

Appendix A

Bookpurnong Strategic Plan	Lock	4
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BL4EA STRATEGIC DEVELOPMENT DOCUMENT - Floodplains

SITES	POSSIBLE ACTIONS	PARTNERS	FUNDING SOURCE	COST	FINALISED BY	PRIORITY
CLARKS SITE A	<ul style="list-style-type: none"> • Flooding trial • Injection trial • Salinity reduction observation & monitoring • Revegetation • Feral pest control • Photo point monitoring 	Community, DWLBC, Greening Australia, Trees for life, Greencorps			Steve Clark	ongoing
CLARKS SITE B	<ul style="list-style-type: none"> • Flooding trial • Pool Level manipulation • Biodiversity mapping • Revegetation • Feral pest control 	Community, DWLBC, Greening Australia, Trees for life, Greencorps			Steve Clark	ongoing
CLARKS SITE C	<ul style="list-style-type: none"> • Injection trial • Salinity reduction observation & monitoring • Feral pest control 	ditto			Steve Clark	ongoing
GURRA LAKES SOUTH	<ul style="list-style-type: none"> • Pool level manipulation • Revegetation • Feral pest control • Access constraints 	Community, DWLBC, Greening Australia, Trees for life, Greencorps				medium
SA FLOODPLAIN MNGT STRATEGY	DWLBC planning & support	DWLBC SAMDBNRM				medium

BL4EA STRATEGIC DEVELOPMENT DOCUMENT - Floodplains

SITES	POSSIBLE ACTIONS	PARTNERS	FUNDING SOURCE	COST	FINALISED BY	PRIORITY
AJAX ACHILLES	<p>Wetland management strategy document written. Contracted out (to Bookpurnong Consulting) using the existing preliminary document that Jason Size has.</p> <ul style="list-style-type: none"> • Waterway rehabilitation • Island flooding • Biodiversity mapping • Vegetation rehabilitation • Feral pest control • defining ownership & responsibilities of landowners 	<p>Community, DWLBC,</p> <p>DEH, Greening Australia, Trees for life, Greencorps, LBLAP</p> <p>SAMDBNRM</p>	SAMDBNRM, LAP		Jason Size	high
WESTERNS	<ul style="list-style-type: none"> • Habitat enhancement • Revegetation • Feral pest control • Photo point monitoring 	<p>Community, DWLBC,</p> <p>Greening Australia, Trees for life, Greencorps</p>				medium
BLACK BOX FLAT	<ul style="list-style-type: none"> • Flooding trial • Injection trial • Salinity reduction observation & monitoring • Biodiversity mapping • Revegetation • Feral pest control • Photo point monitoring • Access constraints • Destocking 	<p>Community, DWLBC,</p> <p>Greening Australia, Trees for life, Greencorps</p>				medium

BL4EA STRATEGIC DEVELOPMENT DOCUMENT - Face Zone

SITES	POSSIBLE ACTIONS	PARTNERS	FUNDING SOURCE	COST	FINALISED BY	PRIORITY
SOLORA	<ul style="list-style-type: none"> Erosion control Revegetation Photo point monitoring 	Community Landowners, BDO			Doug Spanos	post BDO
LOCK 4 LOWER	<ul style="list-style-type: none"> Erosion control Vegetation enhancement 	Chigros, Johnson SA Water, BDO			Ben Johnson	post BDO
ABOVE Ajax Achilles	<ul style="list-style-type: none"> Revegetation 	Jescke, Gallery, Size BDO			Jason Size	post BDO
BPNG CLIFF FACE	BDO to source funding to evaluate of cliff slump <ul style="list-style-type: none"> Employ a geologist to investigate Remedial action 	Westerns, Klingberg BDO			David Ingerson	post BDO
BPNG HILL	Face zone revegetation <ul style="list-style-type: none"> Feral pest control 	BDO, Community, Landowners, Ingerson			Michael Ingerson	post BDO
GURRA LAKES	Face zone revegetation <ul style="list-style-type: none"> Feral pest control 	Riley, Schwarz BDO			David Riley, Ken Schwarz	post BDO
IRRIGATION PUMP SITES	Rationalise river side infrastructure where possible <ul style="list-style-type: none"> Cleanup & rubbish removal Asthetic improvement Museum 	BDO, Community, Pump owners				post BDO
RIVER BANK	Restore as best as possible to a condition closer to pre settlement. <ul style="list-style-type: none"> Cleanup & rubbish removal Rationlise the number of access roads down to the rivers edge to reduce the impact of vehicle traffic on native vegetation. 	BDO, Community, Landowners				post BDO

BL4EA STRATEGIC DEVELOPMENT DOCUMENT - Irrigated Properties

PROJECTS	POSSIBLE ACTIONS	PARTNERS	FUNDING SOURCE	COST	FINALISED BY	PRIORITY
ON-FARM RESEARCH	<p>Research opportunity provision</p> <ul style="list-style-type: none"> • Trial work • Research & development • New ventures 	<p>Community, Commercial partners CRC, PIRSA, RWIDC</p>			Ben Kimber	medium
CASE STUDY	<p>Continuation & expansion of the Case Study</p> <ul style="list-style-type: none"> • Benchmarking studies • Review of the MOU 	BL4EA, ICMS			Jason Size	ongoing
INFRASTRUCTURE UPGRADES	<p>Assessment of single regional distribution system (RDS) to deliver irrigation water to all current BL4 irrigators with the provision for future expansion. Link connection to the scheme with an agreement to abide by the BL4LMA.</p> <ul style="list-style-type: none"> • Feasibility study for RDS • Region wide weather station grid • Region wide distribution of moisture monitoring equipment with regular reporting back to land holders on their performance against the average for their commodity • supply of potable water to all loctions adjacent the new irrigation infrastructure. If SA Water are no interested the BL4EA may choose to build the scheme itself and run it as a private water supply utility. 	SAMDBNRM, NAP, BL4EA, Community, Landholders	Government, Self Funded	\$22,000,000	<p>Operational by June 2008</p> <p>Ben Kimber</p>	high
SIS & ENVIRONMENTAL ENHANCEMENT SCHEME STAGE 2	<p>Studies to establish impacts to Gurra Lakes from BPNG ground water mound & continuation of SIS to northern boundary of BL4EA region</p> <ul style="list-style-type: none"> • Feasibility study into a Gurra SIS • Investigate wetting & drying options for the Gurra system 	DWLBC, SAMDBNRM, SA WATER, COMMUNITY, NAP			Dave Riley, David Ingerson	medium

BL4EA STRATEGIC DEVELOPMENT DOCUMENT - Irrigated Properties

PROJECTS	POSSIBLE ACTIONS	PARTNERS	FUNDING SOURCE	COST	FINALISED BY	PRIORITY
SALT DISPOSAL CAPACITY	<p>Monitor the regions disposal from the SIS & develop strategies to optimise volumes</p> <ul style="list-style-type: none"> • Investigate use of SIS disposal water • investigate date palm development surrounding the existing basin at Noora to impede the lateral spread of ground water. Add a simple ag-drain at the plantations outer perimeter to ensure that no saline ground water is drifting past the plantation. Possible investment scheme. 	DWLBC, SAMDBNRM, NAP,			David Riley	medium
LAND & WATER MANAGEMENT PLAN (LWMP)	<p>Review the current LWMP.</p> <ul style="list-style-type: none"> • Attract funding then utilise the newly formed "Bookpurnong Consulting" to consult, investigate, write and distribute an upgraded LWMP. 	BL4EA	SAMDBNRM			high
LAND MANAGEMENT AGREEMENT (BL4LMA)	<p>Develop a Land Management Agreement, a simple set of rules & guidelines for the Bookpurnong Region (BL4LMA)</p> <ul style="list-style-type: none"> • Management agreement to include signatories of all Bookpurnong residents. • Aim to encourage any activity or practise that has a net benefit for the Bookpurnong community. • Encourage economically, socially and environmentally sustainable practises. • Encourage new community participants. • Streamline 'red-tape' that impedes development. • EC Credits to be held in trust by the minister to fund any beneficial works within the Bookpurnong community, such as mentoring and monitoring. • Link SIS Land Management objectives with those of the government departments and vice versa. 	BL4EA	SAMDBNRM			medium to high

BL4EA STRATEGIC DEVELOPMENT DOCUMENT - Dryland

PROJECTS	POSSIBLE ACTIONS	PARTNERS	FUNDING SOURCE	COST	FINALISED BY	PRIORITY
ROADSIDE REVEGETATION	<ul style="list-style-type: none"> all road sides identify old unused road easements and reestablish the native vegetation 	Dryland LAP groups, NRM, Trees for Life, Green corp, etc.				BDO
FARM REVEGETATION	<p>BL4EA to be involved with the regions dryland farming sector to jointly develop plans for this section of plan!! Add into the LWMP?</p> <ul style="list-style-type: none"> expand remenant vegetation encourage rare vegetation revege develop biodiversity coridoors encourage new developments to set aside a percentage of the land for ethnic vegetation 	NRM			Del Kaesler	BDO
SUSTAINABLE FARMING	<ul style="list-style-type: none"> erosion control encouage best practice tillage development a management plan to address the issue of evaporation basin leakage 				Paul Kaesler	BDO
INDIGENOUS CULTURAL SITES	<ul style="list-style-type: none"> locate and document 					BDO

BL4EA STRATEGIC DEVELOPMENT DOCUMENT - Inovative Production Techniques

PROJECTS	POSSIBLE ACTIONS	PARTNERS	FUNDING SOURCE	COST	FINALISED BY	PRIORITY
INNOVATIVE HORTICULTURAL PRODUCTION TECHNIQUES	<p>Improved techniques & lower production costs. Aiming at world best practice to satisfy requirements of "rest of world" food safety standards</p> <ul style="list-style-type: none"> • Group Management Scheme to allow existing growers to come together and manage their properties collectively to realise better economies of scale. • Open hydroponics 	SARDI, PIRSA, FOOD SAFETY GROUPS, IRRIGATORS, FOOD PRODUCERS	Government, Self Funded	\$250,000	Operational by June 2007 BDO	BDO

BL4EA STRATEGIC DEVELOPMENT DOCUMENT - Community Capacity Building

PROJECTS	POSSIBLE ACTIONS	PARTNERS	FUNDING SOURCE	COST	FINALISED BY	PRIORITY
IRRIGATION STANDARDS & CODE OF PRACTICE	Develop and publish "Bookpurnong Irrigation Best Practice" standards for irrigation distribution and application within the area covered by the Bookpurnong LWMP incorporating a regional plan for future development in SIS protected zones. This could be a part of the larger BL4LMA project. <ul style="list-style-type: none"> Implement plans 	DWLBC, SAMDBNRM, RDC, ICMS, Chris Alderton	SAMDBNRM community grants scheme	\$500,000	BDO & consulting entity, Published by June 2007, Implemented by June 2008	medium BDO
Environmental Management Systems (EMS)	Environmental management systems development (ISO 14000) <ul style="list-style-type: none"> Elite QA Worker welfare 	PIRSA, OHWS				BDO
BUSINESS SKILLS TRAINING	Developing new & improved business skills for Community <ul style="list-style-type: none"> Know your cost of production (COP) 	PIRSA, TAFE, SAMDBNRM				BDO
COMMUNICATION LINKAGES WITH PARTNERS	Develop community skills to encourage joint ventures and partnerships with relevant agencies, entities and funding providers <ul style="list-style-type: none"> 	Training ??				BDO
TRAINING	Rivercare courses, EMS systems, Whole farm planning <ul style="list-style-type: none"> 	Community, DWLBC, SAMDBNRM, TAFE, SARDI				BDO
WHOLE FARM PLANNING	Assistance to develop on-farm skills <ul style="list-style-type: none"> Apprenticeships Group trainees 	PIRSA, SAMDBNRM RHC training			BDO	BDO
MENTORING	Community discussion groups, <ul style="list-style-type: none"> 	BL4EA,				BDO

BL4EA STRATEGIC DEVELOPMENT DOCUMENT - Economic Advances

PROJECTS	POSSIBLE ACTIONS	PARTNERS	FUNDING SOURCE	COST	FINALISED BY	PRIORITY
DEVELOP A CONSULTATIVE ENTITY - Bookpurnong Consulting	Develop a consultancy entity, Bookpurnong Consulting Inc (BC) with BL4EA as trustee to allow the committee to attract funding in its own right for collecting information from and disseminating information to the community. BC would employ a Bookpurnong Development Officer (BDO) to further the aims of the community.	DWLBC, SAMDBNRM, RDC		\$10,000	Active by June 2007	super high
RAINWATER TANKS	install tanks on all homes to reduce the draw on the river.	BL4EA, SAMDBNRM			Jeremy	medium
ECO-SEPTICS, SOLAR ARRAYS	install aerobic septics to all homes and businesses within the BL4EA area. Install a solar array with the eco-septics to reduce the impact of the running costs. Connect the solar array to the grid where possible to allow the full benefit of the array to be realised.	BL4EA, SAMDBNRM				medium
BL4EA OFFICE / MEETING ROOM	investigate the possibility of acquiring a community hall or similar to act as the shop front for BL4EA. The BDO would operate from here. A website would be one of the first priorities of the BDO.	BL4EA, Local Govt.	Karlene, NRM			high
ENERGY CONTRACTS	Community wide contracts	BL4EA, Commercial entity				medium
FUEL CONTRACTS	Community wide contracts	BL4EA, Commercial contractor				medium
BUYING GROUP	United buying strength	BL4EA Irrigators				medium
REGIONAL MARKETING STRATEGY	Consolidated marketing & promotion of region and its unique products "Bookpurnong". Regional accreditation of standards & achievements	RDC, Food Riverland, Austrade, Local Govt.				low
SALINITY CREDITS AND VALUES	Community valuing credits for regional improvements	BL4EA, DWLBC,				
GUEST WORKER FACILITIES	Consideration to encourage establishing facilities in major towns for guest workers	RDC, BL4EA,				
COMMUNICATION INFRASTRUCTURE	Seek improved communication infrastructure to service region with best mobile & broadband service	RDC, BL4EA, Local Govt.				

Appendix B

Preliminary Background
Report

*The South Australian Murray Darling Basin
Natural Resources Management Board*

**Upgrade of the Bookpurnong to
Lock 4 Land & Water
Management Plan to Guideline
Standard**

Preliminary Background Report

August 2008

Project Team

Alison Cusack
Geoff White
Nick Watkins
Alex Ward
Ian Cogdell

ABN 17 485 960 719

1/198 Greenhill Road
EASTWOOD SA 5063

Telephone: 08 8378 8000
Facsimile: 08 8357 8988
www.austwaterenv.com.au

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Environments



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Table of Contents

1. INTRODUCTION	8
1.1 BACKGROUND.....	8
1.2 PROJECT APPRECIATION	10
1.3 PROGRESS TO DATE.....	11
1.4 PURPOSE OF THIS REPORT.....	11
2. CONSULTATION.....	12
2.1 PROJECT INCEPTION MEETING	12
2.2 SITE INSPECTION	12
2.3 STEERING COMMITTEE WORKSHOP – STRATEGIC PLANNING	13
2.4 CONSULTATION PROCESS.....	14
3. LITERATURE REVIEW	16
4. DATA GAPS/RECOMMENDATIONS.....	27
5. KEY NATURAL RESOURCE MANAGEMENT ISSUES	33
6. PROPOSED LWMP STRUCTURE	34
7. ACTIONS.....	35
8. REFERENCES	36

List of Tables

Table 2.1: Strategic Planning Workshop Agenda	14
Table 3.3.1: Literature Review Summary – Policy Documents.	17
Table 3.3.2: Literature Review Summary – Technical Documents.	22
Table 3.4.1: Data gaps identified in each report	28

Appendices

Appendix A	
Initial Workshop Minutes	
Appendix B	
Prompt sheet	
Appendix C	
Bookpurnong Lock 4 Strategic Plan	

1. Introduction

This Introduction section provides a brief background and appreciation of the Bookpurnong Lock 4 Land and Water Management Plan. It summarises progress to date and describes the purpose of this report.

1.1 Background

The Bookpurnong Lock 4 region is located adjacent to the River Murray between Loxton and Berri in South Australia. The planning region comprises the River Murray and associated floodplains/wetlands, dryland agriculture and irrigated horticulture, and associated residential use.

The dominant industry in the region is irrigated horticulture with approximately 1540 Ha (in 2005) of crops under irrigation, including citrus, wine and table grapes, stone fruit and nuts, under family and corporate ownership.

In 1999, in the face of rapidly expanding horticulture and increasing salt loads to the river from historic and current clearing and irrigation practices, and flood plain degradation, the Bookpurnong to Lock 4 Environmental Association, with the support of the Loxton to Bookpurnong LAP and NHT funding, developed the Bookpurnong Lock 4 Land and Water Management Plan.

The plan was one of the first such plans produced in South Australia. It outlined a series of strategies, namely improved on-farm irrigation practices and a salt interception scheme, to achieve a benchmark of 85% water efficiency and the long term sustainability of the land, water and riverine ecology, and further irrigation development and prosperity within the region.

Key outcomes from the Bookpurnong Lock 4 Land and Water Management Planning process include:

- the investigation, design and construction of the Bookpurnong SIS. The SIS is now operational and is successfully preventing saline groundwater flow to river.
- on-farm trials for best practice irrigation have commenced with approximately 80% of the district area included in the trial. Results have been presented for 2005/06 and 2006/07;
- floodplain vegetation watering trials have occurred on Clarks Floodplain, and
- the development of an MOU between the BL4EA and various State Government Agencies, as well as the Minister for the River Murray.

In recent years a number of institutional, regulatory and policy changes have prompted a sharper focus on the Land and Water Management Planning process, namely:

- The appointment of a Minister for the River Murray in recognition of its importance to South Australia
- The establishment of the SA MDB NRM Board with a wider and more integrated focus than the previous Catchment Water Management Board
- The development and implementation of salinity zoning policy
- The development of Land and Water Management Planning Guidelines
- Significantly reduced inflows to the River Murray resulting in unprecedented pressure on irrigators, water and other natural resources
- renewed interest by community groups to actively participate in the management of their local resources

It is against this backdrop that the now Berri Barmera and Loxton to Bookpurnong Local Action Planning Committee (BBLAP) have sought to review and update the BL4 LWMP to the Land and Water Management Planning Guidelines standard.

Australian Water Environments (AWE) has been engaged by the SA Murray Darling Basin Natural Resources Management Board (SAMDBNRMB), on behalf of the LBLAP, which is supported by the Department of Water, Land and Biodiversity Conservation (DWLBC) and the National Action Plan for Salinity and Water Quality (NAP).

The engagement of AWE followed a tender and assessment process that involved:

1. Seeking final approvals for the project, finalising documentation and confirming the tender process.
2. Initiate calls for tenders, with an open call for 3 weeks.
3. Upon closure of the tender call, the tenders were evaluated by Project Management Committee and a successful consultant selected.
4. The Project Management Committee then formally engaged the consultant and work began on the project.

As the preceding backdrop attests, the LWMP Upgrade is being undertaken during a time when there will be difficulties in balancing the competing demands of industry and the environment. However, experience has shown that the BL4 community has been willing to take a proactive stance and develop solutions to issues within their district.

1.2 Project appreciation

As noted above, the purpose of the project is to upgrade the Bookpurnong Lock 4 Land and Water Management Plan to the Land and Water Management Guidelines standard.

The scope of the project includes, but is not limited to the following activities (adapted from the project brief):

- Perform a site inspection(s) of the Bookpurnong region and participate in an inception meeting aimed at defining the key issues within the Bookpurnong Region;
- Undertake document reviews to indicate key data gaps and areas requiring further technical investigation within the region and present findings in a summary report which the PMC can evaluate for relevancy and accuracy.
- Undertake community consultation sessions aimed at capturing community desires and expectations in relation to all issues relevant to the LWMP in line with “the Guidelines”. This will also encompass formalised asset/threat determination sessions in line with the suggested methodology outlined in the Guidelines;
- Have ongoing engagement with other key agency based stakeholders (as facilitated by the RLWMP at the agreed PMC meeting dates), for the purpose of adequately perceiving what the current Natural Resource Management arrangements and agreements that are in place between the Bookpurnong community and the various State Government agencies mean for the Bookpurnong region.
- Develop key defined actions derived from technical review, all stakeholder consultation and community asset/threat determination into cost/benefit analysed options for the LWMP’s investment proposal. All proposed options should be costed out for implementation and be listed as components of the suggested 6 year work plan, key technical investigations to develop these objectives will need to have been formulated to enable these options to be subsequently developed;
- Following on from the previous point, develop a 6 year workplan which captures all of the key agreed objectives flowing from the net outputs of the LWMP into a comprehensive work plan which can be used as a prospectus for targeted action/investment;
- Provide the community and key stakeholders with a summary of outcomes from each workshop;
- Develop and present a first and final draft LWMP for the review of the PMC and the Bookpurnong community and integrate recommended amendments as stipulated by the PMC in agreeance with the relevant consultancy;
- Prepare a report that describes the process undertaken in the development of the LWMP including lessons learnt and recommendations for the development of subsequent LWMP documents;

-
- Finalise and publish the LWMP to an acceptable standard, i.e. professionally composed, printed and bound.

1.3 Progress to date

The project commenced in June 2008 with a project inception meeting in Berri. Since then, AWE has undertaken initial consultation with the Project Steering Committee, a site visit, and completed a literature review.

This has resulted in the identification of key natural resource management issues and has also identified key data gaps and areas requiring further investigation. The approach to consultation with key stakeholders and the community has also been confirmed.

1.4 Purpose of this report

This report includes:

- Consultation outcomes to date, including approach for key stakeholder and community consultation
 - A summary of the literature review
 - A summary of identified data gaps and areas requiring further investigation
 - A summary of identified key NRM issues
 - Proposed structure of the Land and Water Management Plan
 - Actions for the development of the Draft Land and Water Management Plan
-

2. Consultation

2.1 Project inception meeting

A project inception meeting was held at the SAMDBNRMB Board Room in Berri and was attended by Alison Cusack and Ian Cogdell from the Project Team, and the Project Steering Committee. At this meeting the project scope was discussed and confirmed, subject to further discussions with the Project Steering Committee at the Initial Workshop, during which the scope of consultation would be discussed and confirmed. Additional reference material was provided to the Project Team.

2.2 Site inspection

AWE staff (Geoffrey White and Nick Watkins), along with Jeremy Nelson (SAMDBNRMB) and Leah Sullivan (LAP) inspected the Bookpurnong Lock 4 area on 11/7/08 to re-familiarise themselves with the region and observe any recent changes to land use. It was also an opportunity to observe some of the better known issues in the region and engage in general discussion with some of the committee members.

The following is a summary of the issues observed and/or discussed:

- the Bookpurnong Lock 4 area has a variety of enterprises at the forefront of the industry, including Westerns Table Grapes, Ingys Citrus, Schwartz Quandongs, Gurra Downs Date Palms, Brands Stone Fruit, Solara Citrus, CT Farms and Salena Estate as well as other lesser known but equally advanced smaller operations.
- the Gurra Gurra lakes are owned privately;
- the salinity of the Gurra Gurra lakes is increasing.
- previous investigations indicate that there is saline groundwater entering the Gurra Gurra Lakes from the south eastern corner.
- there have been investigations into cutting off the lakes from the river to save evaporative losses (it is estimated that about 10.5GL could be saved) however concerns about acid sulphate soils have seen this idea abandoned for now.
- it was suggested that there might be an opportunity to expand the Bookpurnong SIS to this area, given power and pipeline proximity. Instream benefits will be harder to quantify.

-
- there are several different management options for the Gurra Gurra Lakes system, which will need to consider all users. A facilitator may be needed to balance these interests.
 - seepage and erosion were observable at Goldmine Cliffs.
 - there are problems with aluminium clogging in SIS bores near Goldmine Cliffs.
 - there have been plans developed to disconnect the Ajax Achilles Wetland from the main river channel to save water from evaporation.
 - this would mean that the Brand/Size pump station would need to be shifted and also be used to supply the nearby residents. Issues surrounding this option include securing funding, potential acid sulphate soils, management of pumps, fertigation, vegetation health etc.
 - the Bookpurnong SIS should restrict the amount of salt that enters the Ajax Achilles wetland.
 - inspected a MIS-managed citrus block which differs from other family/smaller company run operations nearby in that they have greater buying power for purchasing water and other inputs, can utilise economies of scale and have operated under different taxation laws in the past.
 - the block is now almost fully under drip, but no real water savings yet due to change over period and tree adjustment.
 - observed the impacts of water restrictions at the MIS-managed enterprise, i.e. water having to be bought in last year and this year to maintain yield and market share, shedding some staff, taking out some product lines.
 - the pumping sheds near the river have been vandalised.

2.3 Steering Committee Workshop – Strategic Planning

A strategic planning workshop was held on the 22nd July 2008 at the SAMDBNRMB Board Room in Berri.

The objective of the workshop was to enable the project Steering Committee to obtain a shared understanding of the current reality and drivers of change within the community. The committee were then able to develop a process for consulting with and engaging the community that will result in a new plan that provides a working document for taking timely action.

The agenda for the meeting is included in Table 2.1. The minutes from this meeting are included in Appendix A.

Table 2.1: Strategic Planning Workshop Agenda

10.00am	Aims and Outcomes of Workshop	Steve Clark, Chairman
10.05am	Revisiting the Dynamic Strategy Model	Ian Cogdell, Facilitator
10.15am	Developing a Shared Understanding of the Context	Ian Cogdell, Facilitator
	<i>Session Objectives: To identify the three or four key drivers of change that need to be incorporated into the development of the upgraded Plan under four headings: environmental, economic, social and market impact</i>	
11.00am	Describing the Current Reality	Ian Cogdell, Facilitator
	<i>Session Objectives: To agree on the present state of implementation of the Plan under the same four headings: environmental, economic, social and market, and identify the obstacles to taking action including community values (attitudes) and capabilities (know-how and infrastructure)</i>	
12.00pm	Identifying the Key Stakeholders and Identifying their Needs and Expectations	Ian Cogdell, Facilitator
	<i>Session Objectives: To identify the key Stakeholders in the Plan that we need to get buy in from, both inside and outside the community and identifying the value they expect and need from the Plan</i>	
12.30pm	Lunch	
1.00pm	Developing the Structure of the Plan	Alison Cusack, Facilitator
	<i>Session Objectives: To develop the key headings of the Plan that will inform the community consultation process</i>	
2.00pm	Building the Community Consultation Skills	Ian Cogdell, Facilitator
	<i>Session Objectives: To develop a basic skill set that will enable the Committee members to engage the community members in the consultation process for upgrading the Plan</i>	
3.30pm	Agreeing the Community Consultation Process	Ian Cogdell, Facilitator
	<i>Session Objectives: To put a community consultation plan in place that the Committee members can implement</i>	
3.50pm	Agreeing Support and Next Steps	Steve Clark, Chairman
4.00pm	Workshop Close	

2.4 Consultation Process

A consultation process was developed during the strategic workshop to make sure that the LWMP identified all stakeholders and incorporated their requirements. The aim is for wide community ownership of the plan so the future actions are supported by the community.

Primary Stakeholders

Irrigators – Those within the BL4EA area.

Residents - Those within the BL4EA area.

Secondary Stakeholders

DWLBC – primary contact is Renee Webster, but DWLBC directors and Minister are stakeholders.

SAMDBNRMB - primary contact is Jeremy Nelson, but SAMDBNRMB Board Members, General Manager and Minister are stakeholders

Other Stakeholders

- Local Action Planning (LAP) groups
- MDBC
- Local Government
- Political Lobbyists
- PIRSA/CSIRO
- Industry
- Research and Development
- Consumers
- LWMP Committees
- EPA

The stakeholder consultation is proposed for Week 6 of the project. Steering Committee members will undertake the consultation of the Primary and Secondary Stakeholders based on a prompt sheet developed by AWE and using skills developed during the July Strategic Workshop. The prompt sheet is included in Appendix B.

3. Literature Review

A range of documents have been reviewed to contribute to the Upgrade of the Bookpurnong Lock 4 Land and Water Management Plan (LWMP).

The purpose of the literature review is to form a complete view of the NRM issues within the Bookpurnong region and indicate key data gaps and areas requiring further technical investigation within the region. The key NRM issues pertinent to the Bookpurnong Lock 4 region are summarised in Table 3.3.1 and Table 3.3.2.

Table 3.3.1: Literature Review Summary – Policy Documents.

Ref No.	Resource Title	Citation	Reviewer and Date	Key Information Contained within Document
A1	1999 Bookpurnong to Lock 4 Preliminary LWMP	AWE (1999)	GJW 16/7/08	This is a summary document of the 1999 Bookpurnong to Lock 4 Preliminary LWMP – Background Report and Appendices (see A2).
A2	1999 Bookpurnong to Lock 4 Preliminary LWMP – Background Report and Appendices	AWE (1999)	AW 26/06/08	Identifies the issues facing the Bookpurnong irrigation district – i.e. rapidly expanding irrigated horticulture, increasing salt loads to the river from historic and current clearing and irrigation practices, and flood plain degradation – and outlines a series of strategies to address these issues, namely improved on-farm irrigation practices to achieve a benchmark of 85% water efficiency and a salt interception scheme – to achieve the long term sustainability of the land, water and riverine ecology, and further irrigation development and prosperity within the region.
A3	Upgrade(s) of Land and Water Management Plans in the SA Murray Darling Basin (note: with reference particularly to the Bookpurnong region’s LWMP)	RMCG Consulting 2005	AW 1/7/08	<p>A review of the preliminary Land and Water Management Plans against the ‘Preparation of Land and Water Management Plans in the South Australian Murray Darling Basin’ (the Guidelines) to identify gaps in data, content and/or process for the four priority areas – Bookpurnong to Lock 4, Pike River, Murtho and Taylorville North. The review, which entailed a desktop review of the LWMPs and stakeholder interviews, concluded that all 4 LWMPs do not meet the Guidelines and need updating/upgrading accordingly, with particular regard to the following principles:</p> <ul style="list-style-type: none"> ○ Community consultation and participation through all stages of the upgrade. ○ Input on technical issues at a regional level through the Board and DWLBC to ensure that decisions are based on latest research findings; ○ Clarity on the role of the LWMPs within the context of the WAP, licensing, the proposed district Codes of Practice and wider initiatives at a LAP, INRM and statewide level; ○ Certainty as to State Government commitment to implementing the LWMPs; and ○ Identifying steps to access funding through the Regional Investment Strategy. <p>Phase 2 of the project is the upgrade the Bookpurnong to Lock 4 LWMP plan in conjunction with the Bookpurnong Lock 4 Environmental Association and other partner organisations to the standards identified in the Guidelines – i.e. this project.</p>
A4	Guidelines for Land and Water Management Plans in the SA Murray Darling Basin. Partnerships for Sustainable Development.	Marsden Jacob Associates March 2004	GJW 26/6/08	<p>Outlines the process for developing a LWMP. Process is summarised as:</p> <ul style="list-style-type: none"> A. Starting out <ul style="list-style-type: none"> 1. Getting Support 2. Building the LWMP Groups 3. Scoping the Plan B. B. Setting the Scene

Ref No.	Resource Title	Citation	Reviewer and Date	Key Information Contained within Document
				<ol style="list-style-type: none"> 1. Gather and Assess Data, establish the Context. 2. 2. Confirm the areas Assets and Threats 3. 3. Develop the No-Plan Scenario <p>C. Developing the Plan</p> <ol style="list-style-type: none"> 1. Set Initial Targets 2. Generate Options for Addressing Priority Risks 3. 3. Evaluate and Prioritise Options 4. Revise Targets and Agree on the Work Program <p>D. Implementing the Plan</p> <ol style="list-style-type: none"> 1. Maintain the Active Group 2. Manage the Implementation of Programs 3. Seek Funding 4. Manage Licensing <p>E. Monitoring and Reviewing the Plan</p>
A5	Bookpurnong to Lock 4 Environmental Association's Strategic Development Plan	Bookpurnong Lock 4 Environmental Association (May 2006)	AW 1/7/08	Prioritises all the development projects identified by the Bookpurnong to Lock 4 Land and Water Management Plan under 7 main groupings – floodplains, face zone, irrigated properties, dryland, innovative production techniques, community capacity building and economic advances. Outlines possible actions, as well as partners, funding sources, cost and the person responsible for each development project.
A6	South Australia's Strategic Plan	Government of South Australia (January 2007)	AW 26/06/08	<p>Provides direction on the economic and social development of the state under 6 key interrelated objectives:</p> <ul style="list-style-type: none"> o Growing prosperity o Improving wellbeing o Attaining sustainability o Fostering creativity and innovation o Building communities, and o Expanding opportunity <p>The Plan has 98 targets including the following: T1.14 TARGET – Total exports treble the value of South Australia's export income to \$25 billion by 2014. T3.9 TARGET Sustainable water supply – South Australia's water resources are managed within sustainable limits by 2018. T3.10 TARGET River Murray – flows - increase environmental flows by 500GL in the River</p>

Ref No.	Resource Title	Citation	Reviewer and Date	Key Information Contained within Document
				<p>Murray by 2009 as a first step towards improving sustainability in the Murray-Darling Basin, with a longer-term target of 1500 GL by 2018.</p> <p>T3.11 TARGET River Murray – salinity –South Australia maintains a positive balance on the Murray-Darling Basin Commission salinity register.</p> <p>T5.9 TARGET Regional population levels (maintain regional South Australia’s share of the state’s population (18%).</p>
A7	State NRM Plan	Natural Resources Management Council (February 2006).	AW 26/06/08	<p>Identifies a 50-year vision for NRM in South Australia, and sets out policies, milestones and strategies to achieve that vision under 4 main goals:</p> <ul style="list-style-type: none"> ○ Landscape scale management that maintains healthy natural systems and is adaptive to climate change ○ Prosperous communities and industries using and managing natural resources within ecologically sustainable limits ○ Communities, governments and industries with the capability, commitment and connections to manage natural resources in an integrated way ○ Integrated management of biological threats to minimise risks to natural systems, communities and industry and coastal waters.
A8	The Water Allocation Plan for the River Murray	River Murray Catchment Water Management Board (July 2002)	AW 26/06/08	<p>Provides the legal policy framework for the allocation, use and transfer of River Murray water within the prescribed watercourse of the River Murray, from the Victorian Border to the edge of Lakes Alexandrina and Albert and portions of Currency Creek the Finnis River and the Angas and Bremer Rivers. Specifically, the WAP identifies:</p> <ul style="list-style-type: none"> ○ the capacity of the resource to meet demand; ○ the water requirements to sustain water dependant ecosystems; ○ the effect of River Murray water use in other regions outside of the prescribed area; ○ how water will be allocated; ○ rules for how and where water can be transferred or traded; ○ water affecting activities that will require a permit to undertake the activity in question, and ○ monitoring and reporting requirements. ○ identifies the maximum volume of water that can be allocated per year for various uses (and provides for this volume to be adjusted as a consequence of intra and interstate water trade) ○ identifies irrigation management zones and the key management issues within each zone including managing the impacts of irrigation and drainage in the River Murray Irrigation

Ref No.	Resource Title	Citation	Reviewer and Date	Key Information Contained within Document
				<p>Management Zone</p> <ul style="list-style-type: none"> ○ puts into operation the key salinity management policies in the South Australian River Murray Salinity Strategy 2002-2015 including irrigators salinity obligations for pre-and post- 1988 irrigation developments ○ sets targets for the efficient use of water the efficient use of water for irrigation purposes ○ provides a specific water allocation for wetland management purposes.
A9	BL4EA – Memorandum of Understanding Sept 2004	BL4EA, LBLAPSAM,DB NRMB, DWLBC, SA Government	GJW 16/7/08	<p>Establishes a framework that provides an integrated and cooperative approach between key stakeholders to implement on-ground actions and achieve outcomes that meet the strategic objectives at the state, catchment and local district level. Specifically, it provides a framework for the BL4EA to upgrade the existing preliminary LWMP for the area and implement on-ground actions as part of the Bookpurnong Lock 4 Resource Management Case Study project, through the support and guidance of the BL4EA.</p> <p>Importantly, the MOU identifies that it is essential that the BL4EA Resource Management Case Study is integrated with projects such as drainage management, operation and capacity of the salt interception scheme, policy, environmental flows, Water Allocation Plan salinity obligations and annual reporting, and Land and Water Management planning.</p>
A10	Lower Murray Landscape Futures Final Report. Volume 4 of 5. Analysis of Regional Plans and Landscape Futures for the River Corridor.	Connor et al, 2008	GJW 10/7/08	<p>The futures project was designed to demonstrate how informed evidence based policy choices can be made in a region despite the challenges of attributing environmental outcomes to NRM agency policies and investments. This report focussed on the river corridor. Various scenarios were modelled for Climate Futures and NRM Futures:</p> <p><u>Climate</u></p> <ul style="list-style-type: none"> ○ Baseline climate conditions ○ Mild climate change ○ Moderate Climate Change ○ Severe Climate Change <p><u>NRM</u></p> <ul style="list-style-type: none"> ○ Current Policy ○ Low impact location policy ○ Irrigation efficiency policy <p>With specific relevance to the Bookpurnong LWMP area is:</p> <ul style="list-style-type: none"> ○ Inflows to the MDB are likely to reduce at 2.5 times the rate of reduction in rainfall. This is likely to result in more variability in allocation levels and water price rises. ○ Increase pricing will result in improved irrigation efficiency in the absence of other policy

Ref No.	Resource Title	Citation	Reviewer and Date	Key Information Contained within Document
				<p>measures.</p> <ul style="list-style-type: none">○ A reduction in drainage is likely.○ Benefit cost analysis suggests that there will be significant opportunities to improve irrigation efficiency and the location of irrigation in the future. <p>The futures modelling also showed that the salinity issues in the Lower Murray cannot be managed without focus on basin scale water allocation policy as well as regional land and water management.</p>

Table 3.3.2: Literature Review Summary – Technical Documents.

Ref No.	Resource Title	Citation	Reviewer and Date	Key Information Contained within Document
B1	Draft Bookpurnong Land and Water Management Planning Background Report	Webster, R and Barnett, S (May 2008)	GJW 26/6/08	Provides a brief overview of the hydrogeology and investigations that have occurred in the Bookpurnong LWMP area. The reviewed document was a draft and was incomplete. The document highlighted some areas where further work may be required. Also provided a summary of the regions annual water use (based on 79% of land) and the water policy framework for the region.
B2	LWMP Guidelines – LWMP Compliance with Annexes B, C and D data requirements	Unpublished document by Jeremy Nelson, SA MDB NRM Board	GJW 8/7/08	This document provides a set of guidelines regarding issues/questions that need to be addressed in developing a LWMP in the SAMDB. The guidelines address the: <ul style="list-style-type: none"> ○ Base Hydrogeological Data requirements ○ Base Primary Production Data requirements ○ Base socio economic data requirements
B3	Technical Support to BL4EA LWMP Case Study Summary (2005 – 2006)	Rural Solutions SA	GJW 8/7/08	This document is the printout of a presentation that provides a summary of the water use and efficiency data for the BL4EA area for different properties and crop types. It also makes comparisons with previous records. There is also a summary of other actions associated with the Case Study project and actions for the future.
B4	Technical Support to BL4EA LWMP Case Study Summary (2006-2007)	Rural Solutions SA		This document is the printout of a presentation that provides a summary of the water use and efficiency data for the BL4EA area for different properties and crop types. It also makes comparisons with previous records.
B5	A Guide to Climate Change and Adaptation in Agriculture in South Australia	Rebbeck, M, Dwyer, E, Bartetzko, M and Williams, A (February 2007)	GJW 9/8/08	This guide provides a systematic approach to managing the risk of climate change to agriculture. The report also provides some simplified background on <ul style="list-style-type: none"> ○ Greenhouse emissions ○ Climate change trends ○ Climate change projections ○ Climate change impacts on agriculture ○ Climate change mitigation and adaptation in agriculture With specific relevance to the Bookpurnong LWMP area is (from reference #6): <ul style="list-style-type: none"> ○ Temperatures have increased by approx 0.2 degree per decade since 1950. ○ The autumn rainfall has decreased for all arable areas in SA and winter rainfall has decreased in the western half of SA. Spring rainfall has increased slightly since 1950. ○ Evaporation has shown annual increasing trend ○ By 2030, the annual temperature increases between 0.5 and 1.3°C, summer warms by 0.5 to

Ref No.	Resource Title	Citation	Reviewer and Date	Key Information Contained within Document
				<p>1.5°C, autumn warms by 0.5 to 1.3°C, winter warms by 0.4 to 1.3°C and spring warms by 0.5 to 1.4°C. By 2070, the annual temperature increases between 1.0 and 4.0°C, summer warms by 1.1 to 4.7°C, autumn warms by 1.0 to 3.9°C, winter warms by 0.8 to 3.8°C and spring warms by 1.0 to 4.4°C. The annual rainfall shows changes of -8 to 0% by 2030 and -25 to +1% by 2070. Spring shows a strong decrease, while other seasons show moderate decreases. CO2 stabilisation scenarios give reduced warming and smaller rainfall changes.</p> <ul style="list-style-type: none"> ○ Beare and Heaney (2002) predicted that there were slight to moderate reductions in water availability for dryland agriculture and moderate to substantial reductions in surface water flows in the MDB (10–25% by 2050, 16–48% by 2100). The economic analysis showed costs to agriculture of \$0.7–1.2 billion by 2100, but adaptation strategies, such as improvements in water use efficiency or water trading, had the potential to reduce the costs by almost 60%. <p>Suggestions on how to adapt horticultural enterprises to climate change in the short term, taking into account potential climate variability and extremes are:</p> <ul style="list-style-type: none"> ○ Consider changing to varieties best suited to predicted conditions. ○ Monitor soil water conditions and improve the timeliness and quantity of irrigation. ○ Adjust systems to more drought tolerant, and heat stress tolerant species. ○ Adopt flexible, integrated pest management approaches as changing conditions may increasingly favour invasive species. ○ As irrigation demands increase in warmer weather, ensure irrigation systems optimise water use and reduce losses to the water table, to surface run-off, and evaporation. ○ Consider increased shade cover to reduce evaporation. ○ Consider other forms of enterprise, such as broad-acre cropping or intensive animal keeping, that may be more suited to the location.
B6	Application of Airborne Geophysical Techniques to Salinity Issues in the Riverland, South Australia	Munday, T, Walker, G and Liddicoat, C (December 2004)	GJW 9/7/08	<p>This report provides a summary of the Helicopter Electromagnetic Survey that was completed in the Riverland. The report also documents the interpretations that have been made from the data and further work that has occurred based on the interpretations.</p> <p>With specific relevance to the Bookpurnong LWMP area is:</p> <ul style="list-style-type: none"> ○ A detailed map of the Blanchetown Clay distribution and thickness was produced. ○ Improved recharge estimates based on the BC mapping and field data collection have been incorporated into the local groundwater models to improve future predictions of salt loads to the river. Models updated are Riverland MODFLOW Model, SIMRAT Floodplain ImPacts Model (FIP)

Ref No.	Resource Title	Citation	Reviewer and Date	Key Information Contained within Document
				<ul style="list-style-type: none"> ○ Further information regarding the Loxton Parilla Sands has meant that the information gleaned from drilling can be interpolated to surrounding areas.
B7	Bookpurnong/Lock4 Hydrogeological Investigations	AWE, Jan 2000 to Sept 2002	GJW 9/7/08	<p>This report provides a summary of the technical investigations (excluding land based geophysics) that took place following the acceptance of the Preliminary LWMP.</p> <ul style="list-style-type: none"> ○ The investigations included: <ul style="list-style-type: none"> ○ Highland and floodplain drilling ○ Drainage bore assessment ○ Groundwater monitoring and assessment (including levels, chemistry, river/aquifer interactions etc) ○ Downhole geophysical logging of selected holes ○ Aquifer testing <p>The investigations led to a detailed description and illustration of the geologic units encountered at Bookpurnong as well as a hydrogeological model that describes the relationships between the aquifers and aquitards in the region.</p>
B8	Bookpurnong and Loxton Salt Interception Schemes Joint Works/State Action Approval Submission to the MDBC	DWLBC, Feb 2003	GJW 9/7/08	<p>Following the development of the LWMP, the SIS investigations were taken over by the state government who oversaw the development of the Approval Submission for the combined Bookpurnong and Loxton SISs to the MDBC. The approval submission outlined the investigations that had already occurred, presented a notional borefield and pipeline design, provided an economic analysis of the scheme.</p>
B9	Various Aquifer Testing reports	AWE, 2003	GJW 9/7/08	<p>Following the approval of the Bookpurnong SIS, various aquifer testing investigations were completed to enable further quantification of aquifer parameters to be made. These reports summarise the results of these testing programs.</p>
B10	Borefield Design (includes associated data folder)	AWE, 2004-2006	GJW 9/7/08	<p>This is a compendium of reports that summarise the investigations leading to the final design of the Bookpurnong SIS. The investigations include drilling and aquifer testing on the highland and floodplain as well as the final design documentation of borefield location and pump and pipeline size selection. The associated data folders include all data collected during the investigation, design, and construction phases.</p>
B11	Investigation into the precipitation of Aluminium-hydroxide during pumping bores at Bookpurnong (Westerns Highland Site) in	DWLBC, 2004	GJW 9/7/08	<p>Following observations of clogging in BHP1 on Westerns Floodplain due to a white Aluminium Hydroxide precipitate, DWLBC conducted investigations in an attempt to determine the hydrochemical conditions and processes leading to the formation of the white precipitate.</p> <p>This report summarises the testing conducted and provides a hypothesis for the method of</p>

Ref No.	Resource Title	Citation	Reviewer and Date	Key Information Contained within Document
	relation to groundwater quality in the Loxton Sands Aquifer			formation.
B12	Bookpurnong Floodplain Living Murray Pilot Project	AWE, 2005	GJW 9/7/08	<p>This report provides concept designs and data requirements for a Pilot Study of the Living Murray program at Bookpurnong.</p> <p>The Pilot Project at Bookpurnong is designed to collect empirical data to underpin vegetation management strategies along the River Murray and elsewhere. The focus is on setting up and testing hypotheses relating to water manipulation, soil water salinity and tree health, with the aim of reporting these in a manner which facilitates knowledge transfer.</p>
B13	Gurra Gurra Wetland Management Plan	Wetland Care Australia, 1999	GJW 16/7/08	<p>This report provides a background to the habitat values, wetland hydrology, changes in vegetation, grazing pressure, pests, and outlines general management issues and options. An action is also presented with priorities and a monitoring plan for ongoing management. All up 26 priority works are presented with technical aspects and some costings.</p>
B14	Gurra Gurra Wetland Management Plan – Hydrogeological Assessment and Salt and Water Balance Study	AWE, 2001	GJW 16/7/08	<p>In the Management Plan, various works were proposed to alter the operating conditions of the Gurra Gurra Wetland. One of the major proposed changes was to alter the flood frequency and duration to address concerns regarding vegetation health, salt build up on the floodplains and increasing salinity in the creeks and lakes. This report documents the knowledge base at the time, summarises investigations that occurred during the project and documents the methodology and results of salt and water balance modelling that occurred.</p>
B15	Wetlands Baseline Survey (relevant chapters as supplied by SAMDBNRMB)	SKM, ****	GJW 16/7/08	<p>This report summarises baseline water quality, vegetation, macro-invertebrate, birds, frogs and fish data for the Gurra Gurra Wetland, Ajax Achilles and Clarks Sandbar amongst others. The report also summarise implications of the data presented for ongoing management and makes recommendations for ongoing monitoring.</p>
B16	Lyrup Forest Reserve Environmental Management Project: Project Brief	Robertson & Reilly, 2006	GJW 17/7/08	<p>The purpose of this Project Brief is to outline the status of the floodplains and wetlands in the Lyrup Forest Reserve, and to describe the ongoing threats to the ecosystem and outline ongoing management strategies.</p>
B17	The Bookpurnong Pilot Project (MDBC Project: I31); Living Murray Environmental Works and Measures Program Progress Report 2007/08	DWLBC, 2008	GJW 17/7/08	<p>This report details progress made on the Bookpurnong Pilot Project by the Knowledge & Information Division from DWLBC for the 2007/08 reporting year. The report details the following:</p> <ul style="list-style-type: none"> o Groundwater Monitoring (at sites A, B & D). o Geophysics (at sites A & B) o Soil Monitoring (at sites A, B & D) o Ecological Monitoring (at sites A, B & D)

Ref No.	Resource Title	Citation	Reviewer and Date	Key Information Contained within Document
B18	Information paper on environmental and management issues associated with drying and partial drying of subaqueous acid sulfate soils in Gurra Gurra Lakes	Fitzpatrick, R., Merry, R., Shand, P., and Hicks, W., 2008	GJW 30/7/08	<ul style="list-style-type: none"> ○ Final investigations of Site E & reporting <p>This report documents the findings of investigations relating to acid sulphate soils in the Gurra Gurra Lakes area. These investigations were undertaken to provide information on the likely ASS development should the Gurra Gurra Lakes be isolated from the main river channel and allowed to dry. Overall the ASS hazard risk was stated to range from moderate to severe. It is estimated that up to 1,500 tonnes of sulphuric acid will be produced in the soil if the lake were allowed to evaporate and dry-out. The amount of lime (calcium carbonate) needed to neutralise potential acid production has been estimated at about 2,300 tonnes (including a standard 50% safety factor).</p> <p>Field and laboratory tests indicate that acidification is unlikely to be a serious problem if the lakes are not dried completely (e.g. approximately 5 cm of water is maintained on the surface of the lakes).</p>

4. Data Gaps/Recommendations

The data gaps and areas requiring further investigation (as stated in each report) are summarised in Table 3.4.1. This table is not intended to be a comprehensive list of all the technical investigations required in the region. Rather, it should be viewed as a supplement to the further work identified in the BL4EA Strategic Development Plan. The BL4EA Strategic Development Plan highlights the areas where work may be required, but does not outline specific work plans or data gaps that need to be addressed to achieve the targets.

No attempt has been made to document the work plan for each BL4EA target in this document.

It should be noted that some of the data gaps / recommendations identified in each report may have subsequently been addressed. It is also likely that further issues will be identified as the consultation process occurs as part of this LWMP upgrade.

Other projects that may be considered include:

- Further reporting on irrigation efficiency projects and highlight where further improvements may be made i.e. expand the case study project;
- Develop business case for Ajax Achilles (i.e. identify process, actions and costings, develop action plan and identify funding sources and who will do it) (Note: this is subject to review of Ajax Achilles report).
- Undertake scoping study into the management of drainage water. The study should include options drainage water reuse and or redirection;
- Define extent of Face Zone management issues and develop action plan to address these issues. (from BL4EA Strategic Document)
- Opportunity for developing business case for involvement in Gurra Lakes South floodplain management (from BL4EA Strategic Document) – or wait until after LWMP completed?
- ASR scheme for drainage water / excess water in high allocation years for use in low allocation years;

Table 3.4.1: Data gaps identified in each report

Ref No.	Resource Title	Citation	Reviewer and Date	Data Gaps/Further Work Identified
A2	1999 Bookpurnong to Lock 4 Preliminary LWMP – Background Report and Appendices	AWE (1999)	AW 26/06/08	<p>Continue to improve irrigation efficiency and:</p> <ul style="list-style-type: none"> ○ collect and report on water use and other relevant data ○ form peer groups for similar water users ○ produce annual reports for various audiences ○ initiate on-farm works to improve efficiency and economic return. <p>Intercept saline groundwater before it reaches the river by:</p> <ul style="list-style-type: none"> ○ installing a curtain of pumping bores adjacent to the river and pumping the saline groundwater to the Noora evaporation basin. <p>Alleviate drainage problems by:</p> <ul style="list-style-type: none"> ○ Installing subsurface drains and/or drainage bores.
A3	Upgrade(s) of Land and Water Management Plans in the SA Murray Darling Basin (note: with reference particularly to the Bookpurnong region’s LWMP)	RMCG Consulting 2005	AW 1/7/08	<p>Actions to upgrade the LWMP:</p> <ul style="list-style-type: none"> ○ Undertake a revised assessment of the outstanding issues and options; ○ develop a project plan; ○ Description of the production and social factors impacted by the plan including history and trends; ○ Establish linkages between the LAP, RMCWMP, WAP and state and national strategies; ○ Description of assets (extent, trend, condition, and value); ○ Establish the no plan scenario including impacts on agriculture, infrastructure, regional economic impacts and provide brief description of the plan; ○ Where appropriate, the targets of the plan should align with the National Framework; ○ Targets for implementation should be included in the plan; ○ Develop a database of options for the evaluation by the community; ○ Ensure processes used in the upgrade of the plan enable Community to participate in key decisions eg setting priorities, evaluation of options; ○ Develop a monitoring and reporting program.
A5	Bookpurnong to Lock 4 Environmental Association’s Strategic Development Plan	BL4EA, (May 2006)	GJW 8/8/08	<p>A detailed project list with partners and responsibilities is identified in this document. However, the detail surrounding each project and specific scope of work for each is not documented. The list is included in Appendix C.</p>
B1	Draft Bookpurnong Land and Water Management Planning Background Report	Webster, R and Barnett, S (May 2008)	GJW 26/6/08	<ul style="list-style-type: none"> ○ Investigate the extent to which current crops are affected by perched watertables in the Bookpurnong region (as opposed to build up of salt in the root zone from lack of leaching irrigation)

Ref No.	Resource Title	Citation	Reviewer and Date	Data Gaps/Further Work Identified
				<ul style="list-style-type: none"> ○ Determine the future of the Clarks Floodplain (Living Murray) Project and any ongoing assistance the BL4EA committee may be able to provide or any additional work the committee may be able to instigate. ○ Investigate opportunities to improve modelling of salinity impacts beneath irrigation areas at Bookpurnong. ○ Investigate levels of trace elements in salt products obtained from the Murray Basin saline waters. ○ Obtain policy on access to SIS water for consideration of future projects. ○ Identify preferred uses of SIS water from the perspective of the BL4EA and provide a proposal for consideration. ○ Engage with policy officers from DWLBC in regard to the new separation of water rights system to determine what opportunities it may provide in Bookpurnong particularly in regard to site use approvals. ○ Engage with the review of the Water Allocation Plan for the River Murray Prescribed Water Resource through the WAP team at SAMDBNRMB.
B5	A Guide to Climate Change and Adaptation in Agriculture in South Australia	Rebbeck, M, Dwyer, E, Bartetzko, M and Williams, A (February 2007)	GJW 9/8/08	Recommendations provided to adapt to projected Climate Change include: <ul style="list-style-type: none"> ○ Reducing the risk by reducing greenhouse gas emissions ○ Adapting your enterprise to the new conditions ○ Applying innovative approaches that enable you to identify new opportunities in the projected changed environment. ○ Monitoring and Review!
B6	Application of Airborne Geophysical Techniques to Salinity Issues in the Riverland, South Australia	Munday, T, Walker, G and Liddicoat, C (December 2004)	GJW 9/7/08	<ul style="list-style-type: none"> ○ Further work should be conducted to better understand the distribution of floodplain soils, recharge during floods and salt discharge to the river. ○ Investigate application of current (HEM) data for improving soil maps in the Riverland. ○ Investigate drainage processes in the vicinity of existing strandlines to inform the siting of future irrigation developments.
B7	Bookpurnong/Lock4 Hydrogeological Investigations	AWE, Jan 2000 to Sept 2002	GJW 9/7/08	<ul style="list-style-type: none"> ○ Accurately quantify the volumes of irrigation drainage water currently being diverted to the Upper Loxton Sands aquifer and/or being reused on site. Investigate reuse of this water or directing to the SIS pipeline.
B12	Bookpurnong Floodplain Living Murray Pilot Project	AWE, 2005	GJW 9/7/08	<ul style="list-style-type: none"> ○ This report outlines a number of work programs that could be undertaken as part of a Pilot Study of the Living Murray at Bookpurnong.

Ref No.	Resource Title	Citation	Reviewer and Date	Data Gaps/Further Work Identified
				<ul style="list-style-type: none"> ○ The work completed is outlined in B17 ○ It is recommended (here) that the outcomes of the scopes of work that have been completed be reviewed and the outstanding work programs assessed to test relevance to BL4EA.
B14	<p>Curra Curra Wetland Management Plan – Hydrogeological Assessment and Salt and Water Balance Study</p>	AWE, 2001	GJW 16/7/08	<p>The following work was recommended:</p> <p>Drying trial of Winding Creek and southern Bookpurnong Lagoon.</p> <ul style="list-style-type: none"> ○ Regular salinity monitoring at various depths and locations, particularly adjacent to areas of high groundwater inflow and potential drying trials; ○ Groundwater monitoring using current piezometers. ○ Run of creek with depth and salinity measurement between and after flushing flows; ○ Flow monitoring at Lyrup and Tortoise Crossing. ○ Additional drilling to investigate variation in geology and connection to underlying aquifers. ○ Aquifer testing to determine parameters for groundwater flow to the floodplain. ○ Water chemistry analysis at various locations on the floodplain to assist with further assessment of connection to underlying aquifers ○ Investigation of the relationship between soils, morphology and vegetation health on the Curra floodplain.
B15	<p>Wetlands Baseline Survey (relevant chapters as supplied by SAMDBNRMB)</p>	SKM, ****	GJW 16/7/08	<p>Curra Curra</p> <p>Future management aimed at maximising flora and fauna diversity needs to focus on the maintaining or increasing the variety of habitats suitable for birds, fish, macro-invertebrates and frogs and consider ways of controlling the carp population. Ongoing monitoring should include the following biological and physical parameters:</p> <ul style="list-style-type: none"> ○ Groundwater: Long-term monitoring to assess improvements from regional programs and local management actions; ○ Vegetation: River Red Gum regeneration and increases in area of fringing vegetation; ○ Carp: Monitor carp populations and impacts on native fish. <p>Ajax Achilles</p> <p>Future management should be in line with the Ajax Achilles Management Strategy (AWE does not have a copy) that aims to introduce overbank flooding and allows periods of wetting and drying. Parameters that will need to be monitored are:</p> <ul style="list-style-type: none"> ○ Riparian and fringing vegetation: To assess impacts of flooding and drying and reduction in salt; ○ Fish: Monitor impact of water regime management on carp populations and recruitment; and,

Ref No.	Resource Title	Citation	Reviewer and Date	Data Gaps/Further Work Identified
				<ul style="list-style-type: none"> ○ Groundwater: Future monitoring at this site should include well EES1 and affect of the SIS on the wetland. <p>Clarks Sandbar Future management should be aimed at implementing a flow regime that decreases saline inflows to the wetland and improve flushing and increase overbank flooding events. Ongoing monitoring should include the following parameters:</p> <ul style="list-style-type: none"> ○ Water quality: to assess improvements in water quality as a result of salt reduction and flushing flows; ○ Groundwater: to clarify interactions between groundwater and surface water and to monitor salinity in groundwater; and ○ River Red Gum: to assess the impacts of watering on tree health and to map regeneration.
B16	Lyrup Forest Reserve Environmental Management Project: Project Brief	Robertson & Reilly, 2006	GJW 17/7/08	The key tasks identified for the Lyrup Forest Reserve project are: <ul style="list-style-type: none"> ○ Approach the organisations involved in the Pike-Murtho SIS to obtain information on how the SIS is likely to affect groundwater levels in Lyrup Forest Reserve and options for integration with LFR ○ Liaise with Lyrup Village Association to present project brief and gauge level of interest and support for the rehabilitation of the Lyrup Forest Reserve. ○ Obtain information on the potential use of existing Lyrup Village Association drainage infrastructure for environmental management at Lyrup Forest Reserve ○ Seek opportunities to undertake a Baseline Survey of the Lyrup Forest Reserve. ○ Continue to liaise with all relevant stakeholders and community groups regarding the current and future management of the Lyrup Forest Reserve, such as the Department of Environment and Heritage (DEH). ○ Seek ongoing political and financial support for the environmental management of Lyrup Forest Reserve from local, state and federal government departments, and other agencies. ○ Provide an outline of the minor works that are required to complete the existing on-ground works at Lyrup Forest Reserve (i.e. to remove barriers to flow). ○ Prepare a detailed Wetland Management Plan (or Floodplain Management Plan) for Lyrup Forest Reserve, which describes the environmental values of the wetlands and floodplain and describes specific management actions to implement at the site.
B18	Information paper on	Fitzpatrick, R.,	GJW	Recommends that the lakes not be allowed to become completely dry (e.g. approximately 5 cm

Ref No.	Resource Title	Citation	Reviewer and Date	Data Gaps/Further Work Identified
	environmental and management issues associated with drying and partial drying of subaqueous acid sulphate soils in Gurra Gurra Lakes	Merry, R., Shand, P., and Hicks, W., 2008	30/7/08	of water is maintained on the surface of the lakes). Consideration should be given to the long-term management of the lakes and it was suggested that a carefully controlled partial drying/wetting regime would help to mitigate future problems of ASS production.

5. Key Natural Resource Management Issues

The following key natural resource management issues have been identified from previous studies, initial consultation and from the literature review. They do not include NRM Issues as determined by the SAMDBNRM Board as part of their strategic planning.

- River health (including flow and salinity);
- Wetland / floodplain health (including drying of Ajax Achilles and Gurra Gurra wetlands, salinisation and flooding trials);
- Native vegetation revegetation on floodplain and dryland farms
- Acid sulphate soil potential and management;
- Feral pests and weeds;
- Irrigation drainage water;
- Irrigation efficiency;
- Level of trace elements in salt products obtained from the SIS;
- The risk of climate change due to greenhouse gas emissions and adapting of enterprises to account for these changes;
- Erosion on cliff face and dryland farms;
- Rubbish along river frontage;
- Aesthetic improvement /rationalisation of river side infrastructure;
- Vehicle impact on native vegetation and floodplain;
- Septic systems, and;
- Retaining and attracting personnel and external funding.

6. Proposed LWMP Structure

A draft report structure was presented to the Steering Committee and discussed at the Strategic Planning Workshop in July. The following reporting structure was agreed upon after discussion about the merits of the LWMP Guidelines. The Steering Committee felt that they have now moved beyond the process outlined in the LWMP guidelines and that they want to focus on developing the business plan component of the plan. The key elements of the guidelines will still be addressed in the plan. However, the LWMP structure outlined in this chapter is thought to match the requirements of the BL4EA.

Part A – Strategic Summary

Part A will be an executive summary of the LWMP. It will summarise the proposed work plans, actions and LWMP implementation strategies.

Part B – Work Plan / Strategies and Actions

Part B will summarise the strategies and actions identified in the LWMP and provide detail about each. Potential partners, funding sources, actions and targets will be identified for each.

This will be in table form similar to the following example (with more detail).

Strategy	Who	Action	Targets	Indicative Cost (\$)	Timeframe	Responsibility	Investors (minor and major)
Improve irrigation efficiency	Irrigators	Ongoing monitoring	Greater than 95% area over 90% efficiency	*****	End 2008	BL4EA	Irrigators Department of Climate Change

Part C – How to Implement the Plan

This section will be the focus of the LWMP and will document the implementation phase of the plan. It will include a list of potential resources and funding opportunities.

This section is to include identification of 1 or 2 priority projects with a business case written up and stakeholders consulted for each (subject to funding negotiation).

Appendix

The appendix will include the technical information used as part of the LWMP development as well as a description of progress of the main projects.

7. Actions

The following key actions have emerged from the initial investigations

1. Discuss with the PMC which (if any) additional investigations may need to be undertaken in parallel with the LWMP. Investigations which **could** be considered include:
 - Document drainage bore volumes and rates since the preliminary LWMP as precursor to investigations into viability of EES;
 - Discuss with irrigators to identify opportunities for maximising value of IRES data and expanding the case study project so it is of more use to growers and includes a greater proportion of properties;
 - Identify 1-2 main projects that the PMC is keen to address and commence the business case for each, e.g:
 - Develop business case for Ajax Achilles (i.e. identify process, actions and costings, develop action plan and identify funding sources and who will do it) (Note: this is subject to review of Ajax Achilles report).
 - Undertake scoping study into the management of drainage water. The study should include options drainage water reuse and or redirection;
 - Define extent of Face Zone management issues and develop action plan to address these issues. (from BL4EA Strategic Document)
 - Opportunity for developing business case for involvement in Gurra Lakes South floodplain management (from BL4EA Strategic Document) – or wait until after LWMP completed?
 - Establish linkages between the LAP, RMCWMP, WAP and state and national strategies;
 - Identify funding sources and programs that may assist the BL4EA to implement the LWMP;
 - Identify method of including dryland properties in LWMP;
 - PMC to discuss incorporating Gurra Gurra into BL4EA area;
2. PMC to undertake consultation with key stakeholders and local community as described in this report
3. Project Team to commence drafting LWMP
4. Discuss the preferred approach

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Appendix C

Summary of Organisational Targets

Summary of Organisational Targets

A summary of the following organisational targets is provided to the Project Management Committee to assist with the development of the Bookpurnong Lock 4 LWMP Upgrade:

1. Integrated Catchment Management in the Murray– Darling Basin 2001–2010: Delivering a Sustainable Future
2. Murray Darling Basin Salinity Management Strategy 2001-2015
3. State Natural Resources Management Plan 2007
4. South Australian Murray Darling Basin Natural Resources Management Board Draft Regional NRM Plan 2009-12.
5. Water Allocation Plan for the River Murray Prescribed Watercourse
6. South Australia’s Strategic Plan
7. Riverland Development Corporation Strategic Plan
8. Riverland Strategic Tourism Plan
9. District Council of Loxton Waikerie Strategic Plan
10. Regional Planning Strategy for South Australia – Riverland Planning and Development Area
11. DC Loxton Waikerie Development Plan

1.1 Integrated Catchment Management in the Murray– Darling Basin 2001–2010: Delivering a sustainable future

Target	Timetable
Water quality, including surface water and groundwater	
<p>- reducing or slowing the rate of increase</p> <p>- reducing the threat of algal blooms</p>	<p>By 2001. A Basin strategy for in-stream salinity and of in-stream salinity end-of-valley targets for each major catchment of the Basin will be established as part of the Basin Salinity Management Strategy. Over time these will be underpinned by a system of within-valley targets.</p> <p>By 2003. A Basin strategy for in-stream nutrients and other factors affecting algal blooms, and targets for each major catchment of the Basin will be established. Over time these will be underpinned by a system of within-valley targets. These targets will be informed by a regular Sustainable Rivers Audit. Other possible areas for setting water quality targets will be considered by the Ministerial Council and include pesticides, temperature, and turbidity</p>

Water sharing, including surface water and groundwater	
- establishing flow regimes that provide an appropriate balance between consumptive and in-stream, wetland, floodplain, riparian and estuarine water requirements. Consumptive use includes irrigation, stock and domestic use, and urban water supplies.	<p>Arrangements for a cap on diversions of water from the Basin's rivers were agreed in 1995. The introduction of the cap was seen as an essential first step in establishing management systems to achieve healthy rivers and sustainable consumptive use. The current cap has been set at 1993-94 development levels, adjusted for climate conditions, except for Queensland and the Australian Capital Territory.</p> <p>By 2006. A Basin strategy for water sharing and targets for each major catchment of the Basin will be established. Targets for water sharing will be informed by a regular Sustainable Rivers Audit</p>
Riverine ecosystem health - maintaining/re-establishing viable populations of native species and integrity of ecological communities throughout their range within floodplain, wetland, riparian, in-stream and estuarine ecosystems.	<p>Between 2001 and 2006. Work will be undertaken to determine appropriate targets to reflect riverine ecosystem health, building on and extending the work on targets for water quality and water sharing. Development of a Basin strategy and catchment targets for riverine ecosystem health, and the timeframe for development, will be informed by this work and by a regular Sustainable Rivers Audit. A Basin strategy and targets for each major catchment will be in place by 2006.</p>
Terrestrial biodiversity	
- maintaining key ecological processes; maintaining or re-establishing viable populations of native species and the integrity of ecological communities (especially vegetation); and controlling threats to biodiversity	<p>Between 2001 and 2006. Work will be undertaken to determine appropriate targets to reflect terrestrial biodiversity. These targets will take account of management options for salinity. As an initial step, work will commence on determining appropriate targets for native vegetation in major catchments to deliver Basin outcomes. A Basin strategy and targets for each major catchment will be in place by 2006.</p> <p>By 2002. A Basin strategy and interim targets for native vegetation for each major catchment of the Basin will be established.</p>
Catchment health	
- a system of 'core signals' will be developed for each catchment to assess trends in the health of the catchment and pressures on the water, land and other environmental resources. These core signals	<p>A framework for catchment health core signals will be developed to incorporate targets as they are agreed. The framework will not be complete until all agreed targets are in place for each major</p>

will incorporate the targets for water quality water sharing, riverine ecosystem health, and terrestrial biodiversity.	catchment of the Basin. By 2008. The full framework will be in place.
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1.2 Murray Darling Basin Salinity Management Strategy 2001–2015

Lock 6 to Morgan salt load target: 110% of Yr 2000 conditions by 2015.

1.3 State Natural Resources Management Plan 2007

Vision

South Australia, a capable and prosperous community, managing natural resources for a good quality of life within the capacity of our environment for the long term.

Goals:

Goal 1 – Landscape scale management that maintains healthy natural systems and is adaptive to climate change

Goal 2 – Prosperous communities and industries using and managing natural resources within ecologically sustainable limits

Goal 3 – Communities, governments and industries with the capability, commitment and connections to manage natural resources in an integrated way.

Goal 4 – Integrated management of biological threats to minimise risks to natural systems, communities and industry.

Resource Condition Targets

Land	L1	By 2011, land condition will have improved compared to 2006
Water	W1	By 2011, all ecosystems dependent on prescribed water resources have improved ecological health compared with 2006.
	W2	By 2020, all aquatic ecosystems have improved ecological health compared with 2006.
	W3	By 2015, no further net loss of wetland or estuary, extent or condition, compared to 2006.
	W4	By 2011, an increase in net water quality compared to 2006.
Biodiversity	B1	By 2020, 50% of species and communities in each of the 2006 risk categories have moved to a lower risk category.
	B2	By 2011, no species and ecological communities have moved to a higher risk category from 2006.
	B3	By 2011, no further net loss of natural habitat (terrestrial, marine and aquatic) extent and condition below that of 2006.
	B4	By 2020, a net increase in ecological connectivity across all

		terrestrial, marine and aquatic ecosystems compared to the 2006 values.
People	P1	By 2011, the capacity of people in community, institutions and regional organisations to sustainably manage natural resources will be greater than in 2006.

1.4 South Australian Murray Darling Basin Natural Resources Management Board Regional NRM Plan 2009–12

People

- 80% increase in the number of people managing natural resources sustainably by 2030
- Increase protection and preservation of Aboriginal culture by 80% by 2030
- All landscape development and management to have a neutral or beneficial impact on natural resources by 2030

Water

- All water resources are managed sustainably by 2018
- Improve water quality to achieve the regionally-endorsed environmental values by 2030
- Water is available to enhance and maintain the ecological character of riverine, estuarine and marine ecosystems.

Biodiversity

- Native ecosystem extent increased to 53% of the region and native ecosystem condition improved across the region by 10% by 2030
- By 2030, water-dependent ecosystems in priority areas maintain ecological function, resilience and biodiversity
- No species or ecosystem moves to a higher risk category and 50% of species move to a lower risk category by 2030

Land

- A 10% improvement in soil and land condition from 2008/2009 levels by 2030
- The area of land affected by land degradation processes is reduced by 2030

Atmosphere

- Reduce greenhouse gas emissions in the SA MDB by 60% by 2050

- Voluntary renewable energy use at 20% and support for renewable energy generation in the region
- Natural resource affecting industries adopting climate change sector agreements by 2014
- Revegetation for future carbon (CO₂-E) sequestration of 126,0000 by 2014
- 100% of natural resource managers incorporating climate change adaptation into their forward planning or management by 2030

1.5 Water Allocation Plan for the River Murray Prescribed Watercourse

1.5.1 Objectives

Water Allocation

The following objectives apply to water (holding) allocations and water (taking) allocations.

1. Maintain and improve the quality of water resources.
2. Provide for the water needs of water-dependant ecosystems.
3. Provide for the sustainable use of water.
4. Implement South Australia's obligations under the Murray-Darling Basin Agreement 1992.
5. Provide for the allocation and use of water for environmental land management purposes in the Lower Murray Reclaimed Areas Irrigation Management Zone particularly the minimisation of rising saline underground water.
6. Provide for the allocation and use of water to prevent:
 - a) increases in salinity;
 - b) increases in waterlogging;
 - c) adverse impacts on the water quality of the River Murray Prescribed Watercourse, including increases in salinity, nutrients, turbidity, and chemical or biological contaminants;
 - d) adverse impacts on the quantity and quality of other water resources;
 - e) adverse impacts on the health, biodiversity status or habitat value of floodplains, or wetlands of conservation significance; and
7. Provide for the efficient use of water taken from the prescribed watercourse.

Wetlands

The following principles are in addition to those set out in Section 5.2 of this water allocation plan and apply to water allocated by water (taking) allocation to be used for wetland management purposes.

11. Water shall only be allocated for wetland management in any wetland, or wetlands listed in Appendix A.

12. Water shall only be allocated for wetland management if its use will have, or will be likely to have, environmental benefits including:

- a) the reintroduction of a wetting and drying regime;
- b) an increase in the recruitment and survival of native flora and fauna in the wetland or wetlands;
- c) an improvement in the quality of water in the wetland or wetlands, and/or the River Murray;
- d) an increase or improvement in habitat for native fauna;
- e) the mitigation of any threatening processes;
- f) an improvement in the connectivity between the river and the floodplain;
- g) the promotion of nutrient exchange;
- h) extending the duration or increasing the frequency of wetland inundation.

13. Water shall only be allocated for wetland management where its use will not cause, or be likely to cause, an increase in salinity of the River Murray except where the increase can be offset by an agreement, undertaking, or obligation for works, actions or practices to prevent increases in salinity.

14. Water shall only be allocated for wetland management where the wetland or wetlands will be managed with a hydrological regime that will have environmental benefits which may include those listed in Principle 12.

1.6 South Australia's Strategic Plan 2007

South Australia's Strategic Plan has six objectives and 78 Targets. The Objectives are provided below, and a summary of these targets is attached as a PDF file for reference. Key targets which could relate to the Bookpurnong Lock 4 LWMP are provided underneath the objective headings below.

Objective 1 – Growing Prosperity

Economic Environment

T1.1 Economic Growth: Exceed the national economic growth rate by 2014

T1.5 Business Investment: Exceed Australia's ratio of business investment as a percentage of the economy by 2014.

T1.6 Labour Productivity: Exceed Australia's average labour productivity growth rate in trend terms by 2014.

Objective 3 – Attaining Sustainability

Biodiversity

T3.1 Lose no species: Lose no known native species as a result of human impacts.

T3.2 Land biodiversity: By 2010 have five well-established biodiversity corridors aimed at maximising ecological outcomes particularly in the face of climate change.

T3.3 Soil protection: By 2014 achieve a 20% increase in South Australia's agricultural cropping land that is adequately protected from erosion.

Climate Change

T3.5 Greenhouse gas emissions reduction: Achieve the Kyoto target by limiting the state's greenhouse gas emissions to 108% of 1990 levels during 2008-2012, as a first step towards reducing emissions by 60% (to 40% of 1990 levels) by 2050.

T3.7 Ecological footprint: Reduce South Australia's ecological footprint by 30% by 2050.

T3.9 Sustainable water supply: South Australia's water resources are managed within sustainable limits by 2018.

T3.10 River Murray – flows: Increase environmental flows by 500GL in the River Murray by 2009 as a first step towards improving sustainability in the Murray-Darling Basin, with a longer-term target of 1500GL by 2018.

T3.11 River Murray- salinity: South Australia maintains a positive balance on the Murray-Darling Basin Commission salinity register.

Objective 4 – Fostering Creativity

Innovation

T4.7 Business Innovation: The proportion of South Australian businesses innovating to exceed 50% in 2010 and 60% in 2014.

Investment in Science Research and Innovation

T4.9 Public expenditure: By 2010, public expenditure on research and development, as a proportion of GSP, to match or exceed average investment compared to other Australian states.

T4.11 Business expenditure: Increase business expenditure on research and development to 1.5% of GSP in 2010 and increase to 1.9% by 2014.

Objective 5 – Building Communities

Regional Population Levels

T5.9 Regional Population Levels: Maintain regional South Australia's share of the State's population (18%).

Objective 6 – Expanding Opportunity

No targets directly relevant to the Bookpurnong Lock 4 LWMP Upgrade.

1.7 Riverland Development Corporation Strategic Plan 2006

Infrastructure

- Ensure local capacity to effectively influence own destiny
- Ensure that regional infrastructure supports development

Business Development

- Maximise potential for local business opportunities to succeed and grow
- Encourage the development of new businesses in the area
- Attract new investment into the region.

Food & Beverage

As a major food and beverage-producing region, maximise the Riverland's contribution to achieving SA food plan targets and wine industry development opportunities.

Export

- Assist enterprises in the region to commence exporting on a sustainable basis and convert irregular exporters to regular sustained exporting (as per TradeStart objectives).
- Support existing exporters to grow their export volumes.

Employment & training

- Facilitate employment creation in the Riverland, by integrating regional employment strategies with economic and social development strategies.

Tourism

- Maximise tourist yield supporting tourism business and employment opportunities, while balancing environmental and community issues.

Government

- To encourage the development of balanced communities, recognising the joint requirements of:
 - Economic development
 - Provision of community infrastructure
 - Provision of efficient and effective Government services

Health

- Promote the health and wellbeing of people in the Riverland region with desired outcomes of:
 - Community access to increased range of well-coordinated health services
 - Holistic culturally sensitive responsive care
 - Improved capacity for prevention, health promotion and early intervention

Education

- Access to quality education (primary, secondary and tertiary) for the whole community, including recognition of the needs of business. Focus on Career Pathways, Vocational Education and Training and linking Industry and Secondary Education.

Population

- Achieve population growth so that the local population remains a dynamic and balanced community (i.e. so that there are a balance of ages and cultures)

Water resource

- Ensure use and management of the River Murray such that:
 - Physical, economic and social well-being of the state is sustained
 - Meet the needs of future generations
 - Protecting ecosystems
 - Minimise the detrimental effects of use and management.

Other

- Minimise the effects and reverse the damages of interactions of economic and community activities on the environment, such as
 - Waste disposal requirements
 - Land salinity impacts

1.8 Riverland Strategic Tourism Plan

- 2.5% growth per annum in visitor nights achieved through an increase in visitors and length of stay

1.9 DC of Loxton Waikerie Strategic Plan

The 2007/2008 Strategic Plan included Objectives, Annual Business Plan Actions, Performance Measures and Performance Outcomes. The Objectives of the Strategic Plan are as follows:

Objective 1 – Sustainable Economic Development

To positively contribute to the economic environment of the District in order to promote sustainable growth and development of new and existing business and economic opportunity.

Objective 2 – Community leadership and vision

To provide decisive, accountable and visionary leadership to encourage initiative, self belief and confidence in the community.

Objective 3 – Provision and maintenance of infrastructure

To provide and maintain community infrastructure that is responsive to the changing needs of the community and its visitors.

Objective 4 – Recognition and protection of the environment

To ensure the importance of the natural environment and open spaces are both recognized and protected for the enjoyment of future generations.

Objective 5 – Provision of Cultural and Community Services

Develop, enhance and maintain cultural and community services that improve the quality of life for the community.

Objective 6 – Effective delivery of relevant services through responsive corporate management.

Ensure the delivery of Council services in undertaken in an accountable and efficient manner.

The only performance measure in the District Council of Loxton Waikerie’s Strategic Plan which is relevant to NRM is Strategic Plan Reference 4.9 in the table that follows:

Strategic Plan Reference	Annual Business Plan Actions	Performance Measures	Performance Outcomes
4.9 The management and control of noxious weeds, vertebrate pests and environmental issues such as soil conservation and air pollution.	The SAMDNRMB promotes community objectives and aspirations by working to achieve a healthy environment that is based on the sustainable use of the region’s natural resources and is supported by a strong economy and a vibrant community.	Levy collected Remitted to State Government	Ongoing

1.10 Regional Planning Strategy for South Australia

Economic Activity Strategies

1 Promote production of most profitable crops, value-added and niche market projects.

2 Ensure land division supports economic primary production and will not restrict further development.

- 3 Allow for extension of irrigation into dryland areas where water supply is available.
- 4 Encourage expansion of horticulture production.
- 5 Continue to upgrade, rehabilitate and restructure old irrigation areas (like Loxton) to improve efficiency and ensure water is available for its highest economic use.
- 6 Encourage new horticultural areas where water can be provided and impact on the River Murray minimised.
- 7 Protect encroachment of productive horticultural land by rural living.
- 8 Amend Development Plans by introducing comprehensive performance policies that reflect industry requirements, land capability, environmental characteristics and responsible resource management for development in rural areas.
- 10 Plan tourism facilities and attractions based on the area's natural features and character.
 - a. Promote nature-based developments that address the river or other parts of the local environment (as has Banrock Station).
 - b. Plan visitor facilities including small-to-medium scale accommodation, signage, interpretive/information centres for walking trails, wildlife and bird watching.
 - c. Improve the area's interface with the river through the upgrading and development of riverside infrastructure and amenities.
 - d. Plan outdoor sport and recreation opportunities to capitalise on the comparatively high number of hours of sunshine in the area.
 - e. Plan tourism links to significant activities of the area such as wine, food processing, agriculture, environmental management.

Environment and Resources Strategies

- 11 Conserve and manage biodiversity and essential ecological processes.
 - a. Protect and manage remaining natural biodiversity with particular emphasis on key biodiversity areas including large remnant areas, fragmented and threatened habitat areas.
 - b. Protect and manage important conservation areas, parks and reserves and identify new areas.
 - c. Protect areas of native vegetation and associated native fauna on both public and private lands.
 - d. Retain, re-establish and manage native vegetation and threatened plant communities including those areas that provide links and buffers between existing habitats.
 - e. Restore native vegetation in key areas such as watercourses and erosion gullies through fencing, destocking and weed control.
 - f. Control the spread of weeds, introduced animals, fire and other risks to biodiversity.
 - g. Ensure land use policy recognises and protects areas of conservation significance.

12 Recognise the importance of a healthy River Murray to the economic, social and cultural prosperity of the communities along the length of the River.

13 Protect and restore key habitat features in the river, riparian zone, floodplain and estuary to enhance ecological processes.

14 Protect and restore healthy riverine and estuarine environments and high value floodplain and wetlands of national and international importance.

15 Prevent the extinction of native species from the riverine system.

16 Overcome barriers to the migration of native fish species.

17 Promote sustainable development and rehabilitate degraded areas on the River Murray floodplain.

18 Remove evaporation basins from the flood plain.

19 Reinstate ecologically significant elements of the natural flow regime.

20 Significantly improve connectivity between and within riverine, wetland, floodplain and estuarine environments.

21 Develop flow management strategies to maintain the health of the River Murray.

22 Substantially improve water quality in the Murray system to a level that sustains ecological processes, environmental values and productive capacity.

23 Manage salinity to minimise impacts on ecological processes and productivity levels

a Investigate options to use planning tools to prevent further irrigation development in areas of high salinity impact risk, linked with water allocation and catchment management plans.

b Amend relevant Development Plans so that new irrigation development is required to demonstrate neutral or positive salinity impacts and comply with measurable performance standards.

c Encourage the trading and re-allocation of water licences along the River Murray into lower salinity impact areas.

24 Manage nutrient levels to reduce the occurrence of blue-green algal blooms.

25 Minimise the impact of potential pollutants such as sediment and pesticides within riverine environments.

26 Control drainage and run-off to protect water quality.

27 Maximise sustainable use of regional water supplies by managing demand and providing opportunities to supply future needs.

a. Protect and supplement recharge and retrieval of groundwater aquifers.

b. Promote efficient water use.

c. Implement a total water cycle management approach to regional water supplies.

28 Optimise environmentally sustainable recreational use of the River.

29 Maintain and further develop the Biosphere Reserve.

30 Improve management of groundwater in the Brown's Well area.

31 Better link the legislative policy and assessment frameworks applying to irrigation activities so that assessment processes for development decisions are integrated with those applying to water decisions and duplication, overlap and uncertainty is minimised.

32 Protect and enhance natural areas, scenic routes and landscapes from unsightly development by minimising its visual impact.

a. Develop urban areas adjoining the river in a manner that protects its natural character while accommodating sensitively designed and located urban activities and tourist and recreation facilities.

b. Investigate opportunities to redesign and redevelop inappropriately located housing areas that do not satisfy environmental, health or public access standards.

c. Protect and enhance the river environments and ecosystems and ensure development does not change the natural dynamics of these areas.

People, Towns and Housing Strategies

33 Encourage the continued social and economic development of existing townships and ensure they maintain an appropriate level of services.

34 Ensure land use policies encourage a diverse range of housing types to meet the changing needs of the community, including accommodation in town or business areas where appropriate.

35 Encourage increased private sector investment in housing in regional areas along with appropriate management structures, infrastructure and supply of land.

Infrastructure Strategies

36 Investigate opportunities for transfer of freight from road to rail through rail and road network improvements and improvements in access to terminals for heavy road freight vehicles.

37 Protect important freight routes and terminals from adjacent incompatible land uses.

38 Encourage improvements to the road network from the Sunraysia area to the South Australian border to facilitate efficient export of products from this area.

39 Investigate the commercial viability and potential to institute a rail freight service from Loxton to Adelaide to handle primarily citrus products, but also the emerging mineral sands industry.

40 Improve access between the Riverland, Port Adelaide and Adelaide International Airport.

41 Investigate the possibility of an inter-modal terminal at Loxton for the export of containerised produce from within both the Riverland and Sunraysia regions.

42 Improve access to information for family, business and community support, including:

- a. access by farms and other small businesses to market information by using new communication technologies
- b. distance education and training through e-mail
- c. expansion of the mobile phone network with priority given to the areas along the Loxton to Murray Bridge Road and Loxton to Swan Reach Road
- d. access to the Internet.

1.11 DC Loxton Waikerie Development Plan

- Objective 1 The orderly and economic development of towns
- Objective 2 The proper location of public and community facilities by the reservation of suitable land in advance of need.
- Objective 3 The re-development of localities which have an unsatisfactory layout or have become unhealthy or obsolete development.
- Objective 4 Land liable to flooding from the river Murray kept free of development which could be damaged by or impede floodwaters.

1.12 References

District Council of Loxton Waikerie (2008) “Annual Report 2007-2008”

Government of South Australia (2006) “State Natural Resources Management Plan 2006”
Department of Water Land and Biodiversity Conservation

Government of South Australia (January 2007) “SA Strategic Plan 2007”

Riverland Development Corporation (2006) Riverland Development Corporation Strategic Plan 2006

SA MDB Investment Strategy 2005/06 (April 2005), SA MDB NRM Board

River Murray Catchment Water Management Board (2002) Water Allocation Plan for the River Murray Prescribed Watercourse

Murray Darling Basin Ministerial Council (2001) Integrated Catchment Management in the Murray– Darling Basin 2001–2010: Delivering a sustainable future

Murray Darling Basin Ministerial Council (2001) Murray Darling Basin Salinity Management Strategy 2001-2015

Appendix D

Potential Funding Sources

Potential Funding Sources

- **Caring for our Country**

Caring for our Country is the Government's new natural resource management program. Caring for our Country is designed as an integrated package with one clear goal, a business approach to investment, clearly articulated outcomes and priorities and improved accountability. It commenced on 1 July 2008 and will integrate delivery of the Commonwealth's existing natural resource management programs, the Natural Heritage Trust, the National Action Plan for Salinity and Water Quality, the National Landcare Program, the Environmental Stewardship Program and the Working on Country Indigenous land and environmental program.

Website

<http://www.nrm.gov.au/funding>

- **Environment, Water, Heritage and the Arts Grants and Funding**

This web page lists the grants available through the Australian Government Department of the Environment, Water, Heritage and the Arts.

Website

<http://www.environment.gov.au>

- **Water for the Future**

The Australian Government is investing \$12.9 billion over ten years through *Water for the Future*.

Go to <http://www.environment.gov.au/water> for information on the following:

- [Restoring the Balance in the Murray-Darling Basin Program \(water entitlement purchasing\)](#)
- [2008-09 southern Basin water entitlement purchase round](#) - closes 30 June 2009
- [Irrigator-led Group Proposals](#)
- [Murray-Darling Basin Small Block Irrigators Exit Grant Package](#) - closes 30 June 2009
- [Irrigation Modernisation Planning Assistance](#)
- [Living Murray Initiative](#)
- [Water Smart Australia](#)
- Modernising Irrigation in Australia
- [On-Farm Irrigation Efficiency \(Pilot Projects\) Program](#)
- [Water Meter Test Facility Upgrading and Accreditation](#)
- River Operations and Storages Program

- **Native Vegetation Fund Research Grant Scheme**

<http://www.dwlbc.sa.gov.au/native/nvc/grants.html>

- **Foundation for Rural and Regional Renewal**

The Foundation for Rural and Regional Renewal is Australia's only national foundation dedicated to the needs of rural and regional Australia. The Foundation for Rural and Regional Renewal is a philanthropic foundation, with an independent board, to help provide a viable social and economic future for Australia's rural and regional communities. It aims to encourage innovative collaboration between business, community and government in philanthropic endeavours that will boost the economic and social well-being of regional Australia.

Website

<http://www.frrr.org.au>

Appendix E

Conformity with LWMP
Guidelines

Conformity of the Draft Bookpurnong Lock 4 LWMP Upgrade with Land and Water Management Plan Guidelines

The following table demonstrates the extent to which this Plan is accordance with the LWMP Guidelines, and it is based on the Checklists provided at the end of each key stage within the Guidelines.¹

Table D.1 – Conformity of Upgraded Plan with LWMP Guidelines

Item	Guideline Checklist	Completed? Y/N	Comment
Stage A – Starting Out			
A1	Group has made contact with key stakeholders and gained understanding of what developing a plan will require	Y	Steering Committee consulted with community and government agencies
A2	Members of group clearer about how to work together in practice in developing the LWMP	Y	Focus workshop held to refine approach
A3	Group starts to build engagement with community	Y	Steering Committee undertook targeted consultation with community and government agencies
A4	Group has completed a scoping exercise to agree the boundaries and coverage of the plan	Y	During development of project brief and during focus workshop
A5	Group has agreed on initial plan with a major goal and provisional action targets to address priority issues	Y	Development of Project Brief and engagement of consultant.
A6	Project plan developed with realistic assessment of time-scales and resourcing requirements	Y	Development of Project Brief and engagement of consultant.
Stage B – Setting the Scene			
B1	Gathered together and reviewed available data including hydrogeology, production, etc.	Y	DWLBC prepared Bookpurnong Land and Water Management Planning Background Report.
B2	Identified new or additional data and where to source it from.	Y	Undertaken in conjunction with consultant.
B3	Understood wider strategies and policies developed by DWLBC and Board	Y	Consultation undertaken with key government agencies

¹ Marsden Jacobs Associates (March 2004) *Guidelines for Land and Water Management Plans in the SA Murray Darling Basin*, prepared for the SA Murray-Darling Basin Regional Land and Water Management Plan Steering Committee

			and via involvement in Steering Committee
B4	Confirmed which assets in the area are the most valuable for them	Y	Identified during initial consultation and to be refined during consultation on draft.
B5	Identified which threats pose the greatest risk to those assets	Y	Identified during initial consultation and to be refined during consultation on draft.
B6	Developed an initial set of priorities for the overall plan	Y	Identified during initial consultation and to be refined during consultation on draft.
B7	Recognised what would happen if no plan is implemented	N/A	A plan is currently being implemented – this document is an upgrade.
Stage C – Developing the Plan			
C1	Agreed initial targets for each of its main assets	Y	Proposed in draft LWMP – feedback to be sought from Steering Committee and community during consultation
C2	Actively set about identifying what steps it can take to meet those targets	Y	Proposed in draft LWMP – feedback to be sought from Steering Committee and community during consultation
C3	Reviewed and assessed each of the options in a thorough and consistent way to identify key issue including costs, benefits and risks	Y	Proposed in draft LWMP – feedback to be sought from Steering Committee and community during consultation.
C4	Evaluated those different options to identify which represent the best value for money	N	Feedback to be sought from Steering Committee and community during consultation.
C5	Translated that list of optimal options into a practical work program which takes account of key factors including: <ul style="list-style-type: none"> - target setting - cost allocation - monitoring and evaluation 	Y	Proposed in draft LWMP – feedback to be sought from Steering Committee and community during consultation.

C6	Collated and integrated that process into a powerful and convincing LWMP which sets out the realistic ambitions and commitments of the area to achieving a sustainable future.	Y	Proposed in draft LWMP – feedback to be sought from Steering Committee and community during consultation.
Stage D – Moving from Words to Deeds			
D1	Maintain the group's enthusiasm	This stage has yet to be completed – outside scope of work of consultant. To be undertaken under direction of Project Management Committee	
D2	Manage the implementation of projects		
D3	Seek external funding		
D4	Support licence compliance		
D5	Continuously improve the plan		