Shepparton Irrigation Region
Implementation Committee

Water, Land and People

Annual Report

2009 - 2010

GOULBURN BROKEN
CATCHMENT MANAGEMENT AUTHORITY

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Find more information about the Goulburn Broken Catchment Management Authority on the web at:
www.gbcma.vic.gov.au

Cover image and page 8: Peter Gibson, Chair of Shepparton Irrigation Region Implementation Committee.
Photographer: Peter Howard - GB CMA

Acknowledgment
This project is funded as part of the Goulburn Broken Catchment Management Authority Regional Catchment Strategy in the Shepparton Irrigation Region and is provided with support and funding from the Australian Government and Victorian Government. This project is delivered primarily through partnerships between the Department of Primary Industries, Goulburn-Murray Water, Department of Sustainability and Environment, the Goulburn Broken Catchment Management Authority, North Central Catchment Management Authority and other bodies.

Contents

OVERVIEW

Goulburn Broken Catchment Management Authority

The Goulburn Broken Catchment Management Authority (GB CMA) is a statutory authority established by the Victorian Government to coordinate land, water and biodiversity management. Under the Catchment and Land Protection Act 1994 the GB CMA was established as the peak natural resource management body in the Goulburn Broken catchment to develop and oversee the implementation of the Regional Catchment Strategy.

To assist in this task, the GB CMA has established two geographically based Implementation Committees: the Shepparton Irrigation Region Implementation Committee and the Broken Goulburn Implementation Committee. The Implementation Committees comprise community representatives appointed by the GB CMA and a non-voting representative from each of the Department of Primary Industries, Department of Sustainability and Environment and Goulburn-Murray Water.

The prime function of Implementation Committees is to support and communicate implementation of the priorities of the Regional Catchment Strategy and to provide feedback on the local community's view. In so doing, the Implementation Committees have an important role in identifying and providing input to refinement and review of the Regional Catchment Strategy and its implementation priorities.

A charter established by the GB CMA sets out operational guidance and direction, operational framework, together with roles and responsibilities for the Implementation Committees.

The Implementation Committee roles include:

- providing advice to the Board on GB CMA Policy, including the Regional Catchment Strategy;
- providing comment and feedback on proposed GB CMA works programs;
- involving others in decision-making (where relevant) and/or keeping them up-to-date about appropriate decisions and actions;
- listening to, and understanding and passing on the regional communities' points of view;
- reporting to and/or providing feedback from various community committees to enhance the connection of the GB CMA to the community.
- The Implementation Committee members are appointed for a period of four years.

The Regional Catchment Strategy in the Shepparton Irrigation Region is funded jointly by the regional community, the Australian, Victorian and Local Governments. The works program is delivered by government agencies and landholders working in partnership to implement the Regional Catchment Strategy.

Shepparton Irrigation Region Implementation Committee

The Shepparton Irrigation Region Implementation Committee provides community engagement and assists with implementation priorities for the programs of the Goulburn Broken Regional Catchment Strategy that are relevant in the Shepparton Irrigation Region. These relevant programs are collectively referred to as the Shepparton Irrigation Region Catchment Implementation Strategy (SIRCIS).

A simple and effective network structure comprising working groups, technical representatives and other valuable mechanisms has been established to coordinate and inform the Shepparton Irrigation Region Implementation Committee. This is explained here and shown diagrammatically on the following pages along with current committee members.

Working Groups

Working Groups have been established for the four action program areas overseen by the Shepparton Irrigation Region Implementation Committee: Farm and Environment; Surface Water Management; Groundwater and Salt Management, and Waterways. All Working Groups comprise community representatives including representatives from each of the four Water Service Committees of Goulburn-Murray Water, Victorian Farmers Federation, Local Government, environmental groups and agency representatives.

A 'Budget Sub-committee' exists to inform and comment on investment issues. This committee has developed and maintained a relationship based on openness and trust between the community and those charged with investment responsibility. In this regard, the Budget Sub-committee has proven to be effective and invaluable.

Technical support

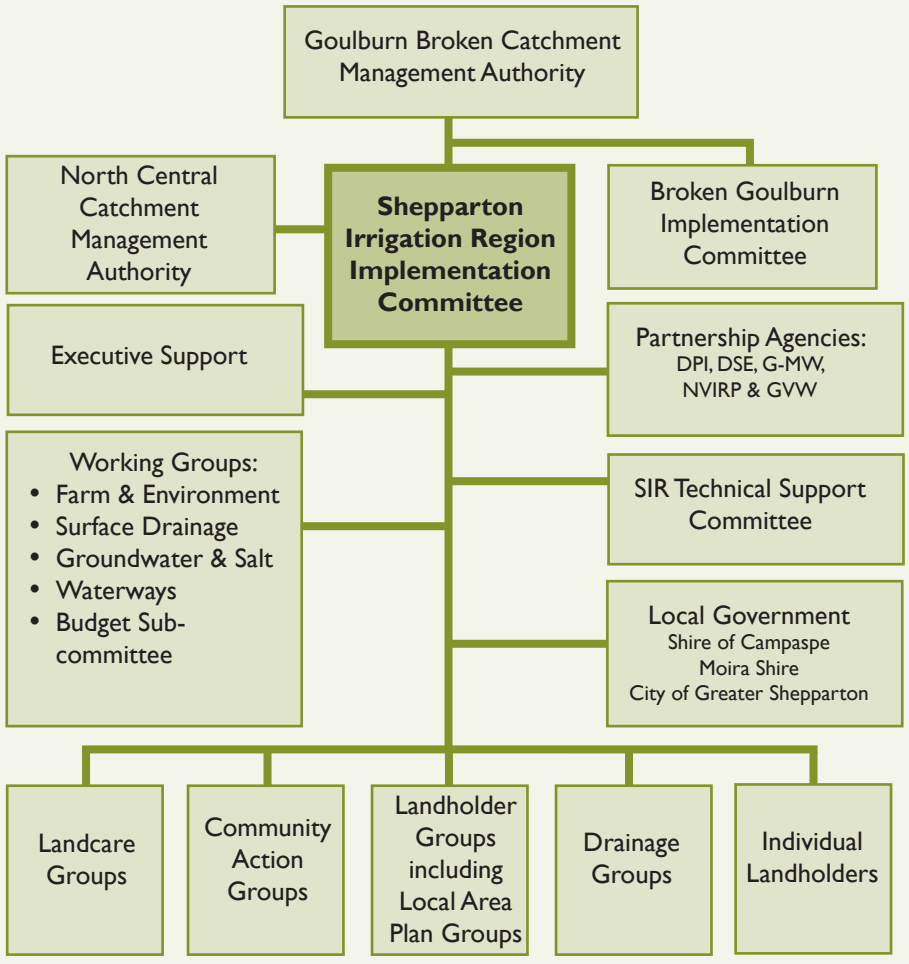
The Shepparton Irrigation Region Implementation Committee is supported by an Executive Support Team, which provides executive and technical advice for the implementation of the Shepparton Irrigation Region Catchment Implementation Strategy. Agency staff also provide technical input through the Shepparton Irrigation Region Technical Support Committee, (SIRTEC) the working groups and specific project teams.

Partnership structure

Community involvement is made possible because of a multi-faceted partnership network. This partnership network enables community involvement at every level as the Shepparton Irrigation Region Catchment Implementation Strategy evolves during its implementation. This ensures community input and ownership of the decision-making process.

The Shepparton Irrigation Region Catchment Implementation Strategy signifies a true partnership between the local community and all levels of government, State, Federal and Local. Community representatives actively participate in decision-making processes through a committee structure (see diagram).

Committees, Agencies, Community Groups
Shepparton Irrigation Region Catchment Implementation Strategy Partners



Community Representatives

Victoria

Goulburn Broken Catchment

Stephen Farrell

- Member since 2002
- Member of the Surface Water Management Working Group

Stephen is a dairy farmer from Echuca. Stephen is an active Landcare member and is concerned about all aspects affecting the environment. Stephen believes landowners should be encouraged to use better farming practices and communities made aware of the long term benefits of the implementation of on-ground works. Stephen's main focus is to balance environmental management with farming practices. Another important focus is maintaining farm productivity, profitability and provide a future for our sons and daughters.

Allen Canobie

- Member since 1990
- Past Chair
- Chair of the Surface Water Management Working Group

Allen is an irrigation farmer at Numurkah who has been involved with environmental management since the days of the salinity program (Salinity Program Advisory Council). He is committed to promoting better farming practices encompassing revegetation, nutrients and fertiliser use. Allen also has a strong commitment to developing better partnerships with processing bodies and industry and the wider community.

Roger Wrigley

Deputy Chair

- Member since 2006
- Member of the Waterways Working Group and Farm and Environment Working Group

Roger is a geotechnical and environmental engineer and soil scientist engaged as an academic by the University of Melbourne at Dookie College and Monash University. His research and practice is related to soil,water and waste management.

John Wenske

- Member since 2008
- Member of the Groundwater and Salt Management Working Group, Shepparton Water Services Committee

John is an irrigation dairy farmer and business owner from Katandra West who has been actively involved in the irrigation industry for many years in Victoria and South Australia. John is keen to play a role in ensuring the ongoing viability and sustainability of our catchment community by encouraging adoption of sustainable integrated resource management principles to tackle challenges of the potential climate change, competing demands for water and regional adjustment.

Peter Gibson

Chair

- Member since 1995
- Member of the Surface Water Management Working Group

Peter is an irrigation dairy farmer and business manager at Nanneella and is involved in a number of committees and organisations. He is passionate about the use of water and its impact on the environment into the future. The Regional Catchment Strategy is a critical document and sets targets and priorities for on-ground works. Peter has been Chair of the Nanneella/Timmering Landcare group for a number of years and is a member of the Rochester Campaspe Water Services Committee.

Nick Ryan

- Member since 2004
- Member of the Waterways Working Group and Farm and Environment Working Group

Nick is an irrigation dairy farmer and has a keen interest in sustainable economic growth and natural resource management in the Shepparton Irrigation Region. Nick is Chairman of a Steering Committee project 'Future Dairy Farming Systems'. Nick brings a number of skills to the program and is a keen advocate of community consultation keeping the public informed of the work done by the implementation committee and its working groups.

John Gray

- Member since 2006
- Member of the Waterways Working Group and Farm and Environment Working Group

John Gray is a retired school teacher who has had vast experience as a municipal councillor, and as a government appointee to the former Catchment and Land Protection Board, the GB CMA and Goulburn Valley Water. He is proud to have enthusiastically embraced successful cultural and organisational changes in natural resource management, the water industry and local government over the past progressive couple of decades. John is committed to the environment, sound sustainable land planning principles, floodplain management and best utilisation of our finite water resource. Also, GB CMA representative on Riverconnect Advisory Committee.

Helen Reynolds

- Member since 2006
- Member of the Farm and Environment Working Group and Groundwater and Salt Management Working Group

Helen is an irrigation grain farmer and enthusiastic conservationist and has a background in ecology and natural resource management. She is President of the Goulburn Valley Environment Group and an active member of the Victorian Farmers Federation and the Victorian Irrigated Cropping Council. She is interested in seeing the region flourish through improved environmental management on farms and enhanced protection and management of public land.

Shepparton Irrigation Region – working together

The effectiveness of the Shepparton Irrigation Region Implementation Committee to deliver an on-ground works program gives landholders the confidence to invest in "works that will work". The value of potential benefits of the works is such that for every dollar invested, they can potentially receive between $1.27 and $1.64 benefit:cost ratio (approximately).

Shepparton Irrigation Region community is resilient in adapting to a constantly changing environment. The financial strength of agriculture industries in this irrigation region empowers landholders to have the financial capacity to invest in positive outcomes to their properties and access incentive schemes that Shepparton Irrigation Region Implementation Committee oversee.

The strong relationship between farming community representatives, partner agencies and local government reflects the needs and aspirations of the community to leave the land in better shape for the next generation.

Implementation Strategy

As mentioned previously, the Shepparton Irrigation Region Catchment Implementation Strategy is the package of work programs and priorities from the Goulburn Broken Regional Catchment Strategy that are relevant to the Shepparton Irrigation Region. The Shepparton Irrigation Region Catchment Implementation Strategy is a 30-year strategy that provides the framework for land, water and biodiversity management. Commencing in 1989, with whole community cooperation, the strategy aims to improve the condition of natural resources in the Shepparton Irrigation Region for current and future community.

The Shepparton Irrigation Region Catchment Implementation Strategy addresses the following issues: salinity, water quality, native biodiversity, riverine health, pest plants and animals as well as climate change and greenhouse gas emissions.

The Shepparton Irrigation Region is currently the focus of massive investment in the upgrading of the irrigation delivery system that will see the automation of supply and also the improvement of delivery.

Who pays

The Shepparton Irrigation Region Catchment Implementation Strategy is funded jointly by the regional community, the Australian, Victorian and Local Governments. The regional community has a major commitment to the Shepparton Irrigation Region Catchment Implementation Strategy, both to capital projects and ongoing operation and maintenance. In 2009-2010, this was approximately $30 million. Annually, the Shepparton Irrigation Region Implementation Committee attracts funding of close to $15 million with the majority of this funding going directly to on-ground works projects. For more details, refer to the Appendices.

Our Region

The Shepparton Irrigation Region covers over 500,000 hectares and occupies approximately one third of the Goulburn Broken catchment, the eastern area of the North Central catchment and forms part of the Murray-Darling Basin.

The irrigated area of 317,000 hectares within the Shepparton Irrigation Region utilises approximately 1.5 million megalitres of water each year. The gross value of agricultural production in 2005-2006 (ABS) was $1.38 billion. This accounts for 14.9 percent of Victoria's gross value of agricultural production. The main primary industries are horticulture, dairying, cropping and grazing.

The population of the Shepparton Irrigation Region is over 120,000 people and includes more than 7000 rural properties, with over 20 percent of those landholders being of a multicultural background.

Our region is home to the largest Indigenous Australian population outside metropolitan Melbourne. Cultural and linguistic diversity is a feature of the region where well established communities, primarily as a result of Southern European post-war migration, co-exist with more recently arrived communities from countries such as Iraq, Iran and India.

CHAIR'S MESSAGE

Peter Gibson
Chair

Shepparton
Irrigation
Region
Implementation
Committee

This annual report details the program of works that the Shepparton Irrigation Region Implementation Committee (SIRIC) in collaboration with landholders and communities, has achieved over the past year.

The Shepparton Irrigation Region Catchment Implementation Strategy programs attracted $13.3 million in funding through Victorian and Australian Government initiatives including Our Water Our Future, Water in a Climatically Challenged Environment, Natural Resources Investment Program, and Caring for Our Country. In addition SIRIC attracted $1.4 million of regional funds.

The Committee was supported in the delivery of the planned programs as a direct result of the ongoing commitment of the representatives from our Partnership Agencies: the Department of Primary Industries, Goulburn-Murray Water, the Department of Sustainability and Environment and the Northern Victoria Irrigation Renewal Project.

The Committee re-elected Roger Wrigley as SIRIC's Deputy Chair and myself as Chair for another two-year term. Sadly, long-standing Executive Officer, Ken Sampson, passed away in October. Ken was instrumental in developing and implementing salinity and drainage programs and was Executive Officer of the Shepparton Irrigation Region Implementation Committee from 1994. Ken Sampson made a remarkable contribution to northern Victoria and within natural resource management organisations regionally and beyond. Carl Walters was appointed Executive Officer in November 2009.

I would like to thank my fellow Committee members: Allen Canobie, Steve Farrell, John Gray, Helen Reynolds, Nick Ryan, Roger Wrigley and John Wenske. Their contribution to the Committee, Working Groups and individual community forums has been outstanding.

I would also commend the work of our Partner Agency representatives Terry Batey, James Burkitt and Rob Steel and our Executive Team of Carl Walters and Peter Howard who have provided a high level of professional support to myself and the Committee.

I thank them for their hard work and personal contribution.

Furthermore, I would like to acknowledge the resilience of the landholders and communities of the Shepparton Irrigation Region who have continued to devote resources, personal and financial, to invest in environmental programs throughout this long period of sustained dry conditions.

Peter Gibson
Chair - Shepparton Irrigation Region Implementation Committee

ACTIVITIES and ACHIEVEMENTS

Executive Team Report

Written by Carl Walters, Peter Howard and Rod McLennan, Goulburn Broken Catchment Management Authority

Works and activities are delivered in collaboration with our regional partners in the Department of Primary Industries, Goulburn-Murray Water, the Department of Sustainability and Environment and more recently Northern Victoria Irrigation Renewal Project (NVIRP). Our links with Local Government form part of the strategy to ensure a consistent approach to Natural Resource Management issues across the Shepparton Irrigation Region.

Government funding continued in a downward trend which is impacting on elements of the program particularly in Environment, Groundwater and Salt and Surface Water Management. However, incentives available under the Northern Victoria Irrigation Renewal Project have seen an increase in activities as landholders plan for water efficiencies under a modernised irrigation system.

Irrigation Modernisation

Through the NVIRP, a $2 billion works program is being undertaken to modernise Victoria's Foodbowl region by upgrading ageing irrigation infrastructure. An average of more than 800 gigalitres of water is being lost every year through leaks, system inefficiencies and evaporation.

Modernisation will improve efficiency and service to irrigators. It will underpin future economic growth and regional prosperity, providing confidence for communities that are facing significant challenges because of the drought. The project is anticipating the recovery of an estimated 225 gigalitres of lost water by 2012, with water savings to be shared equally between irrigators, the environment and Melbourne.

The Shepparton Irrigation Region Implementation Committee has worked closely with NVIRP and other modernisation activities to ensure that water saving projects are consistent with and complementary to implementation of the Shepparton Irrigation Region Catchment Implementation Strategy.

In the latter stages of 2009-2010, significant efforts were devoted to developing the "On-Farm Irrigation Efficiency Program" funding bid, the supporting 'Farm Water Program', and the subsequent detailed business case. The Goulburn Broken Catchment Management Authority (GB CMA along with it's partners were slected to deliver $25 Million worth of irrigation efficiency works on farm as part of Round 1 of this program

Irrigators, senior management and technical, environmental and implementation staff are ensuring that both NVIRP and the Shepparton Irrigation Region Catchment Implementation Strategy are seamlessly implemented. This is achieved through collaborative input into wetland watering plans, farm irrigation assessments, environmental assessments, waterway watering plans, identifying "backbones" (major network link irrigation channels), connection processes, and farm works. Cost-sharing agreements have been developed with NVIRP and effective relationships have been developed and maintained.

The Shepparton Irrigation Region Implementation Committee Executive Officer is the GB CMA representative on various NVIRP committees, including the Technical Advisory Group, the Environmental Technical Advisory Committee, and the Salinity Impact Technical Advisory Committee and has encouraged the development of the Environment Connection Working Group.

Performance

The drought continues to have an impact on our works programs, especially the Environmental and Surface Water Management programs. Funding cuts have limited the Groundwater and Salt Management and Surface Water Management programs. Farm Program activities have however increased due to the need for landholders to use water more efficiently and to integrate with the irrigation modernisation program.

Works and operations - highlights

- Whole Farm Plans on 212 properties covering 16,018 hectares were completed, bringing the total number of Whole Farm Plans under this incentive to 3,904 covering 269,232 hectares or 85 per cent of the irrigated area.
- Seventy six re-use systems draining 4,518 hectares were installed, bringing the total number of re-use systems constructed with assistance from this scheme to 625 serving 40,188 hectares.

- Seven automatic irrigation systems were installed under the scheme, bringing the total number of automatic irrigation systems constructed with assistance from this scheme to 149 serving 8,710 hectares.
- Thirty landholders received support to undertake environmental and tree growing projects.
- Highlights of this year's River health base program included 86 hectares of vegetation enhancement and over 600 hectares of exotic vegetation managed along frontages.
- Environmental water was delivered to Reedy (300 megalitres), Black (100 megalitres) and Kinnairds Swamps (700 megalitres) and the Broken Creek.
- Five shallow groundwater pumps were installed and four upgrades were completed, with three new sites in progress.
- Groundwater investigations were completed at 17 sites. Three investigations are in progress. Twenty three sites are on the newly prioritised waiting list.
- Six kilometres of primary drains and four kilometres of community drains were constructed. These systems will protect a further 725 hectares of productive land.
- An 'environmental water allocation' connecting structure was installed at Kinnaird's Swamp to facilitate more efficient delivery of water from Muckatah Drain.
- Environmental site assessments completed across the Goulburn Murray Irrigation District for NVIRP comprising meters, meter access, channel regulators and access, and channel lining.

Shepparton Irrigation Region Implementation Catchment Strategy Program Reports:

- Environment
- Biodiversity
- Farm
- Surface Water Management
- Groundwater and Salt Management
- Waterways
- Monitoring
- Program Support
- Research

Environment Program

Written by Jen Pagon, Department of Primary Industries

Program Goal: To protect and enhance natural assets and their ecosystem processes and functions in a way that provides benefits for native biodiversity, social and economic aspects.

The Environment Program is a component of the Farm and Environment Program and a key delivery program for the Shepparton Irrigation Region Catchment Implementation Strategy. The Environment Program supports the main action programs including: Groundwater and Salt Management, Farm, Surface Water Management and Waterways.

The Environment Program provides a key service to the Groundwater and Salt Management Program and Surface Water Management Program in particular by providing Environmental Assessments of planned and completed works.

The Environment Program has increasingly been involved in protecting natural assets through the modernisation and reconfiguration project, and ensuring that the natural assets of our catchment are incorporated into day-to-day farm management.

Activities and achievements

Surface Water Management Program

During 2009-2010 three landholder visits on the Mosquito 40 Primary Surface Water Management System were conducted. A letter was sent to the Department of Environment, Heritage and the Arts, for Murray Valley Drain 11, regarding the type of plants (understorey) used for offset plantings.

Groundwater and Salt Management Program

High Value Environmental Features

The Millewa Nature Conservation Reserve Threat Mitigation Plan was completed for the Groundwater and Salt Management Program High Value Environmental Features project. Staff also assisted in site selection and soils testing for groundwater monitoring bores at Kanyapella Basin as part of the Groundwater and Salt Management Program's High Value Environmental Features project.

Environmental and Tree Growing Projects

The Environmental and Tree Growing Projects provide

advice to landholders throughout the Shepparton Irrigation Region relating to protection, enhancement and revegetation of native vegetation.

This year 39 hectares were planted within areas of existing native remnant vegetation and 21 hectares were planted away from "remnant" areas, including over two hectares of direct seeding. Projects also protected and enhanced over 73 hectares, including three hectares of wetlands and involving nearly eight kilometres of fencing and more than 22 hectares of direct seeding.

Modernisation

Through aligning our service delivery with the Northern Victoria Irrigation Renewal Project (NVIRP) the Environment Program successfully negotiated a $700,000 contract to provide Environmental Site Assessments to NVIRP. This contract is for the provision of five staff for assessment works across the Goulburn Murray Irrigation District (GMID).

Environmental Site Assessment works that were completed for NVIRP (across the GMID) were:

- Meters = 1,781
- Meter Access = 444
- Regulators = 478
- Regulator Access = 33
- Channel Lining = 90 kilometres
- Connections = 65 Business Cases

Development and implementation of management plans for wetland and terrestrial features

The design and development of Environmental Management Plans for priority wetland and terrestrial sites in the Shepparton Irrigation Region is an important value-adding tool to support improved water management. Environmental Management Plans are developed with input and strong collaborative processes across multiple agencies. Key partners are the Department of Primary Industries (leading development of the plans), the Department of Sustainability and Environment, Goulburn-Murray Water, Parks Victoria, Goulburn Broken Catchment Management Authority (GB CMA) and community groups. These plans provide the managing authority and community groups with a clear view of what the needs and priorities are of each site.

The Wetland Working Group continued to provide community input to the management of wetlands in the Goulburn Broken catchment.

No new management plans were developed in 2009-2010 for either terrestrial or wetland sites and no specific support was required by the existing management committees.

Mandatory Environmental Monitoring

A review of all the environmental monitoring processes that occur in the Shepparton Irrigation Region was initiated and completed in 2009-2010. As a result of this review it was determined that Mandatory Environmental Monitoring would not be continued.

Biodiversity

Written by Steve Wilson, Goulburn Broken Catchment Management Authority

During 2009-2010 there was a suite of biodiversity related activity across the Shepparton Irrigation Region. This includes:

- continuing investigations and assessment of sites in the Victorian Riverina for woodland sites through the "Caring For Our Country" Multi-Regional Woodlands sites;
- development of the GB CMA Biodiversity Strategy. This should be ready for release in July 2010. The five strategic directions of the strategy are: adapting to change; nurturing partnerships; investing more wisely, building our ecological infrastructure and legitimising biodiversity conservation;
- the long standing Superb Parrot Project is steaming along with over 400 hectares of revegetation works occurring to date and an average 25 hectares of revegetation works each year, with the Picola, Yielima and Bearii areas a priority in recent times;
- strong support for our local groups to continue to deliver good on-ground community outcomes at a local level. Including activities by the Whroo Goldfields Catchment Management Network in the Goldfields area of the Shepparton Irrigation Region, coupled with the Goulburn Murray Landcare Network.

Permanent Habitat Protection (Trust for Nature)

Trust for Nature continues to work in the Shepparton Irrigation Region seeking permanent protection of remnant vegetation through conservation covenants.

Farm Program

Written by Rabi Maskey, Department of Primary Industries

Program goal: To reduce groundwater accessions, soil salinisation and waterlogging on farms.

Activities and achievements

Whole Farm Plan Project

There has been a high number of Whole Farm Plans prepared across all areas of the Shepparton Irrigation Region in the 2009-2010 year with many landowners developing new or updating existing plans to design on-farm irrigation delivery in line with Goulburn-Murray Water upgraded infrastructure.

A total of 212 new Whole Farm Plans were completed covering an area of 16,018 hectares during 2009-2010. This included the preparation of 24 Modernised Existing Whole Farm Plans covering 745 hectares (see table). These plans were prepared in response to modernisation activities on properties where a Whole Farm Plan had been prepared previously.

Whole Farm Plans were prepared for seven horticultural properties covering 591 hectares and 205 broad acre properties over 15,427 hectares. Over 81.98 per cent of the irrigated area of the Shepparton Irrigation Region has now been 'Whole Farm Planned" (see figure).

A total of 51 plans were completed in areas covered by Local Area Plans, covering 5, 811 hectares.

In 2009-2010 there were 308 Whole Farm Plans commenced. This is the second highest number of commenced plans in any one year, just below the record year in 2008-2009 when a total of 358 plans commenced.

Incentives totalling $1,145,262 (excluding GST) were paid to landowners for preparing their Whole Farm Plans. This was above the budgeted target of $1,000,000. Landowners paid $1,423,485 (excluding GST), for the preparation of these plans. A total of 98 incentives were paid to landowners for having their plans certified by Local Government, resulting in 41 per cent of all plans completed in 2009-2010.

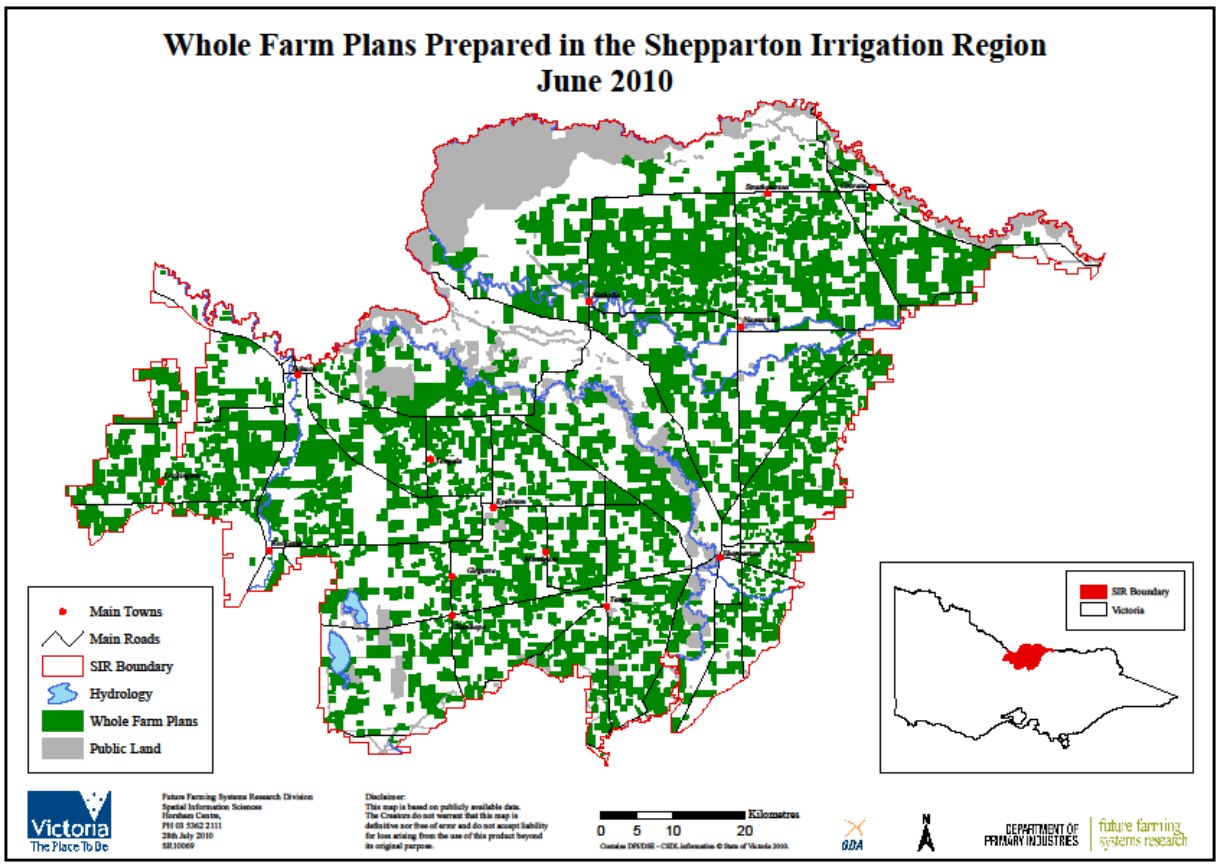
The cumulative number of Whole Farm Plans prepared in the Shepparton Irrigation Region from 1987 to June 2010 is also shown (see graph).

Irrigation Area	*No*	*Area (ha)*	*Grant $*	*Total cost $*	*Plan cert*
Murray Valley	50	6,956	311,556	373,252	24
Murray Valley: Horticulture	0	0	-	-	0
Rochester - SIR-GB	12	1,145	67,818	83,552	6
Rochester - SIR-Nc	17	1,179	79,950	99,757	8
Central Goulburn	60	3,415	231,373	286,256	35
Central Goulburn: Horticulture	7	591	71,986	85,137	1
Shepparton	42	1,989	152,000	187,591	19
Shepparton: Horticulture	0	0	-	-	0
Diversions	0	0	-	-	0
Totals	*188*	*15,273*	*914,684*	*1,115,545*	*93*

Whole Farm Plan Totals – Irrigation Area, 30 June 2010

Irrigation Area	*No*	*Area (ha)*	*Grant $*	*Total cost $*	*Plan cert*
Murray Valley	8	0	119,085	175,480	1
Rochester - SIR-GB	2	0	5,252	6,179	1
Rochester - SIR-NC	3	0	11,366	13,372	0
Central Goulburn	4	202	58,858	70,535	0
Shepparton	7	543	36,018	42,374	3
Totals	*24*	*745*	*230,578.84*	*307,939.94*	*5*

Modernised Whole Farm Plans – Irrigation Area, 30 June 2010

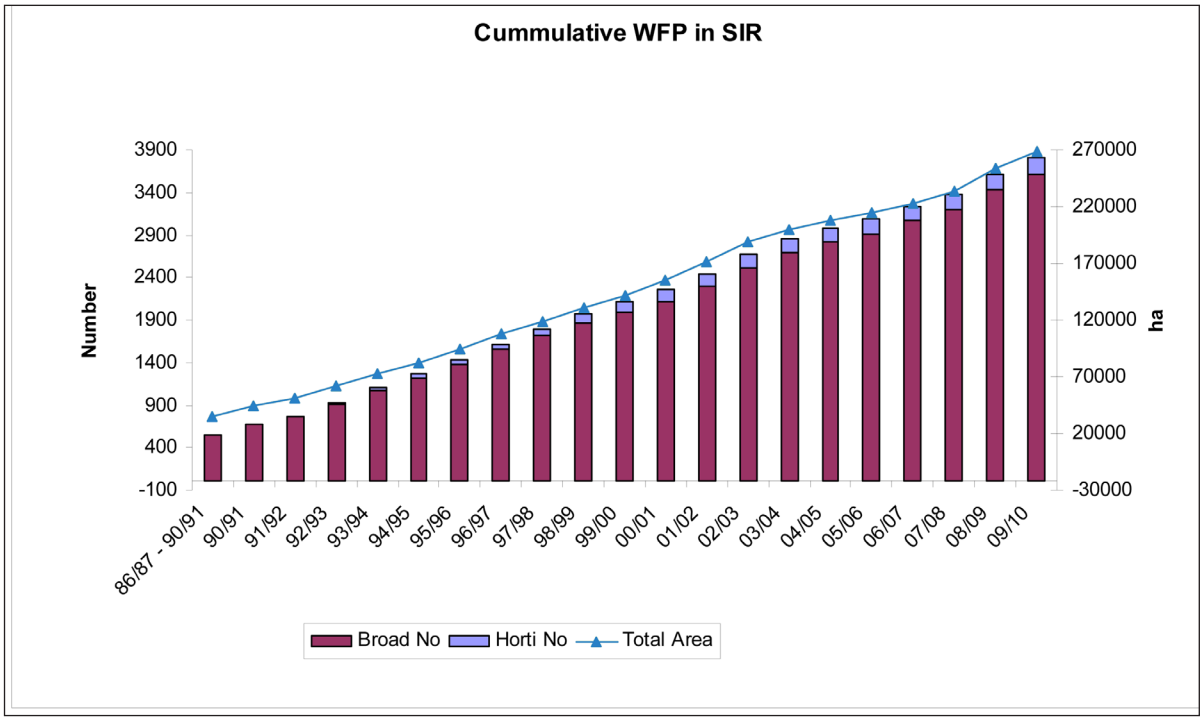


Location of Whole Farm Plans prepared since 1987 to 30 June 2010.

Department of Primary Industries Officers, Rabi Maskey and Chris Nicholson discussing the preparation of a whole farm plan with a landowner

Irrigation Area	Number	Area (ha)	Grant $	Grant GST $	Total Cost $	Cost GST $	Financial Assessment	Plan Cert	% Irrigation Area WFP	Irrigation Area (ha)
Murray Valley	870	65668	1,760,001	73,131	3,645,806	146,923	16	229	84%	77886
Murray Valley: Horticulture	21	1136	82,098	6,912	168,693	13,935	0	1	32%	3524
Rochester - SIR-GB	187	18579	510,230	25,772	1,074,213	50,691	2	24	90%	20570
Rochester - SIR-NC	524	31308	843,653	36,625	1,752,406	73,575	3	65	76%	41142
Central Goulburn	1156	74494	2,138,946	92,172	4,532,474	179,005	24	336	65%	115009
Central Goulburn: Horticulture	54	2577	166,249	6,930	357,666	14,250	0	5	56%	4582
Shepparton	527	31646	913,166	46,209	1,799,479	87,023	13	210	64%	49146
Shepparton: Horticulture	117	3537	82,508	5,019	368,875	10,244	4	3	71%	4994
GB CMA Diversions	83	9018	233,228	8,483	502,269	14,299	2	4		
TOTAL	*3539*	*237963*	*6,830,078*	*301,252*	*14,201,881*	*589,945*	*64*	*877*	*75%*	*316853*

Cumulative Whole Farm Plans Totals 1986-1987 to 2009-2010.



Cumulative Whole Farm Plans Totals 1986-1987 to 2009-2010.

Drainage Re-use System Project

A total of 76 drainage re-use systems were installed as part of the Drainage Re-use System Project in 2009-2010 servicing 4,518 hectares. Since the project started in 2001-2002, nearly 15 per cent of the irrigated area of the Goulburn Broken component of the Shepparton Irrigation Region is serviced by a Drainage Re-use System installed as part of this project. The average grant payment was 48.2 per cent of the total costs.

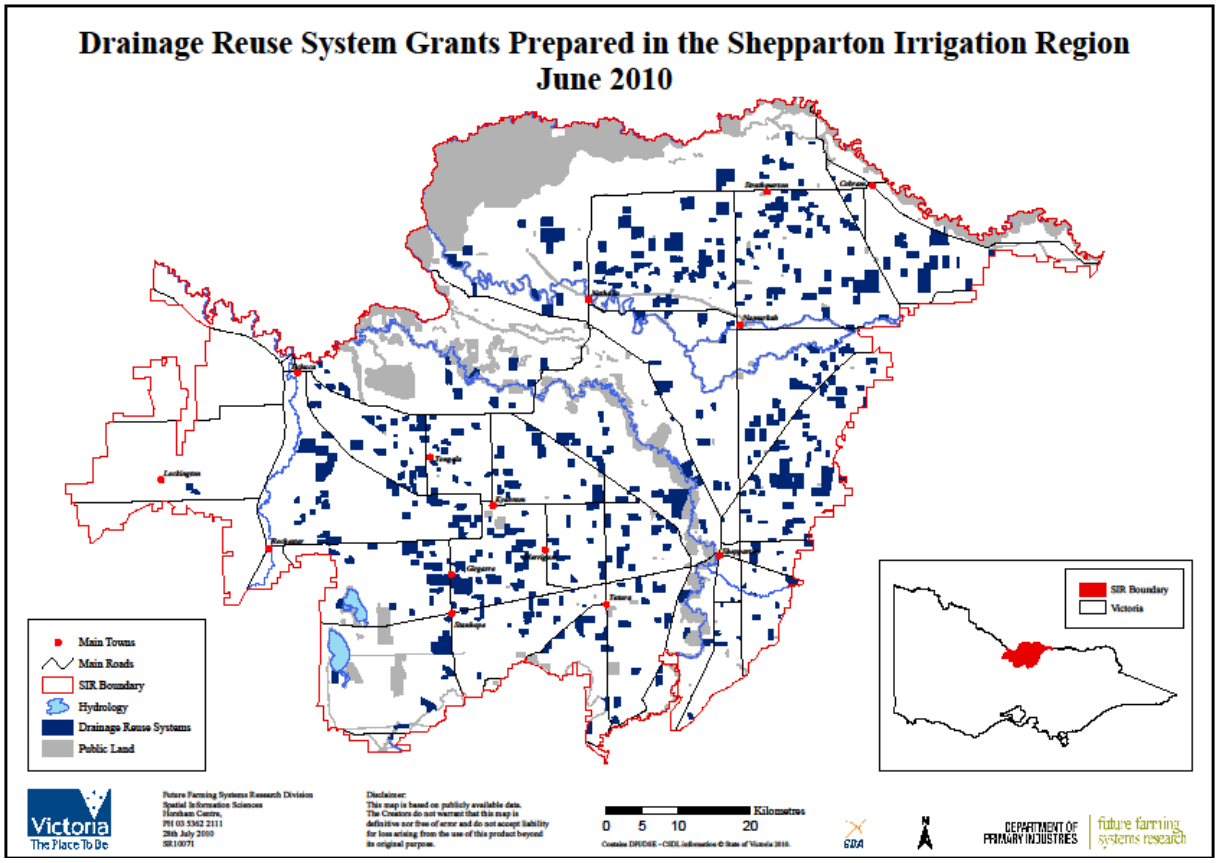
Incentive payments totalling $820,103 (excluding GST) were paid to landowners for installing Drainage Re-use Systems. This was above the budgeted target of $650,000. When broken down into the three components of the incentive, expenditure was as follows: $327,542 for earthworks, $388,761 for pumps and motors, and $103,800 for electricity. Landowners paid $1,701,604 (excluding GST) for the installation of the re-use systems on their properties.

The location of Drainage Re-use Systems installed in the Shepparton Irrigation Region is shown (see figure).

Automatic Irrigation Project

A total of seven grants have been paid as part of the Automatic Irrigation Project in 2009-2010 covering an automated area of 472 hectares. The total number of automatic irrigation systems completed in the Goulburn Broken Catchment Management Authority (GB CMA) area with assistance from the incentive scheme is 149, automating 8,710 hectares.

The Automatic Irrigation and Drainage Re-use System projects which were started in 2001 cconcluded in June 2010. Landholders wishing to undertake these sorts of improvement projects in the future were subsequently directed to the Farm Water Program (see below) which may provide an alternative incentive option.



Location of Drainage Re-use Systems installed

Farm Irrigation Assessments: East Goulburn Main Channels 7 and 8

Farm Program staff started Farm Irrigation Assessments in September 2008 in the Central Goulburn No 4 Channel system and continued to provide this service to the Future Flow Alliance in 2009 in the East Goulburn Main channels 7 and 8. Staff reported on 172 outlets on 136 properties. This work was completed in September 2009.

There were two review reports prepared to assess the learnings from the work. The first report focused on the process aspects of how the work was carried out. The second report concentrated on the effectiveness of the Farm Irrigation Assessments to help landowners make informed irrigation infrastructure decisions.

Department of Primary Industries Officer Rabi Maskey undertaking a Farm Irrigation Assessment

Farm Water Program

Farm Program staff were involved in the delivery of the Farm Water Program from early 2010. This is the Australian Government funded program supporting irrigators in implementing on-farm infrastructure projects to improve the efficiency and productivity of water use and management.

Program staff also assisted landowners in preparing their Farm Water Program funding applications. The process included verifying the eligibility of the landowners for the program, calculating the water savings generated by proposed activities and assisting in completing the comprehensive application form. The demand for the program has been very high with over 400 "Expression of Intent" forms submitted followed by 179 full application forms completed by the deadline of 20th of May 2010.

Local Area Plan Project

In 2009-2010, resources available from the Shepparton Irrigation Region Implementation Committee became increasingly limited. Strategic decisions were made to support active groups and as necessary make changes to the way Local Area Plan project implementation was supported.

In November 2009, in conjunction with each of the eight Local Area Plan groups, a decision was made to finalise funding for existing projects and reporting for three groups; notify two groups they would receive no further funding support; and notify the remaining three groups they would be funded to continue existing projects and begin a transition towards self-sufficiency.

As of 30th June 2010, all Local Area Plan groups ceased to receive dedicated support from the Shepparton Irrigation Region Implementation Committee.

Farm Services Victoria Award

Farm Program staff won the Customer Service category in the Department of Primary Industries Farm Services Victoria Awards in 2009. The award was presented for the work that the team had carried out in undertaking the Farm Irrigation Assessment Program.

Surface Water Management Program

Written by Neil McLeod, Department of Primary Industries and Sam Green, Goulburn-Murray Water

Program Goal: By 2020, improve the health of natural resources and reduce the risk to investment in the Shepparton Irrigation Region, by providing an appropriate surface water management service in areas where the total benefits, including economic, social and environmental benefits exceed the costs.

Activities and achievements

Primary Surface Water Management highlights

Project Targets

- Provide technical support and implementation for the Primary Surface Water Management Program as required.

Designs were completed for 16 kilometres of primary surface water management schemes, including Mosquito 36 and Murray Valley Drain 11 stages 2 & 3. Construction

continued on Stanhope Stage 2, Murray Valley Drain 11 pump station, Mosquito 40 as well as some minor works on Muckatah and totalled approximately six kilometres.

Irrigation Drainage Memorandum of Understanding

Significant progress was made on the 5 year review of the Irrigation Drainage Memorandum of Understanding (IDMOU) with a replacement document at initial draft stage by late May. Further Steering Committee meetings will be held in coming months to finalise the new IDMOU in preparation for signing. Key points to note include the continued support of all current signatories to the IDMOU format and the addition of the Department of Primary Industries as a new signatory.

Wetland Reports and Works

Four wetland infrastructure scoping reports were completed for Gaynor, One Tree, Two Tree, Mansfield and Kinnairds Swamps.

Works in Kanyapella Basin were undertaken, including installation of control structures on the Yambuna and Warrigal Creeks, and preparation works for a low-level bank. These works will assist in controlling environmental water deliveries in the future.

Whole Farm Plan Referrals

Whole Farm Plans are referred to Goulburn-Murray Water by the local shires under the Planning and Environment Act. A total of 141 plans were referred to Goulburn-Murray Water with a number being amended plans caused by consultation regarding modernisation of Goulburn-Murray Water assets.

Goulburn-Murray Water made a significant contribution to the revision of the uniform planning controls for earthworks within the municipalities of Moira, Shepparton and Campaspe. A letter of support was provided to the municipalities regarding a planning scheme amendment to incorporate the updated earthwork controls document within each of the planning schemes.

Co-ordination and Support for Community Surface Water Management Systems

Targets

- Provide technical support for the Community Surface Water Management Program as required.

Progress

- Attendance and input at various meetings including Community Surface Drainage Co-ordinating Committee, Technical Liaison Groups, Community Surface Water Management Systems Operating Group;
- Continual monitoring of design guidelines;
- Provision of technical advice to the Department of Primary Industries Surface Water Management Officers and Community Surface Water Management Groups;

Community Surface Water Management Incentives

Targets

- Construction of 5.95 km of Community Surface Water Management System;
- Initiation, and Survey and Design of a number of Community Surface Water Management Systems.

Progress

- Initiation of Community Surface Water Management System:
  - Muckatah 18P;
- Survey and Design of Community Surface Water Management Systems completed or in progress:
  - Muckatah 11AP
  - Muckatah 4/8P
  - Muckatah 22P
  - Muckatah 2/3P and 3/8P;
- Construction of Community Surface Water Management Systems:
  - Mosquito 8/25P progressed to construction stage with landholder support. Delays in Tender price delayed construction of this system into the 2010-2011 year. No other systems went to construction during 2009-2010 primarily due to landholder interest and inability to support construction in the continuing drought;
- A Cultural Heritage Management Plan (CHMP) was approved for the Muckatah 2/3P and 3/8P as a result of a number of scar trees being found in the catchment area;
- A final inspection of the Muckatah 2/8P was completed during November;
- The Mosquito 8/25P Community Surface Water Management System progressed to tender for construction stage, however, given the shortage of earth moving contractors during 2009 and difficulties with final quotes the system was re-tendered.

Policy implementation

- The annual business planning workshop was held in July with a subsequent Community Surface Water Management Program Business Plan developed;
- Collaboration with regional Solicitors and Real Estate Agents was strengthened with an invitation that respective Solicitors and Real Estate Agents seek information regarding the establishment of Surface Water Management Systems on properties they are involved in selling;
- The Surface Water Management Working Group commented on the Victorian Irrigation Drainage Program-Draft Strategic Direction Review;
- The Community Surface Water Management Program initiated Phase II of the Muckatah Scoping Study to gauge further interest in Surface Drainage in the Muckatah Catchment.

Increasing Water Use Efficiency through Strategic Water Harvesting – Drainage Nutrient Removal Incentive Scheme

Scheme background

The Drainage Nutrient Removal Incentive Scheme (DNRIS) was introduced in April of 1998 to encourage landowners to construct strategically located storages (drainage nutrient removal systems) to collect and use regional drainage water. The water and nutrients collected can be used productively and are not lost to areas of the catchment where they may cause problems such as blue green algae blooms. These storages can increase the volume of water available to the landowner and reduce the amount of nutrient rich water entering our waterways.

Targets - long term:

- Increase the amount of nutrient-rich water diverted from regional drains and used productively on farm by 25 per cent;
- Capture 10,000 ML of water savings from regional and farm drainage to be used for maximum public benefit;
- Improve irrigation management across 50 per cent of the newly drained Shepparton Irrigation Region in the next five years;
- Contribute significantly to the Goulburn Broken Water Quality Strategy goal of reducing phosphorous and nitrogen drain loads by 50 per cent by 2016 through decreasing the amount of poor quality (high nutrient/salt) water leaving the catchment and flowing into environmentally sensitive waterways.

Targets - short term:

No new DNRIS applications were accepted as the DNRIS incentive was suspended until further notice early in 2009-2010. Despite suspension of the Scheme annual recording continued of actual diversion volumes and estimated volumes of phosphorus and salt captured by testing stored water.

Progress

Continued drought conditions experienced in the Shepparton Irrigation Region over the past few years resulted in below average water allocations and drain flows. This has put economic pressure on irrigators resulting in a virtual stalling of uptake of the DNRIS.

One new application approved during 2008-2009 was carried over into 2009-2010. This application was closed with no action as at 30th June 2010. Since the scheme commenced the total number of high flow storages built in the Shepparton Irrigation Region with assistance from the incentive scheme is 34, with a storage capacity of 6,003 ML.

Drainage Nutrient Removal Incentive Scheme Results 2009-2010

At the completion of the 2009-2010 financial year the majority of landowners with systems constructed with the assistance of the DNRIS were contacted to determine the volume of water collected and used for irrigation during the year.

In the 2009-2010 financial year very nominal high-flow drain diversion took place for landowners with storages constructed under the DNRIS. Sampling and analysis of salt and phosphorous concentrations of water held in storage was not undertaken, as the majority of the storages were dry. One Murray Valley high-flow diverter pumped small volumes (25 ML) during the year.

Water Services Area	*Constructed capacity (ML)*	*Volume diverted (ML)*	*Salt saved (tonnes)*	*Phosphorous saved (tonnes)*
Central Goulburn	1,968	0	n/a	n/a
Murray Valley	2,590	25	n/a	n/a
Shepparton	1,295	0	n/a	n/a
Rochester (SIR)	150	n/a	n/a	n/a
Total	*6,003*	*25*	*n/a*	*n/a*

Drainage Nutrient Removal Incentive Scheme system monitoring

Geographic Information Systems

This year has again seen the continued use of Geographic Information Systems (GIS) to map where storages have been constructed within the Shepparton Irrigation Region in comparison to Water Services boundaries and Local Area Plan boundaries. At present 10 of the 34 constructed storages fall into Local Area Plan boundaries.

Local Area Plan Area	*Actual since 1998*			
	No	*ML of storage*	*Total Cost*	*Cost GST*
Bunbartha/ Karimba/Zeerust	2	180	$30,279.54	$3,027.95
Nathalia & District	4	1050	$80,000	$8,000
Cornella	0	-	-	-
Dhurringile	0	-	-	-
Invergordon	1	150	$20,000	$2,000
Nanneella	0	-	-	-
Muckatah/ Naring	2	140	$39,561.69	$3,956.17
Wyuna	1	250	$20,000	-
TOTAL	*10*	*1770*	*$189,841.23*	*$16,984.12*

Drainage Nutrient Removal Incentive Schemes Systems constructed in Local Area Plan areas

Conclusion

As in 2008-2009, interest in the DNRIS remained low during 2009-2010, primarily due to the ongoing drought conditions. The DNRIS is likely to remain as a low priority for irrigators until the drought ends, farm businesses are under less financial stress and the frequency of high-flow events in the drainage network increases.

Environmental Assessment for Primary and Community Surface Water Management Systems

Target

- Provide support, comment, reporting and report compilation from an environmental assessment perspective to the Primary and Community Surface Water Management Program and the Groundwater and Salt Management Drainage Program, as required.

Primary Program progress

- No initial or detailed Environmental Assessments were required.

Community Program progress

- No initial or detailed Environmental Assessments were required.

Modernisation Environmental Site Assessments

The Department of Primary Industries was selected as the preferred client by the Department of Sustainability and Environment to undertake Environmental Site Assessment works on behalf of the Northern Victoria Irrigation Renewal Project (NVIRP) on irrigation infrastructure.

Environmental Assessment works during the 2009-2010 year were directed largely toward these Environmental Site Assessments for NVIRP. This large resource commitment project involved the completion of environmental site assessments of some 2,550 irrigation structures (dethridge wheels and regulators) and 400 connection asset assessments. In addition to these works approximately 90 kilometres of channel were assessed prior to plastic lining being installed.

Irrigation Drain Management

Written by Greg Smith, Goulburn-Murray Water

Targets

- Coordinate project;
- Fortnightly water sampling & field measurements at 15 sites;
- Laboratory analysis of all samples;
- Analyse and report on 2008-2009 monitoring data.

Progress

- Quarterly calculation and reporting of phosphorus loads against strategy targets continued during 2009-2010. Coordination of analysis reports. Manage contractors and database. Periodic data reviews and checks;
- Water samples and field measurements taken from drains fortnightly;
- Samples analysed for nutrients, suspended solids, pH, turbidity, etc. Chlorophyll-A monitoring continued at Deakin Drain and MV Drain 6 sites. Data management;
- Report prepared for 2008-2009 review and analysis.

Groundwater and Salt Management Program

Written by James Burkitt and Stephen Feiss, Goulburn-Murray Water

Program Goal: To work with and unite community and all government agency stakeholders to provide adaptive groundwater and salt management services which support sustainable agricultural practices, foster viable communities and improve key environmental assets across the Shepparton Irrigation Region.

Team Leader Report

The Groundwater and Salt Management Program moved into a planning phase. New initiatives related to the uncertainty regarding salt storage and mobilisation and the understanding of water balance changes underpinning these processes in the Shepparton Irrigation Region were brought to the forefront of the program.

An increased focus was also placed on achieving improved environmental outcomes for the program relating to the mitigation of secondary salinisation impacts on key environmental assets within the Shepparton Irrigation Region.

Activities and achievements

Public Groundwater Pumps

Due to the continuation of drought conditions, the public salinity control groundwater pumping program continued to consolidate outstanding works with no new works initiated. A total of 48 public salinity control groundwater pumps now protect more than 9,800 hectares.

Private Groundwater Pumps

Demand for the Private Groundwater Pumping Program in both the Farm Exploratory Drilling Service (FEDS) and Capital Grants Programs was reduced in 2009-2010 due to funding constraints. This saw the pasture FEDS complete 17 investigations with none being declared successful and only four identified as having potential to be public pump sites. There were three investigations still in progress and 23 properties on the waiting list.

There was no demand for horticulture FEDS investigations.

Capital Grants for Groundwater and Salt Management

Five new groundwater pumps were installed along with four being upgraded under the pasture private groundwater pumping program. Combined, these are estimated to protect an additional 1,827 hectares. This brings the cumulative total of pumps to 379 which include 302 new pumps and 77 existing pumps upgraded.

The overall targets to the end of 2009-2010 were for 295 new installations and 69 upgrades to protect approximately 37,000 hectares. The cumulative area protected from the works to date is estimated to be around 41,000 hectares.

There are three new pumps currently in the process of being installed. No pumps are in the process of being upgraded.

Strategic Plan support

The Groundwater and Salt Management Program Research & Investigation Strategic Plan Annual Report for 2008-2009 was produced. Management and support were provided as required. Significant effort and resources have been directed to the 'Salt & Water Balance Project' which was identified as the highest priority project resulting from the reprioritisation of the Research & Investigation Strategic Plan.

Strategic Plan implementation

The key outputs for 2009-2010 were:

- Ten management and 17 implementation projects being progressed over the 2009-2010 financial year of which:
  - Two new projects were brought into the program for implementation over the next three years based on the new prioritisation;
  - One management and two implementation projects were completed. These three projects were:
    - Management of Grouped Salt Projects (Project GG08 001);
    - Define "C-Type" areas and develop management options(Project GG0. 020);
    - Impact of Water Trade on Agricultural Ecosystems (Project GI06 056);

- Two major existing projects were merged into one. Project GG09 002 "Investigation of salt mobilisation and impacts for various Climate Change Scenarios" and Project GG08 010 "Understanding water balance changes in the Shepparton Irrigation Region" were merged to create what is now the Shepparton Irrigation Region Salt and Water Balance Project. The relationship between the two projects is based on the interrelationships between the hydrological process and the salt mobilisation processes within the Shepparton Irrigation Region;
- The two steering committees convened under the Groundwater and Salt Management Program Research & Investigation Strategic Plan were reviewed with the Grouped Salt Steering Committee being disbanded;
- The establishment of the framework for the strategic approach to meet the key environmental feature objectives of the Groundwater and Salt Management Program was completed.

Winter/Spring salt disposal management

Salt disposal from private shallow groundwater pumps was terminated in 2006-2007. However, until advice is received from the Murray-Darling Basin Authority as to how to manage the removal of private pumps from the Salt Disposal Registers of the Murray-Darling Basin Authority and the Goulburn Broken Catchment Management Authority (GB CMA) they will still be included in reporting processes.

River Murray trigger levels were not reached and therefore no disposal from public salinity control pumps was available.

The total salt disposal impacts from the Shepparton Irrigation Region Surface and Groundwater and Salt Management drainage works is 3.2EC. There was no change resulting from works implemented during 2009-2010.

Committee support

The Groundwater and Salt Management Program continues to provide significant support to the Shepparton Irrigation Region Catchment Implementation Strategy in the form of:

- Support, participation and engagement of committees and working groups;
- Input to funding bids and various forms of annual reporting requirements (eg: GB CMA, Shepparton Irrigation Region Catchment Implementation Strategy, Murray-Darling Basin Salinity Management Strategy – Victoria);
- Budget planning and management;
- Capacity building of staff and resources;
- Strategic Planning;
- Coordination of Local Government funding contributions to the Groundwater and Salt Management Drainage Program (Moira, Campaspe and City of Greater Shepparton).

Extension

An information kit for the community members of the Groundwater and Salt Management Working Group was updated and maintained.

Management and coordination

Provision of Groundwater and Salt Management Program management includes:

- Management, Reporting & Program coordination;
- Ongoing development of business management systems;
- Systems for new consultancy agreements;
- Development and training;
- Management of Occupational Health and Safety requirements.

Waterways Program

Written by Mark Turner, Goulburn Broken Catchment Management Authority

Program Goal: Protection and enhancement of the environmental, economic, recreational and aesthetic values of the rivers and waterways (stream health). Protection of public and private assets from stream-related impacts.

Activities and achievements

Water supply and environmental flows

Works and extension

Continuing low inflows caused by ongoing drought conditions are degrading general river health and resulting in localised water quality problems. The Goulburn Broken Catchment Management Authority (GB CMA), in partnership with other government agencies, is responding by delivering environmental water and translocating and reintroducing native fish populations. Key lower Goulburn River floodplain wetlands and the lower Broken Creek were again the focus of environmental water delivery (see tables below).

System	*Quantity, ML*	*Timing*
Doctors Swamp	40	October November
Reedy Swamp	300	December
Black Swamp	80	March
Kinnairds Swamp	400	April-May
Smiths Creek (Barmah)	440	November
Gulf Creek (Barmah)	250	November
Gulf Creek (Barmah)	27	November
Boals Deadwoods wetland (Barmah)	519	November
Top Island wetland (Barmah)	776	November
Total	*2,832*	

*Environmental water delivered to wetlands in 2009-2010**

**Table notes:*

i *The purpose of all watering was to provide drought refuge, except for Doctors Swamp, which was a trial delivery.*

ii *The source of all water was from the Victorian River Murray Flora and Fauna Bulk Entitlement (Department of Sustainability and Environment), apart from the 250 ML Gulf Creek water, which was from environmental water provisions under The Living Murray Program (Murray-Darling Basin Authority).*

A trial flood of Doctors Swamp (near Murchison) was undertaken to see how the flow into the relatively flat wetland via a regulator related to a nearby overflow sill. The findings have implications for future use of larger Environmental Water Allocation releases. The trial was conducted on 2nd October 2009 while a window of opportunity for gravity diversion was available. The resulting minor flow also had some localised environmental benefits for wetland vegetation and fauna.

The creation of drought refuges within the Goulburn Broken catchment is being undertaken under Commonwealth and State laws, to protect threatened species. The water being used is an environmental entitlement, legally set aside to protect rivers and wetlands. Use of the water doesn't affect any other water allocations. The refuges are being provided with the minimum amount of water to enable species survival during the extended dry period.

Goulburn and Broken bulk water entitlements were again qualified by the Minister for Water to conserve water for critical human needs:

- on 1st July 2009 McCoys Bridge and Goulburn Weir flows were reduced from 400 and 250 ML per day respectively to 150 ML per day; however, flows generally stayed above 200 ML per day;
- the reinstatement of minimum flows was delayed from 15th September to 9th October to build a water reserve for later environmental use;
- the 1,934 ML reserve was used in March to extend and slow the rate of fall of a natural flush along the Goulburn River;
- Broken River minimum flows were set to zero on 1st July 2009 and reinstated on 1 February 2010; Goulburn-Murray Water maintained some flow in the river throughout the year;
- Goulburn-Murray Water maintained flows in the lower Broken Creek to manage water quality risks, including provision of passing flows of 50–250 ML per day between late September and the end of April using Inter Valley Transfers of water from the Goulburn system to the River Murray.

- using 1,451 ML from the Goulburn Water Quality Reserve in January to increase passing flows to manage a build up of Azolla, a native floating aquatic weed, and to manage low dissolved oxygen in the Broken Creek. The Broken Creek is a significant waterway for native fish, however, a history of eutrophic inflows has created a legacy of azolla blooms and organically enriched sediments that, when combined with low flows and high temperatures, usually causes significantly depressed dissolved oxygen conditions that can result in large numbers of fish deaths.

Quantity ML	*Timing*	*Source*
28,240	22-09-09 to 10-05-10	Goulburn Valley inter-valley transfer
818	14-01-10 to 27-01-10	Goulburn water quality account
5,581	intermittent from: 01-07-09 to 17-05-10	Victorian Murray tributary flow

*Environmental water used for water quality management in the Broken Creek during 2009-10**

** Table notes:*

i The purpose of all watering was to elevate low dissolved oxygen levels to avoid large numbers of fish deaths.

ii Data from Thiess up to 6th April. There are expected to be some slight differences to these figures once the final Thiess data is incorporated.

The flow volumes in the table above show that different water accounts were accessed to ensure a small continuous flow in the Broken Creek, especially during periods of high temperature in the summer months.

The water was not 'lost' to the regulated system: it was largely rerouted to achieve multiple benefits. The management strategy was deemed a success and will be used again should similar conditions arise.

Collaborations and communities

As part of the Northern Region Sustainable Water Strategy process, the River and Water Dry In-flow Contingency Group continued meeting to discuss issues related to river health, flows and water quality. The Contingency Group approved the 2009-2010 Dry Inflow Contingency Plan which was submitted to the Department of Sustainability and Environment, emergency response procedures were trialled and reviewed, real time water quality monitoring reviewed and the community was advised of potential water quality issues via various media.

Barmah-Millewa Forest collaborations included:

- cross-state water management with New South Wales and Victorian agencies
- monitoring Red Gum and Giant Rush with the Commonwealth Scientific and Industrial Research Organisation (CSIRO)
- Giant Rush burning trials with Yorta Yorta and Parks Victoria.

Planning is underway to model aquatic refugia within the catchment, in partnership with Department of Sustainability and Environment, the South Australian Research and Development Institute and the Murray-Darling Basin Authority.

Planning and responding (includes research and development)

- GB CMA, Department of Primary Industries, Department of Sustainability and Environment, Goulburn-Murray Water, Field and Game Australia and local bird enthusiasts monitored the ecological response of environmental watering to wetlands.
- Department of Primary Industries continued acoustic monitoring at Reedy Swamp.
- Fish surveys of suspected drought refuge pools were continued on Cornella Creek and within Barmah Forest.
- Work was commissioned through the Australian Platypus Conservancy regarding the health and extent of platypus populations in the Broken Creek, following low flows and community concern.
- The GB CMA supported the Yorta Yorta Aboriginal Corporation in establishing a native turtle monitoring program in Barmah Forest.
- The GB CMA managed the Environmental Watering Plan for the Broken Creek through the appointment of a scientific panel.
- Real time (website accessible) water quality monitoring of the Goulburn River continued.

- The Lake Eildon to River Murray Goulburn Environmental Flow Hydraulics Study identified flows for environmental assets and potential conflicts with economic and social assets. The interactions of tributaries with possible environmental flow releases were also assessed.
- The 2009-2010 Dry Inflow Contingency Plan was completed and submitted to the Department of Sustainability and Environment.
- Regional partners responded to a fish death incident on Boosey Creek in late summer 2009-2010. The process was coordinated under the Regional Water and River Contingency Planning Group.
- GB CMA staff continued to support the development of the Victorian Government's Northern Region Sustainable Water Strategy, which was completed in late 2009. GB CMA is a partner and project leader in an eWater Cooperative Research Centre project investigating how off-channel habitats might be affected under various water supply scenarios.
- Index of Wetland Condition assessments were conducted at 116 wetlands across the Catchment, including 30 sites in Barmah Forest.
- The scoping of works for delivery of environmental water to key wetlands in the Shepparton Irrigation Region was commissioned.

Riparian and in-stream habitat and channel form

Overall achievements were down on previous years because the Drought Employment Program concluded.

Works to improve in-stream habitat were commissioned on the Broken River, Goulburn River and Broken Creek.

Key monitoring projects to assess the impact of works included:

- ecological effects of the Tungamah pipeline on ephemeral systems;
- the effects of the Lake Mokoan decommissioning on turbidity and fish communities in the Broken River;
- the contribution of 'slack water' habitats to in-stream diversity in the Broken River.

'Slack water' habitats were monitored on the Broken River to assess the effectiveness of reintroducing large woody debris into lowland streams.

A joint project into the protection of freshwater catfish was supported through the Victorian Investment Framework within the mid Goulburn River floodplain. River Red Gums that had accumulated in Barmah Forest streams were removed to maintain channel hydrology and improve fish passage.

Works and operations

- Pools were constructed and woody habitat was modified and installed along the Broken and Boosey Creek. GB CMA supervised the project and it was co-funded by the Moira Shire and the Tungamah Fishing Club.
- Irvine's weir on the Broken Creek was upgraded to provide for fish passage.
- Activities along the Goulburn River between Nagambie and Shepparton included:
  - monitoring fish communities (a report is pending)
  - completing the Shepparton weir fishway upgrade, which allows for a greater range of fish species over a greater range of flows
  - stabilising significant lateral erosion of the bank near Murchison using a low-flow pipe and a high-flow rock chute
  - ongoing weed management and enhancement of frontages.
- The Streamlining Methodology was trialled at project sites within the Large Scale River Restoration Program on the Goulburn River.
- An audit of the Broken River Vision Project was undertaken in partnership with the Department of Sustainability and Environment.

Collaborations and communities

Crown licence frontages are being reviewed to improve management practices. A river health officer was funded and employed through the Department of Sustainability and Environment Crown Land Management section. The project is being managed through a regional agency committee involving the Shepparton Irrigation Region Implementation Committee and Department of Sustainability and Environment. Additional funds have been received to extend the project.

The Shepparton Irrigation Region Implementation Committee supported State related activities, including streamlining and forecasting projects and the development of Aquatic Value Identification and Risk Assessment (AVIRA), a database that contains information on the values and threats within individual management units and reaches in the Catchment. It will be used to

inform the next version of the Regional River Health Strategy.

Shepparton Irrigation Region Implementation Committee participated in initiatives under the Murray-Darling Basin Authority Native Fish Strategy and provided major input into the City of Greater Shepparton RiverConnect project directly through representation on the advisory committee.

Planning and responding (including research and development)

- The Broken system and Goulburn River are two of eight rivers in the three year Victorian Environmental Flows Monitoring and Assessment Program. Monitoring in 2009-2010 included fish and macro-invertebrate sampling.
- The master plan for the Yielima property within the Barmah-Millewa Wetlands is currently being implemented including the direct seeding of native vegetation.
- An investigation into carbon sources being used by in-stream organisms was conducted to determine if the reduction of organic matter resulting from the 2009 bushfires impacts on aquatic ecology.
- In the spring and early summer of 2009, the condition of 650 wetlands across the State were assessed. In the Goulburn Broken catchment, 76 wetlands were assessed, including Barmah Forest wetlands, Goulburn River floodplain wetlands and Central Highlands peatlands. Fourteen were found to be in poor to very poor condition, 40 were in moderate condition, 20 were in good condition, one was in excellent condition, and 52 had poor to very poor hydrology. The wetlands were assessed using a method developed by the Department of Sustainability and Environment called the Index of Wetland Condition, which assesses the catchment, physical form, hydrology, water properties, soils and vegetation of the wetlands.

Threatened species recovery

- GB CMA was heavily involved with threatened aquatic species projects through implementation of Actions for Biodiversity Conservation:
  - the status of Victoria's most southerly population of freshwater catfish (at Tahbilk Lagoon) was assessed and comments were provided on the Draft Flora and Fauna Guarantee Action Statement for Macquarie Perch.
- The in-stream habitat of the Broken Creek between Nathalia and Numurkah was assessed. Arthur Rylah Institute will research habitat characteristics and provide recommendations for improving in-stream diversity.
- Habitat pools are being reassessed post-decommissioning of the Tungamah Pipeline.
- The status of fish was reported in the Lower Goulburn Fish Communities project, part of a long-term monitoring program being undertaken by Arthur Rylah Institute.
- Impacts of turbidity on native fish communities in the Broken River are being monitored to assess the effects of the decommissioning of Lake Mokoan.
- A Passive Integrated Transponder (PIT) tag reader is being fabricated for installation at the Shepparton weir to assess the effectiveness of migration and movement of native fish, including Murray Cod and Trout Cod.
- The effect on native fish of installing large wood in the Broken River is being monitored.
-

Outputs

Output type	*Output number*
Alternative watering points	12
Bank Stabilisation	1 structure
Riparian fencing	6kms
Riparian revegetation	46.5 ha
Weed control	611 ha

Water quality (nutrients) in rivers and streams

Continued dry inflow conditions and catastrophic fire events and their potential impact on water quality drove much of the efforts in this investment area. Key actions included the establishment of real-time water quality monitoring to respond to water quality issues and to understand the level of impact on receiving waters.

Very high levels of action that target removal of excess rainfall run-off from irrigated land continue to be achieved, helping to alleviate the threats of nutrient run-off and salinity in wet periods. This is helping to build long-term resilience, even though these benefits are not readily apparent because of the recent long dry period.

Works and operations

- In partnership with the Strathbogie Shire, a trap was installed in Euroa to prevent gross pollutants from entering Seven Creeks.
- The Shepparton Irrigation Region Implementation Committee advised the City of Greater Shepparton on the construction of a bioremediation wetland at Mooroopna's Gemmill's Swamp outfall.
- The Goulburn Broken Dairy Nutrient Management Case Study Project managed by the Department of Primary Industries is in its third year. Activities such as soil testing and field days are encouraging farmers to sustainably use dairy effluent.

Collaborations and communities

- The River Health and Water Quality Coordinating Committee, which was reinvigorated in 2008-2009, continued in 2009-2010, involving a range of regional partners.
- The highly successful Goulburn Broken Waterwatch program funded by Victorian and Australian Governments continued. Waterwatch community actions were increasingly linked to the Goulburn Broken Regional River Health Strategy.
- The Shepparton Irrigation Region Implementation Committee is partnering the Department of Primary Industries in improving farm nutrient management in the Shepparton Irrigation Region, particularly on dairy farms.
- The Shepparton Irrigation Region Implementation Committee was involved in a project commissioned by Goulburn Valley Water in support of Environment Protection Authority's draft risk assessment on wastewater discharges to waterways.

Planning and responding (including research and development)

- Early warning systems were expanded to allow a quick response if heavy rain fell in the upper catchment following Black Saturday bushfires in February 2009.
- Real time, website accessible, water quality monitoring of the lower Broken Creek system and the lower Goulburn River continued.
- The Shepparton Irrigation Region Implementation Committee, Goulburn-Murray Water, Goulburn Valley Water, the Environment Protection Authority, Department of Primary Industries and the Department of Sustainability and Environment are represented on the Goulburn Broken Drought Water and River Contingency Planning Group, which plans for potential hazards as a result of continuing drought and low flows and has established a GovDex wiki page (a web based access site to facilitate communication).
- The Shepparton Irrigation Region Implementation Committee remained a partner of the North East Water Quality Monitoring Partnership.
- An evaluation of the requirements of water quality monitoring within the catchment was commissioned in partnership with Goulburn-Murray Water and North Central Catchment Management Authority.

Monitoring Program

Written by Greg Smith, Goulburn-Murray Water

Program Goal: To understand the water quality and quantity characteristics of surface drainage and ground water systems. To detect trends in water quality and quantity over time and identify areas requiring further investigation. To identify progress in achieving catchment strategy targets.

Activities and achievements

Surface water

Monitoring of surface water management systems for flow and quality continued throughout the year. Flow and salinity were continuously monitored while nutrients, suspended solids, turbidity and pH were tested fortnightly.

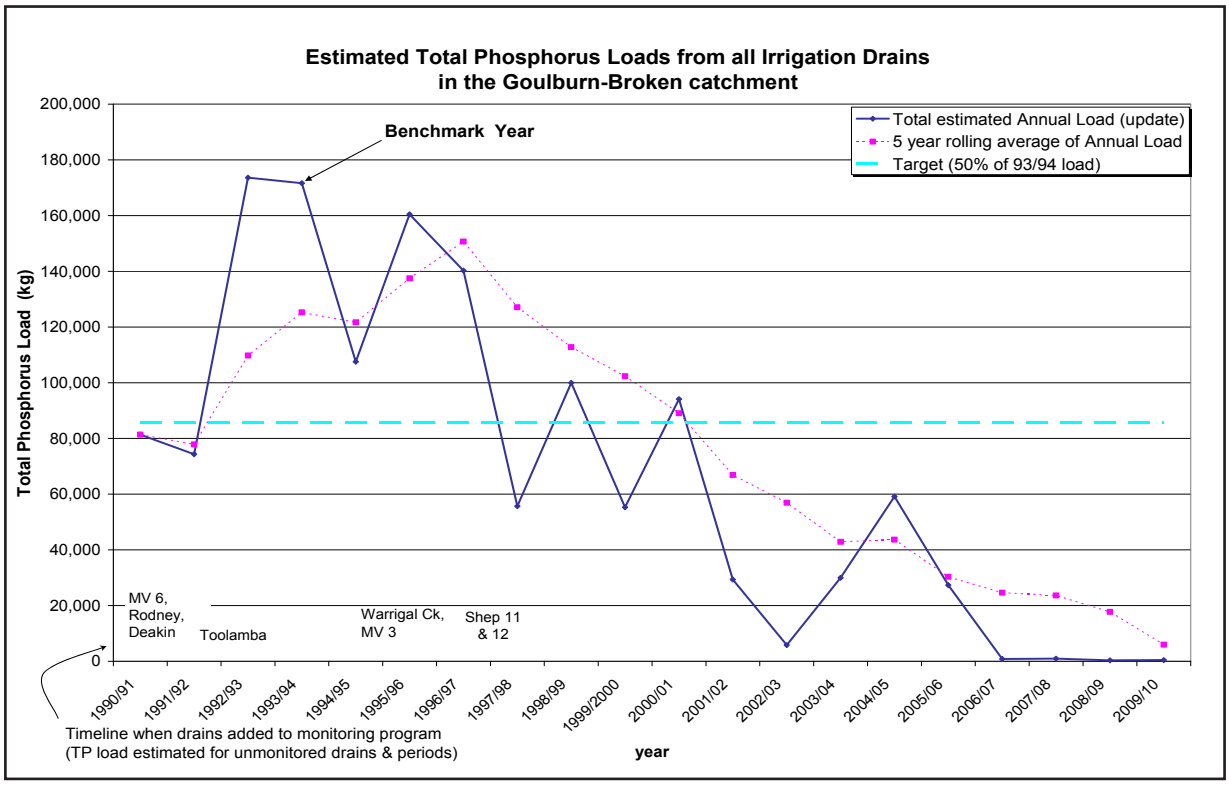
Analysis of all data was undertaken, published and reported to stakeholders. The 5-year rolling average phosphorus load continued to decline and remained below the target value for reduction of nutrient loads from irrigation drains (refer to figure).

Groundwater

Routine bore monitoring; database input and bore maintenance continued. Analysis of groundwater from a selection of public groundwater pumps also continued.

Drain flow leaving the Shepparton Irrigation Region in 2009-2010 was less than 0.3 per cent of water delivered into the Shepparton Irrigation Region.

Phosphorus export from drains in 2009-2010 was similar to the previous three years.



Estimated Total Phosphorous loads from irrigation drains

The 5-year rolling average Total Phosphorous load continued to decline and remained well below the target value for reduction of nutrient loads from irrigation drains (see figure).

Groundwater Drainage Biophysical

Targets

- Monitor drains, channels and streams;
- Monitor investigation bores, public pumps, shallow groundwater bores and environmental assets monitoring bores.

Progress

- Continued monitoring of channels, drains and streams as required. Continued data analysis for the update of annual reporting;
- Continued monitoring of bores and public pumps as agreed under the Shepparton Irrigation Region Catchment Implementation Strategy.

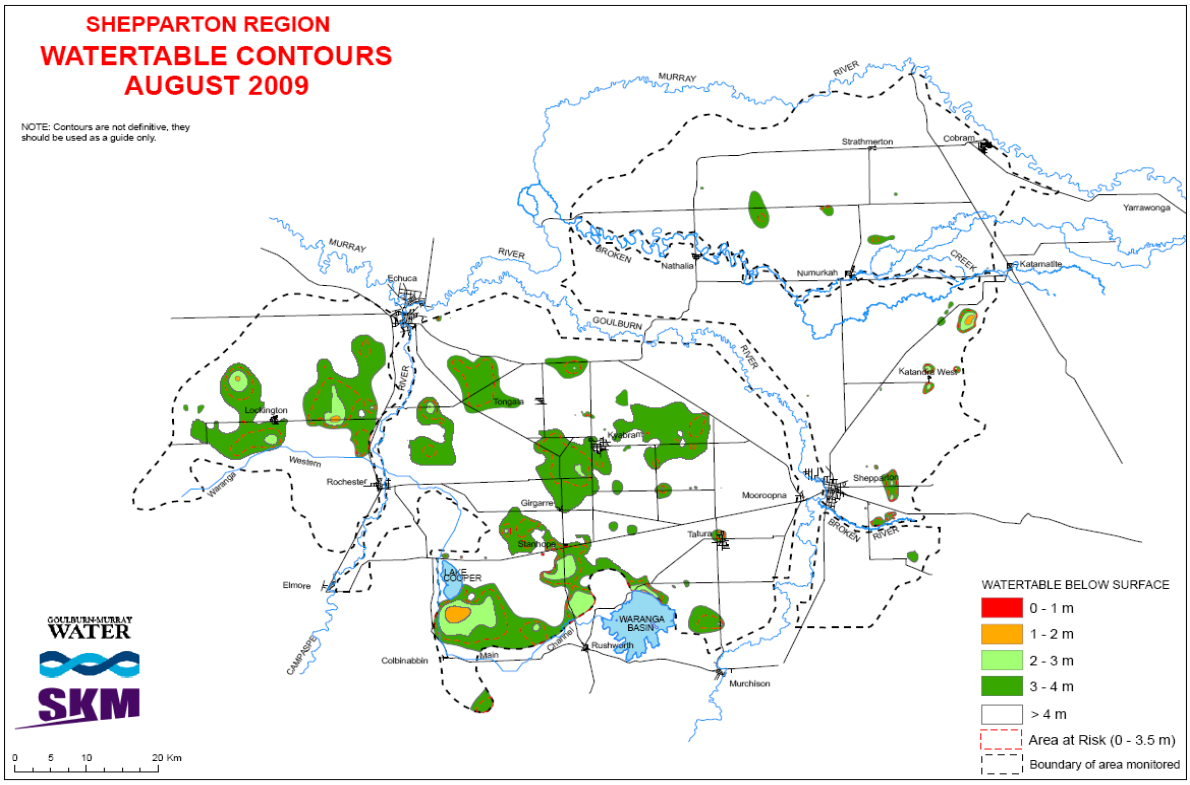
Groundwater and Salt Management performance

Targets

- Review of water monitoring in Shepparton Irrigation Region.

Progress

- Water Monitoring Review initiated. This is a combined project across both irrigation and non-irrigation areas within the Goulburn Broken and North Central Catchment Management Area



Shepparton Region August watertable contours 2009

Program Support

Written by Terry Batey, Department of Primary Industries and Rachael Spokes, Goulburn Broken Catchment Management Authority

Program Goal: To provide the framework to manage and coordinate the Shepparton Irrigation Region Catchment Implementation Strategy.

This component of the Shepparton Irrigation Region Catchment Implementation Strategy provides an overall framework to manage and coordinate delivery of all programs. People in this program provide administrative and technical support to all processes of the Shepparton Irrigation Region Catchment Implementation Strategy and partners.

Salinity Program Management, Department of Primary Industries

The Department of Primary Industries, Sustainable Irrigated Landscapes-Goulburn Broken project is critical to maintaining ongoing community support, participation and confidence in catchment management across the Shepparton Irrigation Region.

The people in the Sustainable Irrigated Landscapes-Goulburn Broken project have a strong commitment to the aims of the Regional Catchment Strategy that is oversighted by the Goulburn Broken Catchment Management Authority.

Community Surface Water Management Program

People in this program work with landowner communities and government agencies to improve regional drainage within the Shepparton Irrigation Region.

Farm Team

Sustainable agriculture and water use efficiency

Working with private landowners, people support development and implementation of sustainable action plans and works using facilitation, communication and incentive methods to achieve change.

Environmental Management Program

People in this program provide services to the community to protect and enhance bio-diversity within the region primarily on private land. These activities are carried out consistent with the Goulburn Broken Catchment Management Authority (GB CMA) priorities.

Goulburn-Murray Water Program Management

Staff have provided support to the Shepparton Irrigation Region Implementation Committee by ensuring the coordination of many functions including management of existing works and delivery of strategic planning projects.

Staff have also supported promotion and communication of project objectives through production of annual reports, performance indicators, media information and contribution to catchment partnerships.

Shepparton Irrigation Region Catchment Implementation Strategy Coordination

This key function ensures that maximum value is gained from the public funds allocated to the Implementation Committee and closely monitors the achievements and progress of the Catchment Strategy.

The Shepparton Irrigation Region Implementation Committee attracted an integrated budget of close to $15 million in 2009-2010. Funding was coordinated across some 50 projects and three agencies. The success of the program requires strong liaison and cooperation between agency staff to ensure works are completed on time and within budget allocations.

Community Education

Catchment Education and Awareness Grants

The Catchment Education and Awareness Grants program has been successfully administered across the Goulburn-Broken Catchment since 1986. It began before the Shepparton Salinity Pilot Program Advisory Committee launched the Shepparton Irrigation Region Land & Water Management Plan in 1989, and has been embraced by the current, broader, Regional Catchment Strategy introduced by the GB CMA.

The purpose of the Catchment Education and Awareness Grants program is to encourage non-profit organisations to undertake activities that increase community awareness and understanding of salinity related issues in the catchment.

The total available funding of $30,000 for 2009-2010, was contributed by the Shepparton Irrigation Region Implementation Committee.

Local government liaison

Formal links with Local Government has been a key strategy of the Shepparton Irrigation Region since 1989. This link, through the role of the Municipal Catchment Coordinator supports an effective partnership between the municipalities of Greater Shepparton City Council, Shire of Campaspe, Moira Shire Council and the Shepparton Irrigation Region Implementation Committee.

The Shepparton Irrigation Region Implementation Committee engaged the Greater Shepparton City Council, Shire of Campaspe, and Moira Shire Council through meetings with each Council, council briefings and Municipal Catchment Coordinator Steering Committee meetings.

Local government funding applications to the "Strengthening Basin Communities Program" were supported and, conversely, local government supported the GB CMA's "On-Farm Irrigation Efficiency Program" (Farm Water Program) funding bid.

Input was also provided into various local government plans. These included Greater Shepparton City Council's RiverConnect Master Plan, its Kialla Landfill Concept Plan and its Shepparton South East Growth Corridor Development Plan and the Shire of Campaspe's Roadside Conservation Strategy.

Research Program

Written by Bruce Gill and Mike Morris, Department of Primary Industries

Program Goal: The overall program goal is to provide sound, up-to-date science to support the ongoing implementation and evolution of the Shepparton Irrigation Region component of the Goulburn Broken Regional Catchment Strategy.

As the drought and low water allocation years have continued, there has been a continuing focus on the two key issues of: "Irrigation Water-use Efficiency" and the "Changing Irrigation Landscape". However, for this regionally relevant research, these ongoing low rainfall seasons are presenting some emerging difficulties for the research partnership between the Goulburn Broken Catchment Management Authority (GB CMA) and the Department of Primary Industries.

In adapting to the current dry conditions, the research effort has tended to focus more on improving understanding of what changes are occurring across the landscape, why they are occurring, when and where. The research projects developing new Geographic Information System methods to map change are an important source of information for regional program managers.

Activities and achievements

Linking spatial sciences to Extension – Shepparton Geographic Information System Services

Background

The Shepparton Geographic Information System (GIS) project establishes and maintains information systems that support the implementation, monitoring and review of the Shepparton Irrigation Region Land and Water Management Plan. The objectives of this project are:

- to improve information management, leading to better land and water management policy decisions, more effective targeting of effort and expenditure, and improved effectiveness monitoring;
- to develop a strategic suite of datasets, information management tools and expertise applied to the range of land and water management and associated issues such as nutrient management, environmental management, regional development, irrigation management and industry support.

Project activities

The project takes a structured approach to the delivery of corporate and local spatial information to the Shepparton Irrigation Region Land and Water Management Plan, the components of which are:

- training courses for GIS using ArcGIS 9;
- technical support through telephone, email, site visits and one on one support;
- information tools to collect incentive and field data;
- map production and spatial products from reports to public engagement maps;
- information delivery to support project and Landcare group activities and reporting.

Achievements and implications

The Spatial Information Sciences group has created a user friendly GIS interface that has allowed staff to successfully use GIS to make informed decisions and spatial products for farm planning and management. This is delivered with a user-specific training course, deployment of GIS and an ongoing support system.

Specific activities include:

- deployment of a new GIS program and supporting spatial data;
- GIS training courses;
- provision of technical advise to the Sustainable Landscapes GIS network paper;
- Farm Program 2009-2010 Incentives capture;
- provision of maps for Shepparton Irrigation Region Implementation Committee Review;
- documentation of incentive workflows and spatial data to develop a "farm data standard" for the "Linking Farms and Catchment Programs to Irrigation Modernisation Initiatives" project;
- ongoing development of ArcGIS landholder linking tool.

Feasibility and sustainability of sub-surface drip irrigation in pasture production

Background

Ongoing water shortages and projected long term reductions in water supply are focussing irrigator and water manager minds alike on the need to make best use of available water. Sub-surface drip (SSD) irrigation delivers water directly to the plant rootzone, thus reducing potential evaporation, runoff and drainage losses. Adoption of SSD on dairy farms may also benefit regional water quality by altering water movement pathways off-farm. However, dairy farmers will not invest in SSD irrigation until they are confident it can withstand cattle grazing and be economically viable. This project is testing the feasibility of SSD irrigation of pasture under grazed conditions on different soil types.

The objectives of this project are to:

- Assess practical and economic feasibility of SSD irrigation on dairy farms;
- Evaluate economic, environmental and social consequences of SSD irrigation on dairy farms at farm and catchment scales;
- Produce information about SSD irrigation on dairy farms for irrigators, irrigation service providers, and irrigation extension and policy programs.

The project is focussed around a field experiment located on two dairy farms in northern Victoria, testing how SSD performs on a 'light' and a 'medium' soil. Measurements occurred from October 2006 through to June 2010. The experiment will quantify SSD design (tape spacing) and management (irrigation frequency) effects for pasture production and the pathways of water. This will identify the best combinations of system design and management for different soils to ensure the technology is used for maximum benefit.

Project activities

Pasture production has been maintained using SSD under grazing throughout the 2006 to 2010 seasons without any soil pugging issues. (Figure 1).

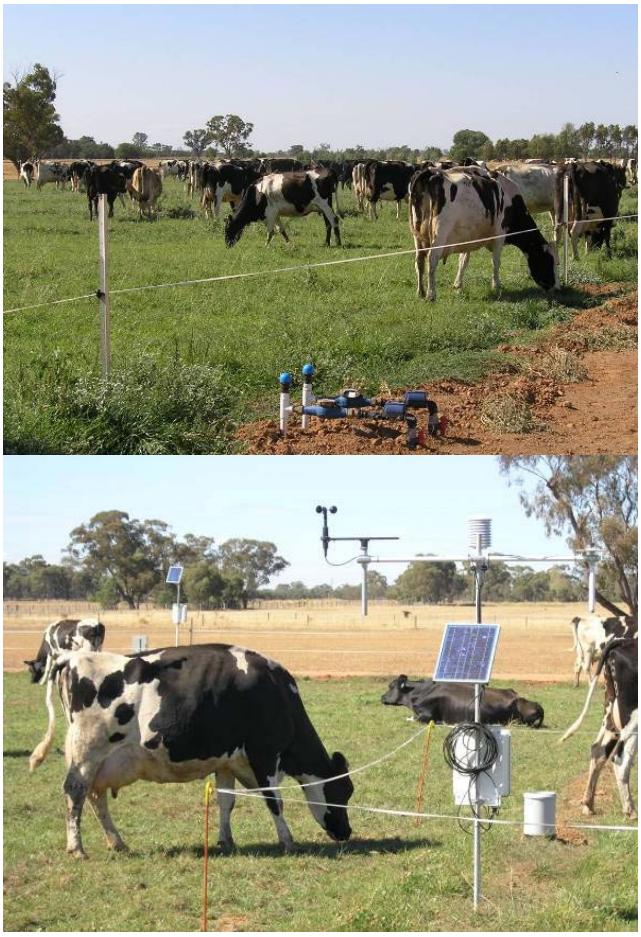


Figure 1: Cattle grazing sub-surface drip irrigated pasture at the experiment sites

If necessary, SSD can be used to germinate pasture on a medium soil without excessive water loss (Figure 2), but SSD should not be used for pasture establishment on light soils. The performance of SSD in achieving uniform spread of water and pasture growth is strongly influenced by soil structure and hydraulic behaviour. On the medium soil, pasture production is unaffected by tape spacing or irrigation frequency, but on the light soil production is decreased as tape spacing increases from 0.6 to 1.0 and 1.4 m. For the medium soil, tape spacing does not influence any aspect of the water balance. For the light soil, tape spacing has affected drainage generation, with more drainage occurring on 1.4 m spacing bays than 0.6 m bays.

Detailed water measurements during 2008-2009 showed that for both light and medium soils, the frequency of irrigation has more impact on likely drainage loss than tape spacing. A desktop economic analysis commissioned by this project showed that SSD for pasture production could be profitable, provided that significant improvements in pasture production and consumption and water savings are achieved, with the grown pasture highly valued. The investment is not sound if water savings alone are achieved.

Figure 2: Wetting patterns for the different tape spacings after 30 mm water was applied at the medium soil site

Achievements and implications

The work has shown that sub-surface drip irrigation can maintain pasture production under grazed conditions, but it will not be suitable for every dairy farm. From an economic viewpoint, significant gains in pasture production and water savings are required for it to be a wise investment. Success will greatly depend on the soil characteristics of the site.

To achieve uniform irrigation and pasture growth across the entire soil area, SSD will work best on duplex soils with low permeability subsoil. On light soils, it is difficult to overcome gravity driven downward movement of water, which results in less uniform pasture growth and water loss below the rootzone. However, evaporation and runoff losses are minimal with this system.

Farm Salinity Management (Mt Scobie Partial Conjunctive groundwater re-use study)

Background

The management of salt is an integral part of sustainable irrigated agriculture in the Shepparton Irrigation Region of Northern Victoria. This project, the only one of its type in the region, provides a substantial record of the effects of groundwater pumping from pre-drought times (1998) to the present. It measures groundwater levels and salinity both inside and outside of a groundwater pump's "area of influence". It also records regular (including in 2010) soil salinity, pH, and cation data from the same area.

In the past, landholders have been encouraged to manage their salt by exporting it 'off farm' via the many drains and rivers that exit the region via the River Murray. This has resulted in significant increases in the salt load leaving the region which impacts on downstream water users. To minimise the amount of salt that leaves the region, systems that can retain salt 'on farm', such as the one employed at this site are required. This project examines a system that employs a conventional groundwater pump with partial conjunctive re-use and disposal to a salt tolerant tree plantation.

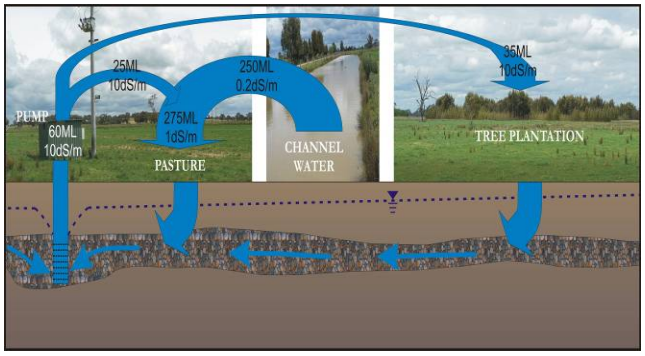
The objectives are to:

- test an alternative salinity management system for areas with high groundwater salinity that retains salt on farm but does not require an evaporation basin;
- develop and test the potential for integrating this system into a working dairy farm;
- determine whether the system is sustainable.

Project activities

A groundwater pump was installed to lower watertables to stop salt accumulating in the root-zone and to allow leaching. The pumped water was disposed of in two ways:

1. A 4 hectare tree plantation, (mixed species, salt tolerant), was established in an already salt affected area to dispose of most of the pumped groundwater;
2. The remaining groundwater was conjunctively used (mixed with fresh channel water) across the property but within the 'area of influence' of the groundwater pump (see diagram).



A schematic diagram of how the salt and water management system was designed to work at the site

Achievements and implications

The major change that has occurred at the site over the past 12 years is the decline in watertable levels. Initial watertable levels across the property were around 1 metre (2001-2002) but these have declined to below 3 metres (2010) across most of the study area due to the groundwater pumping and the continuing drought.

Groundwater salinity has changed little except under the trees where it has increased from 15dS/m to 20 dS/m. Soil salinity has slowly declined across most of the property, except in the tree block where it has increased as a result of irrigation with the saline groundwater.

The increase in soil salinity has affected tree survival and growth rates amongst the species planted, with the eucalypt (Eucalyptus occidentalis) significantly outperforming both of the Casuarina (C. glauca & C. cunninghamiana) species trialled (see photo).

Varied growth rates and survival in the Eucalypts and Casuarinas in the salinity resistance trial at the Mt Scobie groundwater re-use tree plantation (2009)

The overall results of the study indicate that the partial conjunctive re-use system the "Mt Scobie" system of salt management) is a viable system for the management of high salinity and high watertable locations where off-site disposal of groundwater is not preferred or is not available. From a regional perspective, this system provides a way to minimise the loss of salt downstream. It also offers a system of salinity control to farms that have higher groundwater salinities, as well as having measurable biodiversity, carbon capture and aesthetic benefits.

Practice Change Research

Written by Fiona Johnson, Helen Murdoch and Brigette Keeble, Department of Primary Industries

The role of the Practice Change Research is threefold:

- to undertake research projects to inform priority Shepparton Irrigation Region (SIR) issues;
- to provide technical expertise and advice to GB CMA (particularly SIRTEC) on regional irrigation programs; and
- to develop research approaches of world standing that support our stakeholders in deciding the best way to achieve the practice change required for irrigation policy.

Reflecting the emergence of modernisation as a priority issue in 2009-2010, Practice Change Research involved two projects:

1. Exploring policy options for modernisation of the private water delivery system.
2. Partnerships for irrigation modernisation - a case study of Victoria's agencies for the Linking Farms and Catchments Initiative.

Exploring policy options for modernisation of the private water delivery system

Victoria, like other States has faced many challenges in the past decade that have put pressure on sustainable water management. A key strategy to secure Victoria's water supply and ensure sustainable management of natural assets has been to invest in water infrastructure modernisation projects. The Northern Victoria Irrigation Renewal Project (NVIRP) is charged with designing and implementing a specific program of works to achieve water delivery and savings objectives.

The Practice Change Research group undertook a review of Australian and international literature exploring interventions designed to address water savings and other objectives in the private water delivery systems, in particular modernisation and privatisation. The aim of this review was to provide insights into landholder behaviour for the GB CMA and other stakeholders to help implement modernisation programs that support landholders and do not put natural resource management outcomes at risk.

Research results

The literature review established that to meet NVIRP objectives the design of the modernised water delivery irrigation system needs careful consideration.

From the literature we developed "Connection Options Trees" which summarise the complex, interdependent decisions that need to be considered by landholders. These "decision trees" highlight the importance of providing individual landholders with sufficient time to consider their options. Supporting landholders to make decisions is imperative for implementing modernisation successfully.

Some key points about landholder perspectives from the review were:

- there is a high degree of heterogeneity in landholder context, thus support to connect may need to be customised;
- landholders are dealing with risk and uncertainty as a result of modernisation and their needs in this regard are to be recognised and appropriately accommodated in planning.

The review also revealed the importance of design and support of collective connections including the development of sustainable group structures to manage privatised parts of the delivery system in future.

Partnerships for irrigation modernisation - a case study of Victoria's agency for Linking Farms and Catchments Initiative

The Practice Change Research group was engaged to explore how partnerships could support the implementation of 'Linking Farms and Catchments Programs to Modernisation Initiative' for which the GB CMA implements programs. This involved the application of the Relationship Choice Framework (RCF) to classify partnerships, partnership characteristics and the conditions that make partnerships fundamental to successful implementation. This involved interviewing key contacts in government and regional bodies to capture their experience and knowledge about partnerships and modernisation.

Research results

Under the RCF, a partnership is a formalised commitment between organisations to work together to achieve activities or programs.

The Practice Change Research group identified conditions when partnerships may be important to support implementation. These were when:

- organisations shared activities that were core to their objectives, or the activities were customised;
- partners were dependent on each other (e.g. skills, knowledge, access to customers);
- as a result of sharing activities, organisation's access to intelligence was restricted;
- they relied on others to legitimise/authorise their priorities or activities; and when
- the operating environment was dynamic and therefore created uncertainty.

We identified that these conditions were present for organisations implementing modernisation and the 'Linking Farms and Catchments Programs to Modernisation Initiative' programs. Interviewees described they were dependent on partners for: influence, authorisation, access to customers, decision-making, reputation, skills, expertise, resources and data. Modernisation was a core priority for nearly all organisations. The environment in which organisations were operating was considered dynamic. Capability was spread across organisations and specialist knowledge critical to organisations' own objectives lay outside their organisation.

Partnership-type relationships offer organisations a way to deal with the conditions outlined above. They provide flexibility for organisations to adapt activities (essential when there is uncertainty), acknowledge dependencies between partners (offering protection), are relational (regular access to each other) and foster co-operation and commitment.

The research revealed a range of strategies organisations were using that enabled them to implement the 'Linking Farms and Catchments Programs to Modernisation Initiative' and support a partnership approach. The project results can be used to identify when partnerships are important, what constitutes partnerships, the principles and behaviours that underpin them and the management strategies that can be used to ensure they are successful.

APPENDICES

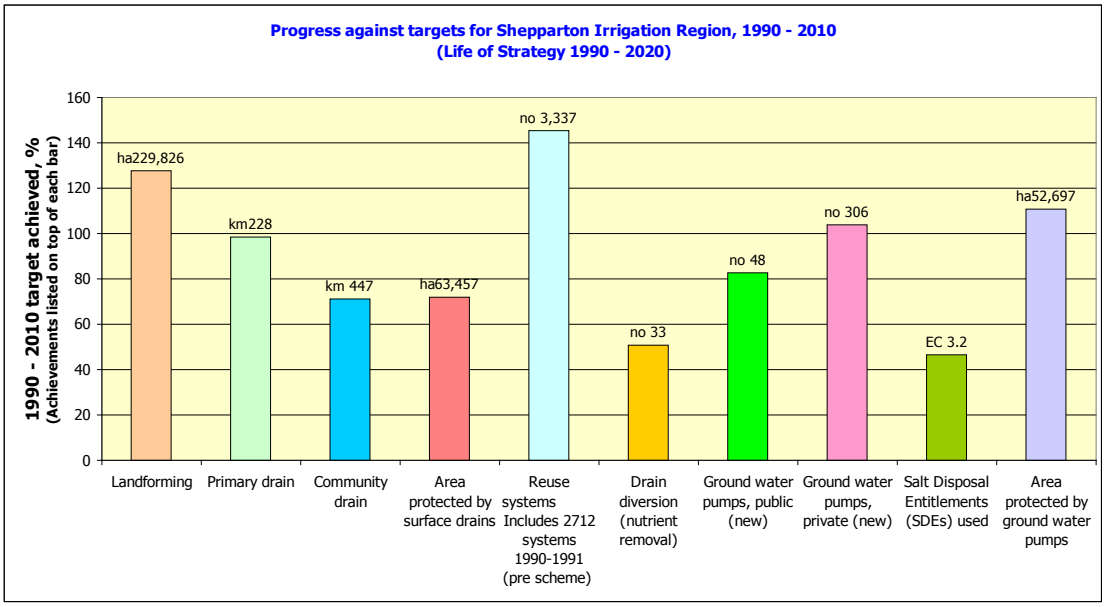
Outputs achieved 2009-2010

Threat				
Land and water use practices		*Target*	*Achieved*	*Achieved %*
Stock grazing: • ha = terrestrial; • km = riparian	Fence terrestrial remnant vegetation (ha)	371	119	32
	Fence wetland remnant(ha)	8	8	100
	Fence stream/river remnant (ha)	37	3	8
	Off-stream watering (no.)	24	0	0
	Binding Management Agreement (license, Section 173, covenant) (ha)	311	260	84
Induced Threat				
Saline water and high watertables		*Target*	*Achieved*	*Achieved %*
Surface water	Landform/lasergrading (ha)	5,000	13,745	275
	Drain – primary (km)	6	6	100
	Drain – community (km)	5.95	4	67
	Farm re-use system (no.)	47	76	162
	Drain – additional water diverted from regional drains (ML)	250	0	0
	Irrigation systems – improved (ha)	5,400	14,217	263
Groundwater and Salt Management	New groundwater pumps – public (no.)	3	0	0
	New groundwater pumps – private (new and upgrade no.)	8	9	113
	Volume water pumped (ML)	600	1,827	305
Nutrient-rich & turbid water & suspended solids	Stormwater management projects (no.)	1	0	0
In-stream and near-stream erosion	Bed and bank protection actions (km)	8	1	8
	In-stream & tributary erosion controlled (km)	2	0	0
Changed flow pattern	Water allocated – e.g. wetlands (ML)	500	900	58
Weed invasion	Aquatic weeds controlled/eradicated (km)	142	21	15
	Targeted infestations of weeds in high priority areas covered by control programs (ha)	6,660	7,253	109
Pest animals	Area of high priority fox infested land covered by control programs (ha)	80	0	0
Impact				
Habitat		*Target*	*Achieved*	*Achieved %*
Habitat loss - terrestrial	Revegetation - plant natives within or next to remnants (ha)	345	91	27
Habitat loss - in-stream	Fish barrier removal (no.)	0	0	0
	Establish Significantly Enhanced Aquatic Refugia (SEAR), (no.)	3	0	0
Habitat loss - threatened species	Threatened Species Recovery Plan and Action Statements (no. projects)	4	4	100
Planning		*Target*	*Achieved*	*Achieved %*
Whole Farm Plans	Whole Farm Plans (no.)	160	212	133

Salinity targets achieved since 1990

Several actions to combat land salinisation and waterlogging have a negative impact on river salinity. However, the actions need to be completed as a package simultaneously to warrant investment from landholders. The net result is progress towards Regional Catchment Targets. These are listed as 'Accountable Actions' on the Murray-Darling Basin Authority Salinity Register.

The levels of government funding have declined in real terms since targets were set in the 1990 Shepparton Irrigation Region Land and Water Salinity Management Plan (SIRLWSMP). At the current rate of investment implementation targets will not be met until approximately 2030 (rather than 2020 as forecast in the 1990 SIRLWSMP).



Long-term strategy implementation progress

- Farm works (landforming, re-use systems, private groundwater pumps) are ahead of schedule;
- Regional infrastructure (public drains and public groundwater pumps) is behind schedule due to declining government investment;
- Works targets set in 1990 and reviewed in 1995, 2001 and 2006 are again being reviewed ;
- Tasks to establish management systems (stakeholder forums, partnerships, technical input, review processes etc) have been thoroughly completed;
- The Irrigation Modernisation project in the Shepparton Irrigation Region, which began in 2008 through NVIRP, is also contributing to reduce salinity threats (it is primarily aimed at achieving water savings for the benefit of the environment, irrigators and Melbourne's water supply).

Salt Disposal Report

Activity	*Uptake of Salt Disposal Entitlements (EC)**			
	Pre-2004	*Total 2004 to 2008-2009*	*Uptake in 2009-2010*	*Total to 2008-2009*
Surface Water Management Systems	-0.055	-0.61	0.00	-0.61
Public Groundwater Pumps	1.64	1.94	0.00	1.94
Private Groundwater Pumps	1.15	1.69	0.00	1.69
Horticultural Sub-surface Drainage	0.18	0.18	0.00	0.18
Total	*2.42*	*3.20*	*0.00*	*3.20*

** Includes pre-1991 impacts*

*Uptake of Salt Disposal Entitlements in the Shepparton Irrigation Region to June 2010**

"Accountable Actions" implemented between July 2009 and June 2010 were the result of works involving nine private groundwater pumps (5 new, 4 upgrades).

A review of the salt balance concept for the Shepparton Irrigation Region (SIR) found that it is unlikely that winter salt disposal from private groundwater pumps will provide tangible benefits for salinity control or protect against rises in pumped groundwater salinity over the next 100 years. Therefore, the SIR Catchment Implementation Strategy has removed winter disposal from private groundwater pumps as a licence requirement. Without winter disposal, the private pumping is no longer an "accountable action", therefore private pump installations have not been included in salinity debits calculations. Victoria has requested the removal of winter disposal from private pumps from Register A.

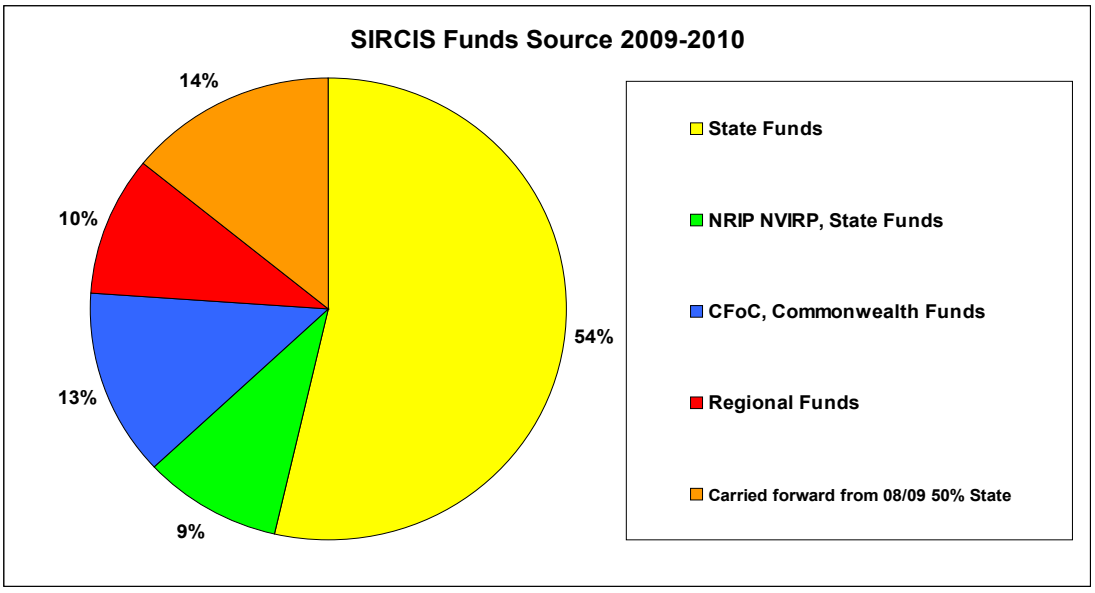
There were no tile drains or low capacity groundwater pumps constructed in horticultural areas, no public groundwater pumps, no new primary or community drains requiring salinity credits in 2009-2010.

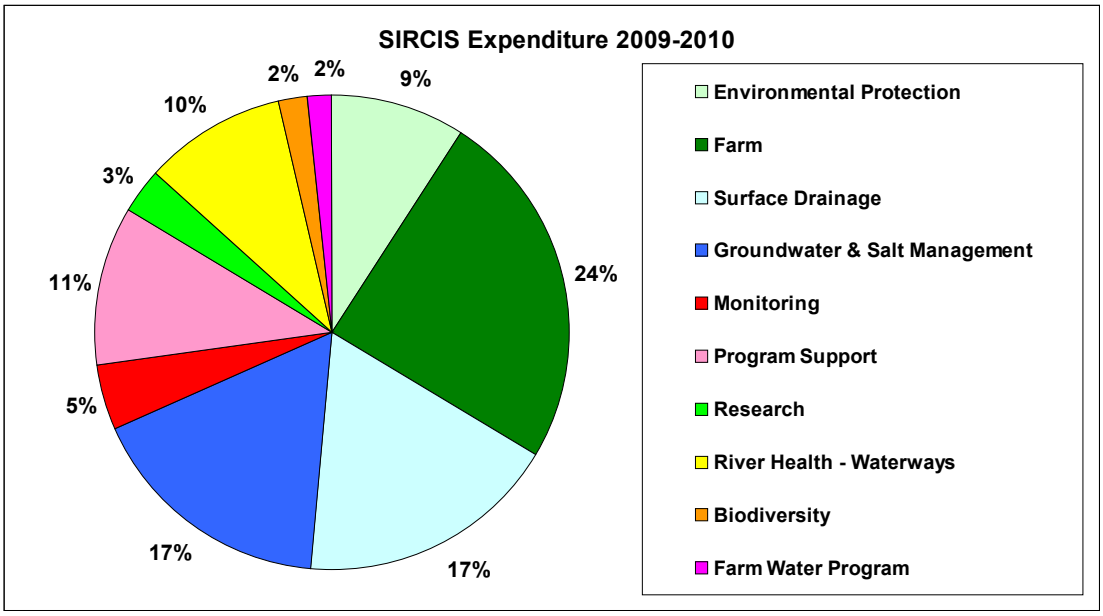
Significant progress continues to be made in reducing drain outfalls by drain management plans and improved farm water management. This work is linked to the tail water factor issue which is yet to be resolved. Victoria is awaiting work to be undertaken by the Murray-Darling Basin Authority to discern why tail water generates a credit in NSW but generates a debit in Victoria. This issue will need to be clarified before the Goulburn Broken Catchment Management Authority conducts work to further understanding of the story of reduced salt inflows to the River Murray from reduced drainage outfalls.*

*From: DSE, 2010. MD BSMS Victoria's Annual Report, Final Draft, 5 October 2010.

SIRCIS Budget & Final Expenditure 2009-2010

Programs	*State Funds $'000s*	*NRIP NVIRP State $'000s*	*CFoC Common-wealth $'000s*	*Regional Funds $'000s*	*Carried forward (2008/9) 50% State $'000s*	*Total funds $'000s*	*Program Expended $'000s*
Environmental Protection	563	256	520		99	1,438	1,204
Farm	1,222		265	715	1,042	3,244	3,281
Surface Water Management	1,458	155			792	2,405	2,332
Groundwater and Salt Management	2,010			270	142	2,422	2,259
Monitoring	230			438		668	599
Program Support	812	175	350		192	1,529	1,444
Research	135	265				400	395
River Health - Waterways	1,308	395	700		-189	2,214	1,303
Biodiversity		125	110		13	248	238
Farm Water Program	191					191	233
Total SIRCIS	*7,929*	*1,371*	*1,945*	*1,423*	*2,091*	*14,759*	*13,288*





Summary of Cost Sharing

Partners	*Annual expenditure (2009-10) $'000s*	*Accumulated expenditure $'000s*
Government	13,288	352,425
Community	29,954	870,388
Totals	*43,242*	*1,222,813*

Government expenditure

Includes expenditure of funds from budget allocation, plus funds transferred into the Strategy during the year. The total amount for the year was for works related to the Shepparton Irrigation Region Catchment Implementation Strategy.

Government expenditure has been obtained from reports on each project, provided by the relevant agency. Appropriate managers, subject to verification, certified the expenditure reports as correct by audit.

Community expenditure

Regional community and landholder expenditure was derived from a survey of farmers within the Shepparton Irrigation Region, and from records of government administered assistance programs.

Accumulated expenditure

Accumulated expenditure is expressed in 2009-2010 dollars. Previous expenditure was adjusted by applying the Victorian Consumer Price Index (CPI) increase of 2.07 per cent in 2009-2010.

Catchment Education and Awareness Grants

Catchment Education and Awareness Grants were established in 1986 to help raise awareness and understanding of salinity.

Grants are available for salinity education and demonstration projects undertaken by schools, farmers and community groups in the Goulburn Broken catchment. The scheme encourages projects that are related to local salinity management plans and strategies. Groups may apply for a grant up to a maximum of $8,000.

Group	*Project*	*$*
City of Greater Shepparton: RiverConnect	Guided Spotlight Night Walks & Student GPS Use	900
Goulburn Broken Waterwatch with Goulburn Valley Water	Lower Goulburn/Broken Waterway Awareness Tour	3,000
Goulburn Murray Landcare Network	The Landcare Tour	1,500
Goulburn Valley Regional Library	Environmental Awareness Resources	1,000
Greater Shepparton City Council	Roadside Revegetation: A Successful Environmental Corridor	2,000
Greater Shepparton City Council	Development of Interpretative Signage for New Wetland Development	2,800
Goulburn Broken Stormwater project with Goulburn Valley Water	Stormwater Education Campaign	1,390
Katandra West Landcare Group	Educational Indigenous Community Gardens	2,550
Rushworth Secondary College	The Goulburn Valley: People, Food, Water & the Environment	1,500
St Mary of the Angels Secondary College	Student Activities Relating to Biodiversity & Local Environmental Issues	2,130
Goulburn Murray Landcare Network	Education Across the Catchment	5,370
Goulburn Murray Landcare Network (on behalf of a collective of 8 groups)	Community Newsletters Publication & Distribution	4,805
South Yarrawonga Landcare Group	Field Trip: Yarrawonga Middle Year Students to Wonga Wetlands	1,140
	Total Grants	*$30,085*

Committees and Working Group Members 2009-2010

Shepparton Irrigation Region Implementation Committee Members

Community members	*Non-voting members agency representatives*	*Executive Support agency staff*
Peter Gibson (Chair) - Nanneella Roger Wrigley (Deputy Chair) - Wangaratta Allen Canobie - Numurkah Stephen Farrell - Echuca John Gray - Toolamba Helen Reynolds - Congupna Nick Ryan - Lancaster John Wenske - Katandra West	Terry Batey - DPI James Burkitt - G-MW Rob Steel - DSE	Carl Walters - GB CMA Peter Howard - GB CMA Rachael Spokes - GB CMA Mark Turner - GB CMA Carla Miles - GB CMA David Lawler - DPI Jen Pagon - DPI Sam Green - G-MW Rhonda McKie - DPI

Attendance Record

Name	*09-5*	*09-6*	*09-7*	*09-8*	*10-1*	*10-2*	*10-3*	*10-4*
Peter Gibson	Yes	Yes	Yes	Yes	Yes	Apology	Yes	Yes
Roger Wrigley	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Allen Canobie	Yes	Apology	Yes	Yes	Yes	Yes	Apology	Yes
Steve Farrell	Yes	Apology	Yes	Yes	Yes	Yes	Yes	Apology
John Gray	Yes	Yes	Yes	Apology	Yes	Yes	Apology	Apology
Helen Reynolds	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nick Ryan	Apology	Yes	Yes	Yes	Yes	Apology	Yes	Apology
John Wenske	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Apology

Working Group Members

Group	*Community members*	*Agency representatives*
Shepparton Irrigation Region Technical Support Committee (SIRTEC)	Allen Canobie Peter Gibson Roger Wrigley	Carl Walters - GB CMA James Burkitt - G-MW Sam Green - G-MW Terry Hunter - G-MW Greg Smith - G-MW Craig Dyson - DPI NC Steve Lottkowitz - DPI NC Terry Batey - DPI GB David Lawler - DPI GB Jen Pagon - DPI GB Fiona Johnson - FSV DPI Brigette Keeble - FSV DPI Helen Murdoch - FSV DPI Alister Terry - FFSR DPI Peter Howard - GB CMA Carla Miles - GB CMA Mark Turner - GB CMA Wayne Tennant - GB CMA Rachael Spokes - GB CMA Rhonda McKie - DPI

Group	Community members	Agency representatives
Budget Sub-Committee	Peter Gibson Stephen Farrell Helen Reynolds Nick Ryan Roger Wrigley	Carl Walters - GB CMA James Burkitt - G-MW Sam Green - G-MW Terry Hunter - G-MW Terry Batey - DPI David Lawler - DPI Mike Morris - DPI FFSR Jason Head - GB CMA Peter Howard - GB CMA Megan McFarlane - GB CMA Carla Miles - GB CMA Mark Turner - GB CMA Rhonda McKie - DPI
Groundwater and Salt Management Working Group	Roger Wrigley (Chair) Heather du Vallon Murray McDonald Bill McMinn Menon Parameswaran Paul Quirk John Wenske Ian Whatley	Terry Hunter - G-MW James Burkitt - G-MW Bruce Gill - FFSR DPI Terry Batey- DPI Carl Walters - GB CMA
Surface Water Management Working Group	Allen Canobie (Chair) Max Baker Ron Brooks Morris Brown Steve Farrell Peter Gibson John Horder Hank Sanders Ken Wood	Craig Rath - DPI Neil McLeod - DPI John Bourchier - DPI Chris Guthrie - G-MW Sam Green - G-MW Rob O'Meara - G-MW Greg Smith - G-MW Neville Atkinson - GB CMA Rachael Spokes - GB CMA Carl Walters - GB CMA
Farm and Environment Program Working Group	Roger Wrigley (Chair) Gerado Fasano John Gray Alfred Heupermann Bill Jones John Laing Alan Lavis Athol McDonald Bill Probst Eril Rathjen Craig Reynolds Nick Ryan Bo Silverstein Graeme Talarico	Julie Engström - DPI Terry Batey - DPI David Lawler - DPI Rabi Maskey - DPI Chris Nicholson - DPI Jen Pagon - DPI Joel Pike - DPI Eamon Reeves - DPI Carl Walters - GB CMA Rachael Spokes - GB CMA
Waterways Working Group	The Waterways Working Group did not convene during 2009-10 due to Drought Employment Program and Fire Recovery Program commitments of the Waterways staff.	

Publications and presentations

Environment Program

Presentations:

- "Sharing the Water between the environment and irrigation"; paper presentation for Irrigation Australia Conference, October, 2009, Swan Hill, Environment Team, Sampson S, Goulburn Broken Catchment Management Authority; Court T, Goulburn Valley Environment Group;
- "Acoustic Monitoring at Reedy Swamp"; poster for Irrigation Australia Conference, October, 2009, Swan Hill, Environment Team, Sampson S, Goulburn Broken Catchment Management Authority; Court T, Goulburn Valley Environment Group;
- "Landscape Links project"; poster for Irrigation Australia Conference, October, 2009, Swan Hill, Environment Team, Sampson S, Goulburn Broken Catchment Management Authority; Court T, Goulburn Valley Environment Group;
- "Tour of Doctors Swamp" for Farm and Environment Program Working Group, Murchison, November 4, 2009; upgraded water delivery infrastructure on the Cattanach Canal, a nest box project. Chalmers K., Engstrom J., Environment Team, Department of Primary Industries;
- "Sustainable Irrigated Landscapes – Goulburn Broken projects", presentation to Chinese Delegates including the Minister for the Environment for China, 17th March 2010; Maskey R., Wood J., Department of Primary Industries Sustainable Irrigated Landscapes – Goulburn Broken.

Publications:

- Wetland Risk Assessment document;
- Environmental Site Assessment Risk Assessment document;
- Wetland Management Case Study;
- Draft review of Environmental and Tree Growing projects;
- Business Plan for 2009 – 2010;
- Business Report for 2008 -2009;
- Reedy Swamp Environmental Watering Plan;
- Draft Optional Watering Points for High Value Wetlands in the Shepparton Irrigation Region;
- Updated Wetland Management Plan Guidelines;
- Most Significant Change Stories completed:
    - Landcare learning – water issues & best practices beyond our own boundaries;
    - Irrigation modernisation and community surface water management systems – links and opportunities;
    - Collaboration with a new stakeholder results in a positive outcome for all;
    - Working in partnership with the Northern Victoria Irrigation Renewal Project;
    - Utilising Biodiversity Action Planning in the Shepparton Irrigation Region;
    - Wetland Management – whose job is it?;
    - Snake awareness for Department of Primary Industries field staff;
    - Better Services to Farmers implementation – spreading the Sustainable Irrigated Landscapes – Goulburn Broken experience;
    - Sustainable, Productive and Competitive Award – Local Families Lead the Way in Future Farming;
    - Collaboration with multiple stakeholders produces positive outcomes;
    - Monitoring Environmental Project Sites can be used to change landholder attitudes towards protecting the environment;
    - Sustainable Irrigated Landscapes – Goulburn Broken People Strategy;
    - Addressing Optional Environmental Watering Points for High Value Wetlands within the Shepparton Irrigation Region;
    - Mapping and reporting Channel Lining Assessments;
    - Using Geographic Information Systems to improve the efficient delivery of Environmental Site Assessments across the Goulburn Murray Irrigation District;
    - Linking Environmental Assets to Irrigation Modernisation.

Farm Program

Presentations:

- "Communication is a key to change within irrigation modernisation activities", Longley S and Stava I (2010) a poster presented to the Irrigation Australia conference held in Sydney;
- "Informed decision making on farm: linking farm irrigation systems to the modernised delivery system", Nicholson C and Maskey R (2009) a paper presented to the Irrigation Australia conference held in Swan Hill;
- "Understanding landholder response to inform successful system modernisation, Stary B and Keeble B (2010) a paper presented to the Irrigation Australia conference held in Sydney.

Publications:

- Department of Primary Industries (2010) A review of Farm Irrigation Assessments in the Shepparton Irrigation Area, Tatura: DPI;
- Department of Primary Industries (2010) Evaluation of Farm Irrigation Assessment Using Goal Attainment Scale Technique, Tatura: DPI;
- Innovative approaches to service delivery to culturally and linguistically diverse (CALD) farmers in Victoria, Extension Farming Systems Journal, Vol.5, No.1. Pandher M, Maskey R and Batey T (2009).

Surface Water Management Program

Publications:

- Shepparton Irrigation Region Drain Nutrients Annual Review 2008/09 (C806)Stephen Lamb, Libby Gawne, Greg Smith, G-MW (2009);
- Annual Watertable Map - August 2009.

Groundwater and Salt Management Program

Publications:

- Annual Watertable Map - August 2009;
- Environmental Monitoring Bore Installation Report 2008-2009.

Waterways

Publications:

- Papers were submitted and accepted at a range of national symposiums and workshops, including the Barmah-Millewa Forests Research Forum, 2009 Murray-Darling Basin Authority's Native Fish Forum, Shanxi Water Resources Bureau (Senior Management Seminars, Melbourne University) and Shanxi Water Resources Bureau–Management, Taiyuan. (See case study at www.gbcma.vic.gov.au: Goulburn Broken CMA involved in Australia–China AusAID partnership.)
- Papers were also accepted in refereed journals, including Freshwater Biology.

Research

Presentations:

- DSE SIP quarterly meetings: the Policy Choice Framework (in conjunction with Anna Ridley), research program, landholder responses to delivery system modernisation - comparison of the MID and SIR;
- Environment Waikato Regional Council New Zealand on the case study of organisational relationships for implementing irrigation policy in the SIR;
- Presentation of the findings of the modernisation partnership interviews for the MERIC workshop;
- "The importance of partnerships" for the region at the Water Cluster.
- Brigette Keeble gave a presentation titled 'Partnerships for irrigation modernisation - a case study of Victoria's agency for Linking Farms and Catchments Initiative' at the Irrigation Australia Conference on June 8th, 2010;
- Brendan Stary, Helen Murdoch presented at the 2010 IAL Conference in Sydney entitled "Understanding landholder responses to inform successful system modernisation";
- Fiona Johnson presented to Greenhouse 2009 Conference 'A Policy Choice Framework for assisting agricultural industries to adapt to climate change,' presented by Fiona Johnson;
- At the GB CMA SIRIC research reporting day Ruth Lourey presented the VCCAP Climate Change Adaptation Project and Ben Rowbottom the Spatial Market Segmentation project.

Publications:

- "Understanding landholders in an era of regulatory change", Murdoch, H, Lourey, R, Kaine, G and Johnson, F – Final Report to GBCMA;
- "Preliminary Analysis of Partnership Interview Data", Keeble, B., Kaine, G., Murdoch, H. – workshop discussion paper for MERIC;
- "A study of partnerships for Victoria's Linking Farms and Catchments to Modernisation Initiative" Keeble, B, Kaine G, Murdoch H, Gemmill N, Johnson F, Maskey R (2010) 'Conference Paper Irrigation Australia, Sydney June 8 2010;
- "Understanding landholder responses to inform successful system modernisation" B. Stary H. Murdoch, B. Keeble, Conference Abstract Irrigation Australia, Sydney June 8 2010.

Partnership Agency Staff 2009-2010

The Shepparton Irrigation Region Implementation Committee acknowledges the valuable contribution and dedication of the staff of our partnership Agencies throughout the past year.

Biodiversity

Tim Barlow	CMA
Jim Castles	CMA
Melanie Haddow	CMA
Vanessa Keogh	CMA
Carla Miles	CMA
Rolf Weber	DSE

Environment

Vanessa Campbell	DPI
Keith Chalmers	DPI
Jo Deretic	DPI
Nickee Freeman	DPI
Rebecca Heard	DPI
Neil McLeod	DPI
Andrew Morrison	DPI
Jen Pagon	DPI
Joel Pike	DPI

Farm

Gemma Beard	DPI
Julie Engström	DPI
David Lawler	DPI
Samantha Longley	DPI
Rabi Maskey	DPI
Chelsea Nicholson	DPI
Chris Nicholson	DPI
Jeremy Patt	DPI
Melly Pandher	DPI
Eamon Reeves	DPI
Brendan Stary	DPI
Ingrid Stava	DPI

Surface Water Management

John Bourchier	DPI
Asher Derwent	DPI
Rebecca Pike	DPI
Craig Rath	DPI
Sam Green	G-MW
Chris Guthrie	G-MW
Robert O'Meara	G-MW

Groundwater and Salt Management

James Burkitt	G-MW
Rachel Bradshaw	G-MW
Andrea Caia	G-MW
Kate Cockroft	G-MW
Peter Dickinson	G-MW
Stephen Feiss	G-MW
Terry Hunter	G-MW
Ian Oppy	G-MW
Mark Potter	G-MW
Luke Stacey	G-MW

Monitoring

Libby Gawne	G-MW
Anne Graesser	G-MW
Stephen Lamb	G-MW
Greg Smith	G-MW

Program Support

Lyndall Ash	DPI
Raechel Ballinger	DPI
Terry Batey	DPI
Rhonda McKie	DPI
Olive Montecillo	DPI
Pam Collins (ret. Oct 2009)	GB CMA
Peter Howard	GB CMA
Menon Parameswaran	GB CMA
Ken Sampson (dec'd 2009)	GB CMA
Andrea Smith (mat leave)	GB CMA
Rachael Spokes	GB CMA
Carl Walters (from Oct 2009)	GB CMA

Research

Department of Primary Industries	Branch
Peter Clayton	FFSR
Tony Cook	FFSR
Rick Dabrowski	FFSR
Tracey Davies	FFSR
Lucy Finger	FFSR
Bruce Gill	FFSR
Amjed Hussain	FFSR
Kevin Kelly	FFSR
Hayden Lewis	FFSR
Richard Maxwell	FFSR
Andrew McAllister	FFSR
Mike Morris	FFSR
Elizabeth Morse-McNabb	FFSR
Susan Robson	FFSR
Alister Terry	FFSR
Nadine Edwards	FSV PCR
Fiona Johnson	FSV PCR
Brigette Keeble	FSV PCR
Helen Murdoch	FSV PCR
Ben Rowbottom	FSV PCR

Waterways

Simon Casanelia	GB CMA
Steve Collins	GB CMA
Meegan Judd	GB CMA
Tom O'Dwyer	GB CMA
Gaye Sutherland	GB CMA
Wayne Tennant	GB CMA
Mark Turner	GB CMA
Carl Walters (until Oct 2009)	GB CMA
Richard Warburton	GB CMA
Keith Ward	GB CMA
Corey Wilson	GB CMA

ABBREVIATIONS

AAV	Aboriginal Affairs Victoria
ANCID	Australian National Committee of Irrigation and Drainage
CaLP	Catchment and Land Protection
CFoC	Caring for Our Country – a Commonwealth funding initiative
CMA	Catchment Management Authority
CRC	Cooperative Research Centre
DPI	Department of Primary Industries
DSE	Department of Sustainability & Environment
EMS	Environmental Management System
EPA	Environment Protection Authority
FEDS	Farm Exploratory Drilling Scheme
GIS	Geographical Information System
GMLN	Goulburn Murray Landcare Network
G-MW	Goulburn-Murray Water
MDBA	Murray-Darling Basin Authority
NRIP	Natural Resources Investment Program
NVIRP	Northern Victoria Irrigation Renewal Project
SIR	Shepparton Irrigation Region
SIR IC	Shepparton Irrigation Region Implementation Committee
SIRCIS	Shepparton Irrigation Region Catchment Implementation Strategy
SIRTEC	Shepparton Irrigation Region Technical Support Committee

ACKNOWLEDGMENTS

The Shepparton Irrigation Region Implementation Committee would like to thank the following agency staff for their contribution to the preparation of this report.

Goulburn Broken Catchment Management Authority
Peter Howard
Rod McLennan
Rachael Spokes
Wayne Tennant
Mark Turner
Carl Walters
Steve Wilson

Department of Primary Industries
Lyndall Ash
Raechel Ballinger
Terry Batey
Bruce Gill
Fiona Johnson
Brigette Keeble
David Lawler
Rabi Maskey
Neil McLeod
Olive Monticello
Mike Morris
Helen Murdoch
Jen Pagon

Goulburn-Murray Water
James Burkitt
Sam Green
Greg Smith

Department of Sustainability and Environment
Rolf Weber

Photography and map production
Photographs used in the Annual Report were gratefully received from Goulburn Broken Catchment Management Authority, Department of Primary Industries and Goulburn-Murray Water staff.

The GIS Group at DPI Tatura produced maps used in this report.

Ken Sampson
1950 – 2009
Ken Sampson was the Executive Officer of the Shepparton Irrigation Region Implementation Committee from 1994 until he passed away in October 2009. Ken made a significant contribution to northern Victoria. He was highly respected within natural resource management organisations at all levels, regionally and beyond.
Thank you Ken.