **6.3 Other Achievements**

- Development of the Environment Program into an integral part of all SIRCS programs. Consideration is underway as to whether the program is still needed as a separate 'issues' based program.
- Inclusion of the Goulburn Broken Native Vegetation Management Strategy goals into the SIRCS.
- Change given in the weighting of environmental priorities used to prioritise catchments for works in the Surface Water Management Program from 10 % in 1995 to 25 % in 2000.
- Contribution to Local Area Planning process enabling a clearer focus on local biodiversity values.
- Strengthening of partnerships with other SIRCS programs, the catchment community and other regional and state natural resource managers. This includes development of operating agreements with DPI/DSE and G-MW.
- Three wetlands and four remnant vegetation sites in the SIR are part of the statewide Environmental Quality Mandatory Monitoring Program.
- Development of Wetland Management Plans.

- 4 Improved accountability through better monitoring and reporting of achievements and outcomes.
- 4 Land under covenanted areas are included as part of total figures above. Reporting from 2000 will separate covenanted areas from those under normal management agreement.



*Figure 22 – Revegetation in the SIR*

## **6.4 Outcomes**

The outcomes of the Environment Program have been reported in the other Programs. The Targets and therefore the Outcomes for the Environment Program are being updated through the Goulburn Broken Native Vegetation Management Plan. These will be reported against at the next review.

## **6.5 Investment to date**

The amount of investment to date in the Environmental Program Grants is \$793,737 (2001\$). This figure does not include the program implementation costs which are met through all the other programs, or the investment made by landowners.



## 6.6 Assumptions

- Tree replacement (as part of compensatory works from implementation of surface or sub-surface management schemes) is calculated by the number of trees removed multiplied by the replacement ratio as set out in the policy. This ratio has increased over time.
- The number of plants equals the number of plants put into the sub-catchment once receipts are received for payment.
- See appendix 2 for further explanation of these dot points.

### Wyuna Bushland Reserve

Some of the region's best natural features are found in this 170 hectare reserve, adjacent to the Goulburn River.

Grey Box, Red Gum and Yellow Box remnant vegetation thrives there, along with endangered plant species including Yellow Tounge Daisy, Dwarf Bluebottle Brush, Leafy Templetonia and Turnip Bassia.

Three significant animal species have also been sighted within the Reserve including Squirrel Gliders, Barking Owl and Bush Stone Curlews, which successfully bred for the first time in eleven years in 1997.

Rehabilitation of the Reserve began in August 1997 when the Wyuna Landcare Group joined with the GBCMA and the then Department of Natural Resources and Environment to implement works within the Reserve.

Dookie College students firstly conducted a preliminary survey of flora and fauna in the Reserve.

Following this, 50 nest boxes for native animals were constructed and installed by clients of the Goulburn Valley Centre for Adults with Disabilities together with members of the Wyuna Landcare group.

Volunteers from Dhurringile Prison Landmate program manually dug 1,000 holes in preparation for tree planting, which was carried out by students from St. Augustines School, Haslem Street Primary School and Unwin Street Kindergarten.

Cattle grids were installed by Landcare members to protect the Reserve from travelling stock, and signs were erected in the Reserve stating the significance of the area.

A Reserve Management Group was established, with the aims of:

- Protecting one of the best natural areas left in the area,
- Improving the conservation value of the reserve for our endangered species,
- Helping educate the community about the importance of natural areas,
- Ensuring our natural heritage is passed on in good condition to future generations.

The Wyuna Landcare Group won a national award which was presented by Ministers Patrick McNamara and Marie Tehan, to the Group President, Mr Earle Phillips, in Canberra in

February 1998. The award recognised the importance of the Reserve and the work contributed by the Group and the Local Community.



*Figure 23 – Wyuna Bushland Reserve showing revegetation works*

## 7 Waterways Program

### 7.1 Program Objective(s)

The overarching aim of the waterway management program in the Goulburn Broken Catchment is to improve the condition of 3,000 km of streams to good or excellent over 30 years while maintaining the condition of streams currently rated as good, very good and excellent.

Within the SIRIC region the target for waterway management programs is within two key Management Units:

- Goulburn River and
- Broken, Boosey Nine Mile system

### 7.2 Biophysical Achievements

Implementation Works	Total to 2000/01
Major grade control / bank stabilisation projects	82
Rock beaching projects	48
Length of stream protected (km)	16
Exotic weed control (km)	36
Fencing projects (km)	144
Revegetation projects (no. plants)	79,600
In-stream rock weirs	2
Fish ladders/ways	22
Urban enhancement projects	12

**Note a:** The targets that would have been displayed in this table have been overtaken by the development of the Goulburn Broken Regional River Health Strategy.

**Note b:** Prior to 1995 minimal work was undertaken to protect the conditions of local waterways. Such action that was undertaken was generally undertaken by local landowners or local government. In 1995 the Lower Goulburn Waterway Management Authority was established to provide a coordinated effort to protect stream condition. This function has been performed by the Goulburn Broken Catchment Management Authority since 1 July 1997.

### 7.3 Other Achievements

- Development of a Waterway Management Plan in 1997.
- Raising of a waterway management tariff.
- Development of a Management Strategy for the Broken Creek.
- Rehabilitating Broken, Boosey and Nine Mile Creeks.
- Completion of a local waterway management strategies for Broken Creek, Boosey Creek and tributaries.
- Research projects including looking at the impacts of river management on aquatic ecosystems, demonstration and evaluation of riparian management and the impact of grazing on soil and water erosion, aquatic ecosystems and vegetation.
- Establishment of benchmarks to monitor the performance of activities.
- The joint projects with Local Government such as the Lake Benalla Riverine Trail and the Numurkah Broken Creek to Kinniards Wetland project.



*Figure 24 – Wells Creek Rock Shute*

## 7.4 Outcomes

The Targets and therefore the Outcomes for the Waterway Program are being updated through the Goulburn Broken River Health and Water Quality Strategy. These will be reported against at the next review.

## 7.5 Investment to date

<b>Waterways Program</b>	<b>Total Funding to 2001 (\$2001)</b>	<b>Comment</b>
<b>1999</b>	4,014,399	No community contribution included
<b>2000</b>	2,468,693	No community contribution included
<b>2001</b>	1,646,000	No community contribution included
<b>Total</b>	<b>8,129,092</b>	

*Source: Waterways Annual Reports, funding received*

## 7.6 Assumptions

- Filter strips and waterway management actions could account for an annual reduction of 6.6t (20% of 32.8t) of treatable Phosphorous from dryland sources.
- Riparian and instream programs will increase the Index of Stream Condition (see Appendix 4) rating over time.
- Providing fish passage will increase the migrational opportunities for native fish species.
- Implementation of the Waterway Program provides a contribution to the improving water quality, biodiversity, and improves recreation and other infrastructure.



*Figure 25 – Broken Creek Fish Ladder*

## 8 Program Support (or Capacity Building Program)

### 8.1 Program Objective(s)

1996

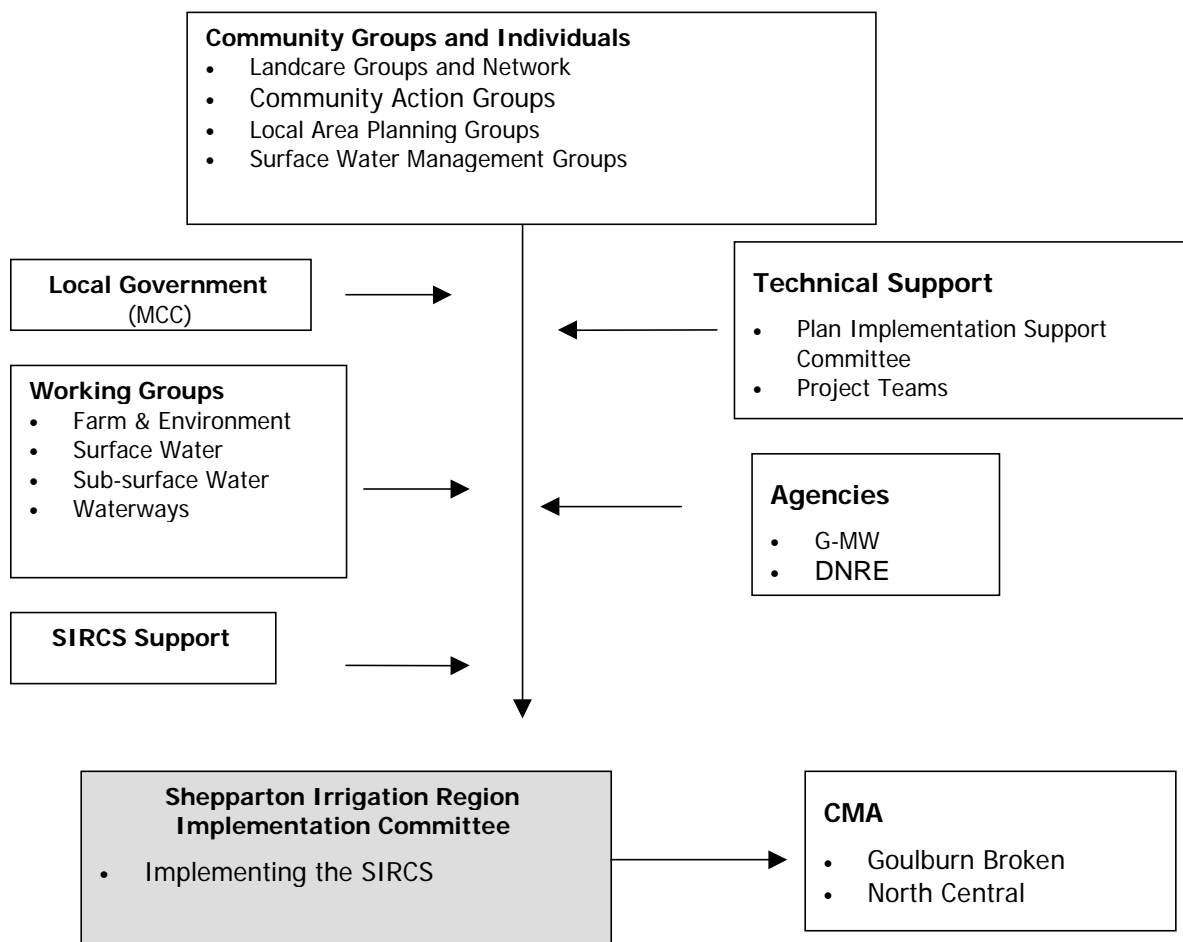
*To provide the framework to manage and coordinate the SHEPPARTON IRRIGATION REGION LAND AND WATER MANAGEMENT PLAN, to review the efficacy of outcomes achieved by implementation, to identify the impact of salinity and nutrient pollution and to provide data for regular review of the priorities and work programs*

**Updated in 2001**

*To protect and enhance the Shepparton Irrigation Region's environmental, economic and social assets through an integrated program based on implementation of best catchment management standards.*

It would not be overstating things to say that this program drives all the others for the SIRCS. The main aim of the program is to build capacity in the community to enable the works to be implemented at the farm scale. This program is where the main connection between the community and those implementing the program lies. The community directly inputs into the implementation and review process, thus ensuring that there is strong community support and interest in the outcomes.

The links between the SIRCS and its various components is shown below.





## 8.2 Achievements

The SHEPPARTON IRRIGATION REGION LAND AND WATER MANAGEMENT PLAN or SIRCS is now recognised as one of the most successful natural resource management programs in Australia. A huge amount of progress has been achieved since the Government endorsed the implementation of the SIR Regional Catchment Strategy in 1990. This is a tribute to the cooperation between individual landholders, local communities, agencies, Local, State and Commonwealth Governments.

The SIR has contributed to other statewide salinity programs through being a 'pilot' salinity program. Other regions have learned and benefited from the experiences of the SIR, and the SIR has benefited by leading the process.

**Recognition** through a number of prestigious awards has been achieved including:

-  The Waterways Management Program was short-listed for the International Riverprize award in 2000 and was awarded the National Riverprize in 2001.
-  SIR IC was highly commended in the Prime Minister's awards in 2000 in the category for Community Leadership in Environmental Achievements.
-  The Muckatah Project won the National Environment Award in 2000 in the Innovation and Land, Bush section and was a finalist in two other sections.
-  The Muckatah Project also won the Engineering Institute of Victoria Excellence Award for outstanding achievement in design and construction of a unique integrated surface water management system with innovative wetland rehabilitation and environmental enhancement features.
-  Waterways Working Group was a finalist in the Waterways section for state Landcare Awards in 2000.
-  Surface Drainage Working Group was a finalist in the state Landcare Awards in 2000.
-  Banksia 2000 winner in the Landcare, Bush and Waterways category.
-  The Muckatah Catchment Strategy won the Institute of Engineers Awards for Environmental Excellence in 1999.
-  Finalists in the Banksia Awards in 1999 in the community group section.
-  1999 Victorian Landcare and Farm Management Awards Finalist.
-  DNRE staff working on the SIRCS were runners up in the NRE Daniel McAlpine Award in 1998.
-  The 1993 Landcare Australia Awards - Highly commended Telecom Local Government Award - Municipalities Against Salinity in Northern Victoria.
-  The 1995 Landcare Catchment Award for the Shepparton Irrigation Region Land and Water Salinity Management Plan.





**Figure 26 – John Dainton and Ken Sampson accepting the 1995 Landcare Catchment Award for the Shepparton Irrigation Region Land and Water Salinity Management Plan**

- In 2000, the Prime Minister, John Howard, opened the Muckatah Stage One near Numurkah in August,
- the state Minister for Environment and Conservation, Sherryl Garbett celebrated the completion 2000th Whole Farm Plan in March 2000
- In 1999, the then State Minister for Agriculture, Pat McNamara opened the Rodney 3/6P Community Surface Water Management System, celebrating the 50,000<sup>th</sup> hectare of land drained by a Community Surface Water Management System,
- Visit by the World Bank.

See Appendix 4 for a full list of visitors



**Figure 27 – Prime Minister John Howard with Dustin Lavery (on the left) launching Stage One of the Muckatah Surface Water Management Scheme, August 2000**

**Investment** has been successfully attracted to achieve outcomes through a number of sources including:

- \$ State Salinity Funding
- \$ Murray Darling Basin Drainage Program,
- \$ Working Nation Program,
- \$ Natural Resource Management Strategy Integrated Catchment Management Program,
- \$ Natural Resource Management Strategy - Investigations and Education,
- \$ State Water Quality Funding
- \$ State Fishways Funds,
- \$ Federal Water Resource Assistance Program,
- \$ National Landcare Program, various industry development corporations and foundations,
- \$ Natural Heritage Trust,
- \$ Local Government,
- \$ Federal and State Government expenditure on the Plan over the 10 year period has been \$148 million,
- \$ Major investment into salinity related activities by landholders with over \$380 million spent in the first ten years of implementation of the SIRCS.

The SIRCS is only achieved through the involvement and participation of the **community**. More specifically:

- SIRIC has 8 community members and the catchment wide Biodiversity and River Health and Water Quality Committees have 25 community members. The strong community involvement in the SIRCS provides a two-way feedback mechanism to ensure that works in the community is what the community wants and is able to participate in.
- SIRIC is supported by Working Groups which have strong community representation.
- A community involved in and committed to implementing the SIRCS.
- Strong community involvement in monitoring through the Waterwatch and Drain watch programs.
- 60 community action groups working in the SIR including the very active Goulburn Murray Landcare Network which has 31 member Landcare Groups.
- Development of 4 Local Area Plans (see map).
- Inclusion and involvement of Local Government in implementation.

With the development of the SIRCS, Local Government formed “Municipalities Against Salinity in Northern Victoria” to represent the then 13 **Local Governments**. This involvement has continued post amalgamation with the three municipalities. Several significant achievements have resulted from this partnership with the 3 municipalities which are:

- a jointly fund a position for a Local Government Municipal Catchment Coordinator.
- development of the Earthwork Planning Controls (Uniform Planning Regulations) with subsidised planning permit fees.
- adoption of the Regional Catchment Strategy into Municipal Planning Schemes.
- and, a contribution to the salinity program through rates (paid in recognition of the benefits to council assets through the salinity program).

Another way the SIRCS engages the local community is through the Community Salinity Grants (CSG). CSG offers funds for community groups and schools for projects to increase awareness and understanding of salinity. Projects funded under the scheme include running workshops and field trips, development of school curriculum material and monitoring groundwater bores. The grants are subject to the availability of funds. Over \$226,134 (2001\$) has been provided to community groups through this program.

The SIRCS is implemented using **best catchment standards** and **adaptive management systems**. Examples of this approach include:

- Endorsed guidelines for incentive schemes and documentation for all programs.
- Technical support provided through SIRTEC to aid decision making which drives continuous improvement, improves integration and fine tuning of the programs.
- Evolution of the SIRCS to include new issues such as nutrients, river management and biodiversity have been identified and incorporated.

- Adaptation to incorporate aspects of the Goulburn Broken Nutrient Management Strategy, the Goulburn Broken Water Quality Strategy Waterways Strategy as well as embracing the Goulburn Broken Native Vegetation Management Strategy.
- Development of Community Salinity Grants.
- Integration of all programs within the plan.
- A well developed works program and budget review process. This has enabled advantage to be taken of funding opportunities, and allowed the ready movement of funds between priorities and programs to ensure **full budget commitment**. The SIRCS has an aim to direct 70% of its funds towards works.

Rigorous **reporting and monitoring** to ensure **accountability**, is a feature of the SIRCS and includes:

- Detailed annual reports are prepared and printed each year for government and community distribution, which detail the achievements of all aspects of the Plan.
- A number of reviews by Federal departments and funding bodies (MDBC, Environment Australia, DPIE, and the Commonwealth Environment Protection Agency).
- Natural Heritage Trust mid-term review in 1999.
- An audit of SIRCS in 1994 by the Victorian Auditor General (along with other components of the State Salinity Strategy).
- Audit of the SIRCS by the Auditor General in 2001
- formal audits of the Surface Water Management Strategy, the Public Pump Program and the Exploratory Drilling Program have been implemented by the then Department of Natural Resources and Environment.

The **research and development** component of the plan aims to provide linkages between implementation of the plan and research, to improve the technical knowledge and to base decisions on the best research and information available. Some examples of the impact of research and development into the implementation of works includes:

- Drainage modelling which determined that there is an 11.5 % reduction in accessions to the regional groundwater as a result of the surface water management systems.
- The design of the surface water management systems based on Institute for Sustainable Irrigated Agriculture (ISIA) research on waterlogging of perennial pasture.
- Research on WFPs based on getting water on and off pastures most efficiently.
- Design criteria of irrigation bays based on research.
- Research on water use efficiency has led to improved management of irrigation scheduling.
- Farm drainage reduces accessions to groundwater by 7.5 %.
- Groundwater reuse and other disposal options have been developed as a result of ISIA research.

- GIS modelling and map production assists with community monitoring.
- Research on ecosystems services and the benefits of this approach are being incorporated into the thinking and approach to natural resource management.
- There is a strong planning and review process included in the research and development sub-program.

The Plan has funded a significant amount of research and investigation work. A number of achievements have been made in the areas of:

- drain design to reduce nutrients,
- groundwater research,
- conjunctive water use,
- irrigation management,
- farm irrigation hydrology,
- nutrient management,
- pasture species selection,
- tree water use and interactions with groundwater,
- serial biological concentration of saline water and tile drainage investigations, and
- soil surveying of high-risk areas for soil salinisation has commenced in conjunction with Landcare groups.



**Figure 28 – Partnerships in Action**

**Bill O’Kane (GBCMA CEO), Ken Samson (SIRIC EO), The Hon. Dr. Sharman Stone MP (Member for Murray), John Dainton (GBCMA Chair), Denis Flett (G-MW CEO) and Allen Canobie (SIRIC) at the launch of Mukatah Stage One, August 2000**

### **8.3 Investment to date**

The present value of the expenditure to date (2000/2001) is \$21,871,000 It includes:

- ❖ DPI/DSE Program Management and Coordination,
- ❖ G-MW Program Management and Coordination,
- ❖ GB CMA Program Management and Coordination,
- ❖ Community Support,
- ❖ Community Education,
- ❖ On-going Planning and Adaptive Management, and
- ❖ Monitoring.

## 9 Evaluation of the SIRCS

Rendell McGuckian were asked to review the SIRCS to determine whether the intended outcomes were achieved and to determine what lessons there are to improve the process of strategy implementation and evaluation for 2002-2007.

The conclusions of the review as reported in “Comments on the Evaluation of the Goulburn Broken Regional Catchment Strategy 1997-2001 and its Main Sub-Strategies” were:

- Tracking changes in targets through the documentation will help explain future performance.
- The complexity of reporting can increase with greater integration that will create challenges for reporting and subsequent evaluation.
- There are a number of areas under-performed and many exceeding expected performance. Why they are like they are needs explanation that then leads into the next phase of planning. This captures what is learnt along the way.
- A planned approach to systematically reviewing how the programs/sub-programs are planned and implemented (at a narrower/local level than at, for example, the audit of the surface water management strategy) could enhance the continued improvement of the SIRCS programs (this may be occurring, and if it is some recognition of that would be good to demonstrate what changes come out of it, if any).

This effectively is looking at how effective the extension programs are.

The SIRCS update of 2003 will take in consideration Rendell McGuckian’s conclusions and in particular will explore how we report on outcomes as well as outputs.

## **10 Conclusion**

The SIRCS has achieved a great deal in its first ten years. One of the major achievements which is not easily measured is the level of community engagement. This has been one of the strengths of the program so far.

In total \$148,654,000 (2001\$) has been spent implementing the program. This does not include expenditure by landowners which is estimated to be \$383,030,388.

The SIRCS has evolved throughout its first ten years to change from a salinity plan to a whole of catchment approach incorporating issues such as biodiversity. As we move forward, more evolution will be required to ensure that the SIRCS continues to meet the needs of the catchment community.



## **11 Appendices**

### **11.1 Appendix 1 - Definitions**

#### **Local Area Planning**

Local Area Planning is a process of the local community developing ownership of SIR Catchment Strategy. Procedures are used to identify the issues that have the most impact within their local area. Key community people and staff then have the opportunity to contribute to the development and implementation of the Catchment Strategy within that particular local area. It is a plan to establish a sustainable sound environment by identifying and overcoming land management and social problems through communal action. Local Area Plans help ensure the accelerated implementation of existing natural resource programs (Source: Farm Program Review, September 2002, page 45).

#### **Earthwork Planning Controls**

These controls were introduced across the whole SIR in 1994 through Local Government Planning Controls and make it necessary to obtain planning approval for earthworks.

As laser grading to improve water use efficiency became more common, and as the Surface Drainage Strategy was developed and began to be implemented, it became clear that planning controls over earthworks were needed for two main reasons:

1. to ensure that works by landowners were compatible with the Regional Drainage Network,
2. to prevent damage and loss to others by landowners constructing inappropriate earthworks.

Local Government provides a 50% subsidy of the Planning Permit Fee to landowners who obtain Planning Approval through certifying a Whole Farm Plan. This encourages landowners to consider water management on their property in a holistic way rather than in a piecemeal approach. Whole Farm Planning is being adapted to further incorporate environmental issues such as native vegetation. Local Government benefits by receiving only one application for works rather than a number for any given property. This subsidy also demonstrates to the community that Local Government is strongly committed to the Regional Catchment Strategy and its implementation.

#### **Covenants (environmental)**

A conservation covenant is an agreement between a landowner and the Trust for Nature, which protects and enhances the natural, cultural and/or scientific values of the land. The covenant is registered on the property title and binds all future owners.

Land of high conservation significance is covenanted with Trust for Nature. Such land may have threatened plants or animals, or be one of the last remaining patches of bush in the area. The property may form part of an important wildlife corridor, or act as a buffer to protect a neighbouring National or State Park. In our region it usually means an area of high quality remnant vegetation which is fenced by the owner and has a management regime to protect it. This usually means no grazing or grazing only at strategic times of the year, and so represents an income loss to the landholder.

## **Index of Stream Condition (ISC)**

The index is a measure of a stream's change from natural or ideal conditions. The ISC considers about 2,500 km (25%) of the Catchment's streams on a representative reach basis. It presents an indication of the extent of change in respect of five key "stream health" indices:

- hydrology (change in volume and seasonal flow);
- physical form (stability, degradation/aggradation, influence of artificial barriers and abundance/absence of in-stream debris);
- streamside zone (plant species - native / exotic, spatial extent, width, continuity and links);
- water quality (assessment of total phosphorus, turbidity, conductivity and pH); and
- aquatic life (abundance and type of macro invertebrates) (Goulburn Broken Regional Catchment Strategy, November 2003).

## **Adaptive Management Systems**

This approach involves continuously evaluating and revising both program operation and strategy targets against new information received from external sources such as Strategies developed at the Catchment, State or Commonwealth Scale, and from internal reviews of programs and research results.

## **Community Salinity Grants**

The Community Salinity Grants (CSG) offers funds for community groups and schools for projects to increase awareness and understanding of salinity. Projects funded under the scheme include running workshops and field trips, development of school curriculum material and monitoring groundwater bores. The grants are subject to the availability of funds. Funds up to a maximum of \$8,000 per grant are available for 2004/05 (Source: GBCMA website).

## 11.2 Appendix Two - Acronyms

AAV	Aboriginal Affairs Victoria
CAMS	Catchment Activity Managements System
CAS	Catchment and Agricultural Services
CaLP	Catchment and Land Protection
CMA	Catchment Management Authority
COAG	Coalition of Australian Government
CSD	Community Surface Drainage
CSIRO	Commonwealth Scientific Industry Research Organisation
DNRE	Department of Natural Resources and Environment
EMS	Environmental Management System
EPA	Environmental Protection Agency
EPBCA	Environmental Protective Biodiversity Conservation Act
GBCMA	Goulburn Broken Catchment Management Authority
GGAP	Greenhouse Gas Abatement Program
GIS	Geospatial Information System
GMP	Groundwater Management Plan
GMW	Goulburn Murray Water
GVEEP	Goulburn Valley Environment Employment Program
IC	Implementation Committee
ISIA	Institute of Sustainable Irrigated Agriculture
LAP	Local Area Plans/Planning
LPIS	Land Protection Incentive Scheme
LWMP	Land Water Management Plan
LWRRDC	Land and Water Rural Research & Development Corporation (Land and Water)
MASNV	Municipalities Against Salinity in Northern Victoria
MDBC	Murray Darling Basin Commission

ML	megalitre
NHT	National Heritage Trust
O&M	Operations and Maintenance
PISC	Planning Implementation Section Committee
PPA	Pests Plants and Animals
RCS	Regional Catchment Strategy
RWC	Rural Water Corporation
SDA	Salt Disposal Allocation
SIR	Shepparton Irrigation Region
SIRAP	Shepparton Irrigation Region Action Plan
SIRCIS	Shepparton Irrigation Region Catchment Implementation Strategy (2003)
SIRIC	Shepparton Irrigation Region Implementation Committee
SIRLWMP	Shepparton Irrigation Region Land and Water Management Program 1995
SIRLWSMP	Shepparton Irrigation Region Land and Water Salinity Management Program 1989
SKM	Sinclair Knight Mertz Consulting
SPAC	Salinity Program Advisory Committee
SPC	Shepparton Preserving Company
SPPAC	Salinity Pilot Program Advisory Council
TWE	Trading Water Entitlement
UDV	United Dairy Farmers of Victoria
VFF	Victorian Farmers Federation
WFP	Whole Farm Plan
WSC	Water Services Committee
WUE	Water Use Efficiency

### 11.3 Appendix 3 – Visitors to the SIR

1991/92	Premier Joan Kirner
1991/92	Federal Minister for Primary Industries, Mr. Simon Crean, Federal Minister for Food and Agriculture, Mr. Ian Baker
1991/92	Leader of the Opposition, Mr. Jeff Kennett
1992/93	Chinese Delegation of Agricultural Scientists
1993/94	Premier Jeff Kennett
1993/94	Treasurer Alan Stockdale
1993/94	State Minister for Natural Resources, Mr. Geoff Coleman
1993/94	State Minister for Agriculture, Mr. Bill McGrath
1993/94	Federal Senator Bob Collins
1993/94	Murray Darling Basin Commission Chief Executive Don Blackmore
1994/95	Deputy Prime Minister, Mr. Brian Howe
1994/95	South Australian Ministers for Agriculture and Environment
1995/96	Minister for Agriculture and Resources, Mr. Patrick McNamara
1995/96	Minister for Conservation and Land Management
1996/97	Queensland Minister for Natural Resources
1998/99	Federal Minister for the Environment, Mr. Robert Hill
1998/99	Murray Darling Basin Commissioners
1998/99	National Competition Council
1998/99	CSIRO Scientists
1998/99	Western Australian Water Authorities
1998/99	Minister for Agriculture and Resources, Mr. Patrick McNamara
1999/00	Prime Minister, Mr. Howard
1999/00	Minister for Conservation and Environment, Sherryl Garbutt

#### 11.4 Appendix 4 – Publications and Presentations – a Small Sample

Year	Topic	Conference/Journal
1992	Effects of increasing natural resource management costs on pressure for structural adjustment in the Shepparton Irrigation Region	36 <sup>th</sup> Annual Conference, Australian Agric. Econ. Soc.
1993	Development and Implementation of community driven natural resource management plans for Salinity Control in Northern Victoria	National Conference on Land Management for Salinity Control
1995	A Community Solution to Groundwater Control	International Association Hydrogeology Congress, Canada
1995	Redesigned Farm Uses 25% Less Water	Australian Farm Journal
1995	Local Government and Natural Resource Management – The Shepparton Irrigation Region Experience	The Role of Local Government in Natural Resource Management Conference
1995	Ability of Farmers to Pay Natural Resource Protection Costs	Annual Farm Management Conference, Monnambel
1995	Shepparton Irrigation Region Land and Water Salinity Management Plan - Community Involvement	Murray Darling Basin Commission Workshop
1995	Sharing the Costs of Groundwater Pumping	Murray Darling Basin Commission Workshop
1996	Irrigation with Saline Water in the SIR	Productive Use of Saline Lands Conference, Albany
1997	Balancing Irrigation and the Environment – the Mid Murray Approach	Australian National Committee on Irrigation and Drainage, Deniliquin
1997	Community Involvement in Catchment Management	Australasian Pacific Extension Network, Albury
1997	More than a Question of Numbers	National Landcare Conference, Adelaide
1997	Community Surface Drains – A Community Success Story	Australasian Pacific Extension Network
1997	Managing Wetlands in an Irrigated Catchment, Poster Presentation	Wetland Care Australian Convention

1998	Watertable Watch – Community Awareness into Action	National Agricultural Awareness Conference, Canada
1998	Environmental Protection through Partnerships	Australasian Pacific Extension Network
2000	Management of Saline Drainage Water on Farms in Northern Victoria	Xth International World Water Congress
2000	Group Skills and Community Action – poster presentation	International Landcare 2000 Conference
2000	Community Involvement in Successful Catchment Management – Shepparton Irrigation Region	International Landcare 2000 Conference ANCID Conference Xth International World Water Congress, Melbourne
2000	Management of saline drainage water on farms in northern Victoria	Xth International World Water Congress, Melbourne