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South Australian Murray-Darling Basin
Natural Resources Management Board

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South Australian Murray-Darling Basin Natural Resources Management Board

PRIORITISATION OF THE SOUTH AUSTRALIAN RIVER MURRAY FLOODPLAIN FOR THE DELIVERY AND MANAGEMENT OF ENVIRONMENTAL WATER

PROJECT OVERVIEW

Prioritisation of the South Australian River Murray Floodplain for the Delivery and Management of Environmental Water
- **Project Overview**

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1. Introduction

1.1 Background

The strategy *Environmental Flows for the River Murray* provides for the establishment of the South Australian River Murray Environmental Manager (RMEM). The primary role of the RMEM is the coordination of all environmental watering activities within the SA River Murray, including the delivery, allocation, management and accounting of all environmental water. The Minister for the River Murray has assigned the function of the RMEM to the South Australian Murray-Darling Basin Natural Resources Management Board ('the Board').

A key component of sound environmental water management is through the development of strategic planning and policy tools to assist in setting directions and guiding environmental water decision making. This includes the development of processes and frameworks for the identification and prioritisation of the floodplain, wetlands and in-channel ecological assets.

The results from floodplain, wetlands and in-channel asset prioritisation projects will be considered in parallel with the community values of sites to inform the development of the *South Australian River Murray Strategic Watering Plan* and in guiding annual priorities for environmental water and financial investment.

1.2 Why do we need to prioritise floodplain areas for environmental watering?

"It is unlikely that environmental flows can be delivered to all of South Australia's ecological assets and so priorities will need to be identified to ensure the greatest ecological gains for the investment made."

Environmental Flows for the River Murray (2005)

The need to prioritise ecological assets for the delivery and management of environmental flows is a key element of the strategy "*Environmental Flows for the River Murray*" (DWLBC, 2005a). This Strategy provides direction to the management of environmental flows in the River Murray in South Australia stating that "*it is unlikely that environmental flows can be delivered to all of South Australia's ecological assets and so priorities will need to be identified to ensure the greatest ecological gains for the investment made* (DWLBC, 2005a: 31).

A key strategic area identified within the Strategy for achieving its management objectives is the prioritisation of ecological assets. The Strategy outlines a set of Principles for Prioritisation of Assets (see section 2.3) and describes policies and actions for the development of prioritisation processes, criteria and decision-support frameworks to assist with the identification and prioritisation of ecological assets, including floodplains, for the delivery and management of environmental flows.

The Board has obtained NAP funding to progress prioritisation frameworks and to establish priority floodplain areas along the River Murray in South Australia. Prioritisation of

floodplains will assist the coordination and integration of wetland and floodplain management activities and river operation and management to ensure that environmental flows will achieve the best possible outcomes for river and ecological health along the River Murray in South Australia.

This project has built on a significant body of work already undertaken in South Australia to facilitate stakeholder agreement on priority floodplain areas for the delivery and management of environmental flows. The focus of this project has been to establish broad-scale floodplain priorities to protect and enhance their environmental values and to identify opportunities to manage threats to these values through environmental watering. The information arising from this project will be used to support environmental flow decision-making processes and high level policy and strategic documents.

1.3 Project scope and objectives

The primary objective of this project is to design and facilitate a process to seek agreement on priority River Murray floodplain areas within South Australia for the delivery and management of environmental flows.

The major steps in this project have been:

1) Identify the project drivers and needs in conjunction with the Project Steering Committee.
2) Review existing prioritisation policy and supporting work in South Australia, as well as relevant processes in other States and develop an 'Issues and Directions Paper' for consideration by the Project Steering Committee.
3) Agree on a proposed conceptual framework and prioritisation approach.
4) Facilitate meetings and input from a Technical Working Group to identify and agree on key elements / criteria of the prioritisation framework.
5) Complete data analysis to identify priority floodplain areas for the delivery and management of environmental flows.
6) Test and finalise priorities in consultation with the Project Steering Committee and the Technical Working Group.
7) Complete draft and final reports detailing the prioritisation process and final floodplain priorities.

This project does not involve the identification of environmental water requirements or environmental water provisions for floodplains, wetlands or stream reaches. This project involves the determination of broad-scale floodplain priorities for use in strategic planning and decision-making to maximise environmental water opportunities from river flows and to take advantage of above-entitlement flow events.

1.4 Structure of this report

This document is the Final Report for the "Floodplain Prioritisation Project" being undertaken by the SA MDB NRM Board. It details the conceptual approach, analysis and results for

prioritising floodplains for the delivery and management of environmental water along the River Murray in South Australia. This remainder of this report is structured accordingly:

- Section 2: Strategic and policy framework – this sections outlines the existing strategic and policy framework for environmental flows and for prioritisation of assets in the South Australia.
- Section 3: Approach used to prioritise floodplains – this section outlines the conceptual framework for prioritisation and the approach taken to prioritise floodplains.
- Section 4: Results, observations and validation – this section summarises the results and key observations and discusses methods for validating the results.
- Section 5: Next steps – this section outlines recommendations for further activity relating to stakeholder consultation, incorporation of priorities into decision-making processes; future data and information needs and processes for updating priorities as the information base improves.
- Section 6 – References
- Section 7 - Acknowledgements
- Section 8 – Appendices (Consultation Report)

There are two companion reports which accompany this report:

- Data and Analysis report – Provides the technical detail of the data analysis and results by describing inputs, GIS processing and outputs.
- Consultation report– details the consultation processes and feedback from the Technical Reference Group, including actions to incorporate feedback and revise the analysis.

In addition to the reports, a number of products have also been developed:

- Floodplain and Wetlands Information Package for the SA River Murray including:
  - ArcReader DVD (general distribution)
  - ArcMap DVD (licensed distribution
- Map Books (limited distribution)

2. Strategic and policy framework

2.1 Strategic framework for delivery and management of environmental flows

The Board, through its RMEM function, has the lead responsibility in relation to environmental water for the River Murray within South Australia and has a key advocacy role in Murray-Darling Basin forums. The RMEM oversees environmental water management decisions and determines priorities for environmental watering projects. In doing so, the Board will ensure that environmental water decisions are made to maximise river health and biological diversity for the River Murray, its floodplains and wetlands.

The Board has been charged with developing transparent criteria and decision-making frameworks for prioritising ecological assets for delivery and management of environmental flows. The Board has a key strategic planning and decision-making role for environmental water delivery and management and in the facilitation of on-ground projects.

Together with implementing many of the actions of the *Environmental Flows for the River Murray* strategy, the Board will be responsible for developing the South Australian River Murray Strategic Watering Plan and subsequent Annual Watering Plans.

The **South Australian River Murray Strategic Watering Plan** will be an overarching strategic document that outlines the vision, objectives and targets for the delivery and management of environmental water along the River Murray in South Australia. It will identify and document priority broad-scale assets for environmental watering projects and will support annual decision-making through the Annual Watering Plan. It will also identify potential sources of environmental water, constraints on environmental water delivery and management, and flow triggers. The Plan will outline the process for annual decision-making for environmental water delivery and for facilitating the donation of environmental water. It will be an input to decision-making on the use of Living Murray water, river operations and surplus flow delivery and management. The Plan is likely to be released in mid 2008 and will be reviewed on a five year basis.

In addition, the Board will identify priority sites, actions and projects for delivery and management of environmental water through an **Annual Watering Plan**. The Annual Watering Plan provides the basis for distribution of environmental water allocations to project sites and assets. It will describe accredited projects that are eligible to receive environmental water and will provide the basis for licensing of environmental water. The plan will be developed within the context of the likely environmental water availability and funding availability within that water year and will consider the flow forecasts and the water account. Each year it will specify the recommended distribution of environmental water for known water sources and recommendations in the event of other sources becoming available.

The floodplain priorities identified by this project and outlined in this report will provide a significant input to the South Australian River Murray Strategic Watering Plan and annual decision-making processes. These floodplain priorities will be considered along with other

weir pool, wetland and in-stream priorities to inform coordinated and integrated decision-making, strategy and policy development, and on-ground action.

This project will also assist the Board achieve some of its objectives and will contribute to the delivery of other basin, state and regional policies and strategies for water and natural resource management such as The Living Murray First Step Decision, the State Strategic Plan, the State NRM Plan, the SA MDB NRM Plan and the *River Murray Act 2000*.

2.2 Strategic framework for prioritisation

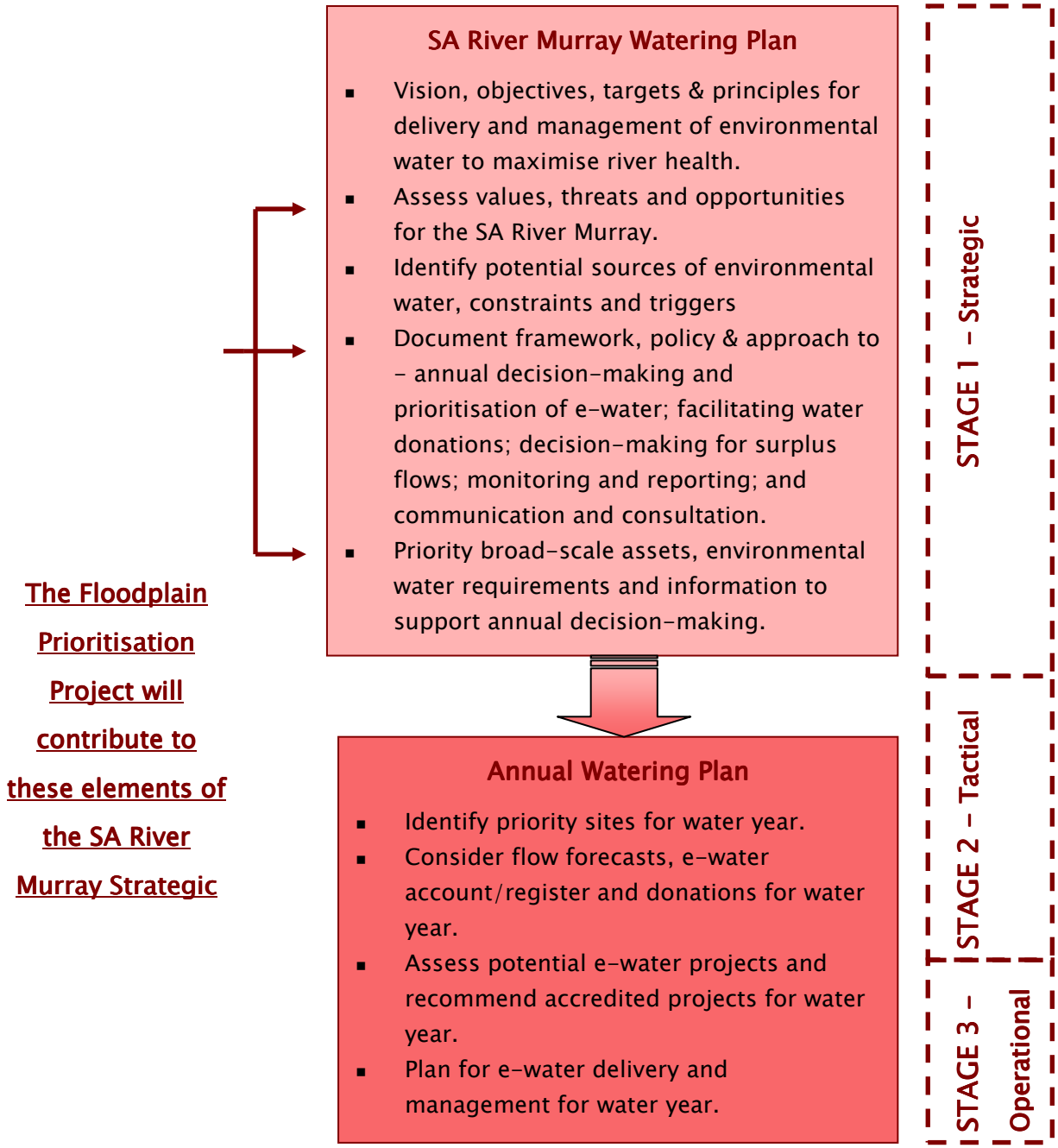
Priority-setting can occur at different stages of decision-making. Fleming *et. al.* (2003) describe five stages in the planning process where priorities can be identified – i) vision-setting; ii) asset valuation; iii) mitigation of threats to assets; iv) strategic responses; and v) implementing work programs.

Through this project, three key stages of prioritisation have been identified to inform environmental water decision-making processes for the River Murray in South Australia – i) strategic; ii) tactical; and iii) operational. These stages are summarised below in Table 1. Each of these stages will consider different information at different scales and will require input from a variety of different stakeholders. Floodplain priorities identified through this project will be one input into Stage 1.

- **Table 1 Stages of prioritisation for environmental water delivery and management**

Stage	Scale	Should consider…	Will provide input to…	Stakeholder input	Rationale
Stage 1	Between broad-scale, strategic priorities (e.g. floodplain unit)	**Ecological** values of the asset, threats to those values and the ability to manage those threats. For example, criteria such as: ▪ Values – (e.g. habitat value, condition, representiveness, threatened species, reserves, conservation status, wetlands, ecosystem services etc.) ▪ Threats – salinity, land/ water management, flow and fish barriers etc. ▪ Risks – likelihood and consequence of threats to asset values. ▪ Benefits – likelihood of actions realising anticipated benefits, opportunities to rehabilitate etc.	▪ South Australian River Murray Strategic Watering Plan ▪ State/Basin level decision-making processes	Largely technical stakeholders (e.g. government agencies)	**Strategic** (knowing the right reasons) – the RMEM needs to be clear about aspirations, objectives and motivation for action. What is the RMEM's 'ecological' business case for pursuing environmental watering on a particular floodplain? Prioritisation at this stage is driven by the role of the RMEM – a focus on river health. Social, cultural and economic values are also considered important but will play a part in prioritising projects and actions in stages 2 and 3 below.
Stage 2	Within reaches/assets (e.g. sites)	▪ Relative values of sites – ecological, social, cultural or economic. ▪ Relative benefits of action ▪ Site history ▪ Site management ▪ Community support and momentum ▪ Other complementary management actions or strategic priorities	▪ Annual Watering Plan ▪ Regional & local level decision-making processes	Technical and community stakeholders	**Tactical** (doing the right things) – moving beyond strategic priorities to identify sites for effective implementation. Here, the focus is on prioritising highly valued sites where action can produce the greatest benefits within the constraints and strategic priorities identified in stage 1. The Annual Watering Plan will outline the priority sites for each water year.
Stage 3	Between projects and actions	▪ Feasibility (economic & technical) ▪ Readiness and urgency ▪ Relative benefits and risks ▪ Acceptability of tradeoffs ▪ Monitoring, evaluation & reporting ▪ Management of impacts & risks ▪ Rigorous planning basis	▪ Annual Watering Plan ▪ Semi-regional or local management plans (e.g. WMP, LWMPs etc.)	Technical and community stakeholders	**Operational** (doing things right) – translates tactics into action, focussing on efficient implementation of projects. Here, the focus is on identifying projects that are feasible, achievable and acceptable. The Annual Watering Plan will identify the priority projects for each site in each water year.

The relationship between the key strategic planning documents, the stages of prioritisation for environmental water delivery and management and this floodplain prioritisation project is illustrated in Figure 1.



- **Figure 1: Links between key strategic documents, stages of prioritisation and this project for environmental water delivery and management.**

2.3 Prioritisation policies and principles

There are currently a series of policies and principles relating to prioritisation that will direct and support decision-making and prioritisation. The policy framework for the project is defined by the principles for prioritisation of assets (from *Environmental Flows for the River Murray* strategy) outlined below.

Policies for prioritising ecological assets (from *Environmental Flows for the River Murray* strategy)

- Prioritisation processes will be consistent with the Planning Framework for Environmental Water Provisions outlined in the State Water Plan.
- Criteria for prioritisation of environmental watering activities will be consistent with the Living Murray Environmental Watering Plan.
- Decision-making and prioritisation for environmental watering will consider the environmental, economic, cultural and social values associated with ecological assets and the risks and benefits of undertaking watering activities.
- Decisions affecting environmental flows will be made within an integrated catchment management context and will recognise relationships between rivers, catchments, coastal/estuarine systems, broader landscapes and people.
- Priority-setting and decision-making will engage communities through involvement in the development and implementation of regional environmental watering activities.

Principles for prioritisation of assets (from *Environmental Flows for the River Murray* strategy)

- Preserve and protect existing high value areas or areas in good condition.
- Restore those ecological assets of lesser value and/or moderate condition where there is:
  - high environmental and community gain for the resources invested;
  - high degree of community support for restoration activities;
  - high level of indigenous cultural significance;
  - high potential to restore threatened species;
  - high potential for rehabilitation;
  - strong relationship between environmental degradation, impacting processes and opportunities for asset rehabilitation;
  - high degree of connectivity, thereby maximising opportunities for complementary benefits; and
  - potential to achieve multiple ecological benefits
- Assign a lower priority to highly degraded areas unless they threaten significant infrastructure or pose off-site threats to significant ecological, social, cultural or economic values.

3. Approach used to prioritise floodplains

This section outlines the conceptual framework developed to prioritise River Murray floodplains for this project. This framework provided the basis for analysis of data to identify priorities however due to data and information constraints some concessions and amendments have needed to have been made in the application of the framework. These are also outlined below. The method, data and results for the GIS analysis are detailed in a companion report (Miles *et. al.,* 2007).

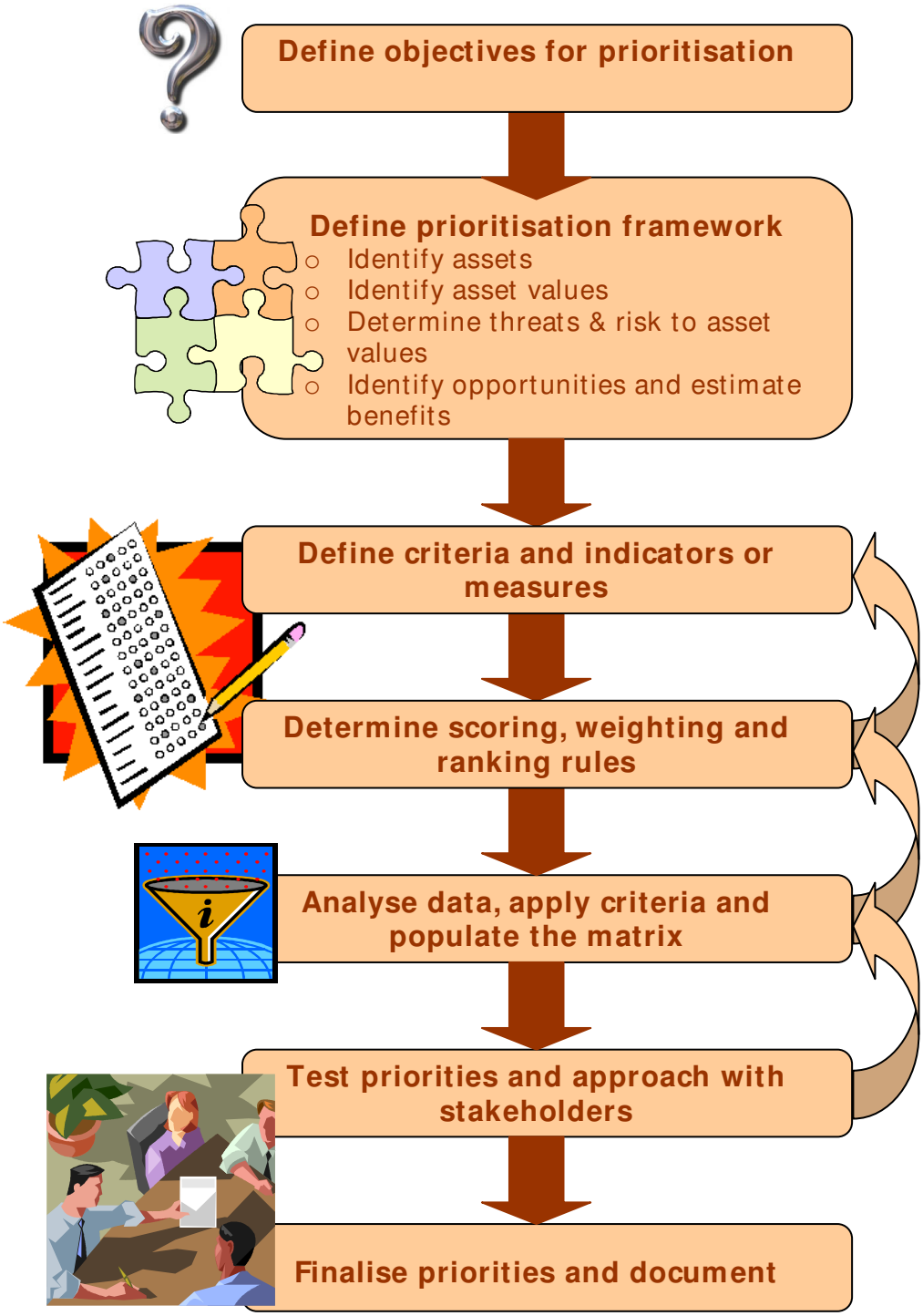
3.1 Overview of approach

Asset-based planning

The conceptual framework developed for this project is consistent with the 'assets-based approach' used by the Board in developing the Integrated NRM Plan and associated investment strategies for the region. Asset-based planning focuses on **natural assets** rather than issues, and management strategies and priorities that address multiple threats to an asset of value to the community in an integrated way.

The framework also builds on work undertaken by DWLBC (DWLBC, 2005b) which proposed the use of a triage approach to developing a framework for prioritising floodplains using three key elements – value, threat and feasibility.

The staged approach and basic elements of the conceptual framework are illustrated on the next page in figure 2 and are discussed further in the following sections.



- **Figure 2: Proposed approach to prioritisation**

3.2 Defining objectives for prioritisation

The *Environmental Flows for the River Murray* strategy outlines policies and plans that will guide decision-making for delivering and managing environmental water in South Australia. The Strategy recognises that environmental water is just one of many important issues that will result in improved river health and ecological health of floodplains and wetlands. The Strategy's vision is:

"Environmental flows in the River Murray are managed to enhance ecological outcomes for South Australia's priority ecological assets"

The South Australian Government has recognised the need for better and more transparent decision-making around the management and delivery of environmental water in South Australia. To this end the RMEM function has been established with the purpose to "***oversee environmental flow decisions, ensuring those decisions maximise river health and biological diversity for the River Murray, its floodplains and wetlands***".

The Board is responsible for undertaking regional delivery of coordinated and integrated wetland, floodplain and in-stream watering activities. It also supports the community to develop and implement wetland and floodplain management plans and undertake monitoring, evaluation and reporting activities. The Board implements on-ground actions and seeks community input into plans and policies. In undertaking its responsibilities, **the Board considers environmental, economic and social risks and benefits of its activities**.

The **principal interests of the RMEM function however is to maximise ecological outcomes**. The role of that function therefore is to deal primarily in the environmental risks and benefits of its activities, while recognising that secondary economic and social benefits may also be achieved and that undesirable impacts need to be avoided and mitigated. Importantly for this project, the RMEM function is not being asked by Government to make decisions regarding economic, social or cultural values or trade-offs in considering and determining strategic floodplain priorities for ecological benefits. Social, cultural and economic values will be considered at the project scale when assessing feasibility and risk. These issues will also be taken into account in the Board's broader prioritisation processes as part of their NRM planning and investment activities.

The strategic objectives for prioritisation of floodplain assets for environmental water management and delivery are therefore to identify high value floodplains which are ecologically healthy and floodplains that can potentially be improved in ecological condition, in line with the "Principles for prioritisation of assets" (section 2.3 above). This is consistent with the purpose, objectives and key functions of the RMEM and the current policy and strategic context in which the RMEM function operates.

3.3 Determining a prioritisation framework

There are five key elements to the proposed prioritisation framework:

1) Identify the asset and determine the scale at which prioritisation occurs;
2) Determine the basis for identifying asset environmental values;
3) Determine the basis for identifying threats and assessing risk;
4) Identify and assess opportunities to deal with threats to floodplain values; and
5) Determine floodplain priorities.

Each of these elements are discussed in detail below.

3.3.1 Identifying the asset and issues of scale

> ***Asset, natural resource –*** *a natural resource or landscape feature. Assets are geographically identifiable and provide services of value to humans or nature. Natural resource assets affect and are affected by economic and social assets (i.e. infrastructure and people).* Fleming *et. al.* (2003)

'Assets' currently form the building blocks of natural resource management (NRM) planning in Australia. They are the focus for making decisions about how to best prioritise management effort and investment. These decisions are usually made on the basis of the asset 'value' (see section 3.3.2 below). Biophysical entities within a region are considered assets because of their productive, social or intrinsic values (DSE, undated).

The *Victorian River Health Strategy* defines an environmental asset as "*the biota, habitats and ecological processes of an area* (DNRE, 2002: 151). This interpretation of assets includes both attributes and uses of environmental and human systems as assets to be protected through improved river management. Within the NRM planning context, assets need to be defined at the level at which action planning occurs and trade-offs between asset values are made (DSE, 2003).

In the early stages of the project **floodplain units** were the agreed asset as they were the most appropriate scale at which to interrogate and analyse data. Final priorities are represented as Floodplain Response Units divided into areas high on the floodplain and low on the floodplain. This recognises hydrologic conductivity across lower parts of the floodplain.

3.3.2 Asset valuation

> ***Value –*** *is a measure of worth that people place on an entity, it includes all economic, environmental, social or cultural significance, whether measurable in monetary terms or not. The value may be absolute or relative within a region (for example, an internationally versus locally important wetland).* Fleming *et. al.* (2003)

Natural resource assets are environmental entities that provide a broad range of services used in a variety of ways and it is those services that are valued. Furthermore it is recognised that the natural resources assets provide a flow of services over time, and it is this on-going flow of services that is of particular importance (Fleming *et. al*., 2003). This provides a conceptual framework for long-term enhancement (or at least preservation) of natural resource assets , because people should be interested in ensuring that the asset will remain in perpetuity as a capital stock for the future provision of services (Fleming *et. al*., 2003).

Floodplain values are a function of the ecological, social/ cultural and economic values of a given floodplain. Given the objectives for prioritisation (section 3.2) we are only concerned here with ecological or environmental values. Other values will be incorporated into decision-making via other processes including broader stakeholder engagement.

This project focuses on values of terrestrial components of the floodplain as aquatic values will be considered in the wetland prioritisation project. Information from both projects will be used to support decision making.

The project steering committee considered two different approaches to asset valuation in the early stages of the project – i) valuing ecological services and ii) valuing good environmental health and condition.

Valuing ecological services

CSIRO have developed a conceptual framework to demonstrate the role of ecosystem services in maintaining natural assets and in supporting the production of goods of value (see for example Cork *et. al*., 2001 and Shelton *et. al.,* 2001). Valuing asset services in the pure sense may not be as important as relative values for each of the services (Fleming *et. al*., 2003). Relative value of asset services needs to be linked to scientifically defensible criteria for determining the level of services that an asset provides.

Valuing services provided by natural resource assets can be complex, time-consuming and tend to rely on qualitative information. For these reasons, the project steering committee decided that this approach was not suitable given the project's objectives and scope.

Valuing good environmental health and condition

An alternative, more pragmatic approach to valuing assets is to attribute value to the ecological characteristics of the asset that contribute to its overall environmental health. This is the approach that is largely adopted in Victorian River Health Strategy, whereby

environmental values of river systems are assessed according to criteria relating to ecological characteristics and importance of the river.

The Victorian River Health Strategy (VRHS) notes that in making decisions on river protection, management and restoration, communities need to balance the economic, social and environmental values associated with rivers. Environmental values of river systems should be judged according to the following criteria:

- **naturalness** – how close the system is to a natural state (i.e. natural macro-invertebrate communities; natural riparian vegetation width, structure and continuity; natural fish populations; fish migration; ecologically healthy river);
- **rarity** – how rare are the features or functioning of the river (i.e. rare and threatened species, significant Ecological Vegetation Classes; rare genetic strains of species; wetland significance; unusual geological or geomorphological features, rare macrohabitats (i.e. floodplains in good working order);
- **representativeness**;
- **diversity**;
- **importance for other systems** – some systems are of considerable value because of their significance at the landscape scale (as breeding areas (estuaries, floodplains)) (e.g. Heritage Rivers, Ramsar wetland or as source areas for stressed systems).

River reaches are assessed against these criteria using a range of measures which are supported by data collated through various means, for example:

- The RiVERS database is used by Catchment Management Authorities (CMA) in the development of Regional River Health Strategies. It integrates environmental, social, and economic information from a variety of sources into a single package. For each of the assets and threats, an index value between 0-5 is assigned, with the higher values generally representing an increasing 'value' of the asset, or a decreasing level of the threat.
- The Index of Stream Condition (ISC) benchmarks river health across Victoria. ISC assessments are surveyed once every five years providing a snap shot of river reach condition. CMAs utilise ISC data for target-setting and prioritising actions in Regional River Health Strategies. The ISC method consists of five components, including – hydrology; biology; physical and chemical parameters; streamside zone; and physical condition.
- The Victorian *Habitat Hectares* approach has been developed to assist in making more objective and explicit decisions about the allocation of resources for native vegetation management. It provides a generic measure of the relative quality (not value) of native vegetation on the basis of weighted factors associated with the site conditions and landscape context.

The Goulburn-Broken Catchment Management Authority has, for example, related measures in the RiVERS database to different characteristics of an ecologically healthy river (see below) (GBCMA, 2004).

- **Table 2: Characteristics and measures of an ecologically healthy river (GBCMA, 2004)**

Characteristics of an ecologically healthy river (VRHS)	Measures in RiVERS
In the river and riparian zone, the majority of plant and animal species are native and no exotic species dominate the system	▪ Invertebrate composition ▪ Native fish O/E ▪ Exotic fish proportion ▪ Exotic flora ▪ Exotic fauna
Natural ecosystem processes are maintained	▪ Riparian width ▪ Riparian continuity ▪ Structural intactness ▪ WQ trend ▪ WQ level ▪ Temperature ▪ Flow deviation
Major natural habitat features are represented and are maintained over time	▪ Bank erosion/stability ▪ Channel form ▪ Streamside zone ▪ Instream habitat ▪ Stock access
Native fish and other fauna can move and migrate up and down the river	▪ Barriers
Linkages between the river and floodplain and associated wetlands are able to maintain ecological processes	▪ Wetland connectivity
Natural linkages with the sea or terminal lakes are maintained	N/A
Associated estuaries and terminal lake systems are productive ecosystems	N/A

Given the nature of the objectives identified for this project and the availability of data, it was agreed by the project steering committee that this approach was preferred to that of attempting to identify and value the environmental services provided by floodplain units. It was considered more practical to identify and value their environmental characteristics and condition. This is based on the premise that a floodplain unit in good ecological health provides a high level of environmental services and therefore has high environmental values.

There are a number of assumptions associated with this approach:

- The relationship between asset condition, the level of environmental services provided by the asset and it's environmental value:
  - A floodplain unit in good ecological health provides a high level of environmental services and therefore has high environmental values.
  - A floodplain unit in moderate ecological health provides a moderate level of environmental services and therefore has moderate environmental values.
  - A floodplain unit in poor ecological health provides a low level of environmental services and therefore has low environmental values.
- The temporal scale at which valuation occurs is in the present as it is based on the current condition of the asset. Consideration of future condition, level of services and therefore value has not been undertaken. Implicit in this assumption of value is that the condition of the asset is neither improving nor declining - an assumption we know to be unlikely. Potential changes in condition of the asset will be taken into account in

determining the level of risk of threats impacting on the asset and the potential to address threats by environmental watering activities (see section 3.3.3 below).

Characteristics of a healthy floodplain

The project steering committee decided to develop criteria and/or define characteristics of a healthy floodplain based on the approach outlined above (i.e. naturalness, rarity, representiveness etc.) however specific criteria and measures would differ somewhat from those of river systems.

Suggested 'first cut' criteria and possible measures for analysing floodplain values (Table 3) were proposed, recognising that they would need to be reviewed and consolidated in the context of data availability, coverage and scale.

- **Table 3: Potential criteria and measures for estimating floodplain value.**

Characteristic	Measure
Naturalness & Diversity	
Ratio of natives/endemics to exotics (flora, fauna, fish)	# or coverage (ha)
Fish migration	# and placement of barriers
Biodiversity conservation values (vegetation/habitat)	?
Tree health	ratio of healthy to unhealthy or unhealthy coverage
Level of development	ratio of land not developed: developed (ha)
Land management practices	presence of grazing, irrigation etc on the floodplain.
Wetland health	ratio of good to poor health (#, ha, score)
Width or area of riparian vegetation	width (m or km) (area (ha)
Longitudinal riparian continuity	% area with good to poor connectivity
Invertebrate communities (aquatic, terrestrial)	composition and # sp
Erosion & geomorphic processes	level of erosion
Rarity	
National or state rare/threatened flora	# and coverage of species
National or state rare/threatened fauna	# and coverage of species
Significant/ rare wetlands	# and coverage (ha)
Unusual geological or geomorphic features	location
Rare or critical habitat	location and coverage
Importance	
Significant large-scale ecological site (e.g. RAMSAR wetland, TLM Icon site)	presence and location – yes/no
Locally significant ecological site	presence and location – yes/no
Heritage Agreement	presence and location – yes/no
Breeding or spawning area	presence of area(s) – yes/no
Links between river, floodplain & wetlands	level of connectivity

Potential data sources were assessed to determine their suitability for measuring and assessing against draft criteria. A review of data showed that there was very little information of sufficient quality, reliability and coverage to be used in such a broad-scale

assessment of floodplain values. The companion data and analysis report (Miles *et. al.,* 2007) details these data sources and the rationale for selecting or rejecting data and models for use in the analysis.

As detailed in the companion data and analysis report (Miles *et. al.,* 2007), tree health and vegetation associations is the most complete and recent dataset for use in the values assessment for the River Murray floodplain. The assessment of floodplain values in this project is therefore based on health of the dominant tree species and presence of shrub communities as indicators of floodplain health. Final floodplain values are expressed as high, medium and low values as follows:

- **High values** = healthy trees, shrubs indicating high value system, system in a highly functioning and stable state;
- **Medium values** = unhealthy trees, shrubs indicating moderate value system, system in a high function state but declining trend; and
- **Low values** = dead trees, shrubs indicating low value systems (e.g. halophytic), system in a low function state.

While there are limits to this analysis it was agreed by the project steering committee and the technical working group that this was an appropriate use of best available information provided that other data was used to validate results and recognising that it would be replaced or supplemented as better data became available.

3.3.3 Identifying and assessing risks to values

Threats and risk

> ***Risk –*** *a measure of the probability of a threat occurring and impacting upon a natural resource asset. Also, the possibility of management actions not delivering the desired outputs and outcome.* Fleming *et. al.* (2003).
>
> ***Threat –*** *a source of impending danger or harm to the condition of natural resource assets or the services that they provide. Threat can be human activities (such as changing land use) or natural or biophysical processes like flooding. Human influence is, however, most often the source of a threat.* Fleming *et. al.* (2003)

Consideration of risk is relevant to two aspects of planning and prioritisation. Firstly there are risks to natural resources assets in the form of threats to the condition of assets and their services. Secondly, there are implementation risks associated with factors that may affect the success of management actions in achieving the desired outcomes (Fleming *et. al.,* 2003). The former is dealt with here and the latter are questions of feasibility that will be considered in later stages of prioritisation.

The first step in the process is to identify threats to assets. Assets and their services can be affected by a variety of threatening processes that are linked to human activities and broadscale landscape and environmental processes. Threats are potential causes of degradation to the asset and its associated services by natural or induced processes such as salinity, vegetation clearance or the spread of pest plants and animals. These issues threaten the quality of an asset and/or the services it provides (DSE, undated).

Many different causes can lead to the same outcome, so threat assessments need to clearly distinguish between threatening activities (e.g. vegetation clearing), threatening processes (e.g. rising saline watertable) and impacts (e.g. poor water quality, loss of arable land, habitat loss) (DSE, undated).

Likelihood and consequence

The conventional risk assessment framework is to assess the relative **likelihood** and **consequence** of threats to assets.

> ***Likelihood –*** *the chance of a threatening process reaching a threshold rate or magnitude based on landscape characteristics and management actions that influence the inherent susceptibility of the landscape to specific threatening processes.* Fleming *et. al.* (2003)
>
> ***Consequence –*** *the outcome of a threatening process acting on an asset, which is a function of the sensitivity (level of response of an asset to a specific threatening process) and value.* Fleming *et. al.* (2003)

The 'likelihood' assessment of risk to assets can be enhanced through the use of spatial and temporal information indicating where the threat is occurring and its rate of spread and confidence in the information used in the assessment. These elements can be tabulated to determine the overall priority for each threatening process against each of the affected assets. The consequence assessment can incorporate economic, environmental or social considerations and tends to be more qualitative in nature because it deals with future, unknown implications.

In establishing priorities, the threat itself should not be the only justification for action. The link between a threat and the loss in asset services or value should be used to prioritise action (Fleming *et. al.,* 2003).

Determining threats and risks to floodplains

The vegetation of the South Australian River Murray floodplain has been negatively impacted upon by reduced soil water availability. This is a result of the combined impact of reduced flooding and increased salinity and has affected mature vegetation as well as recruitment of new vegetation. The processes leading to reduced plant water availability are:

- Reduced surface water flows, through a reduction in the size and frequency of floods, and increased groundwater discharge, bringing with it salts into floodplain

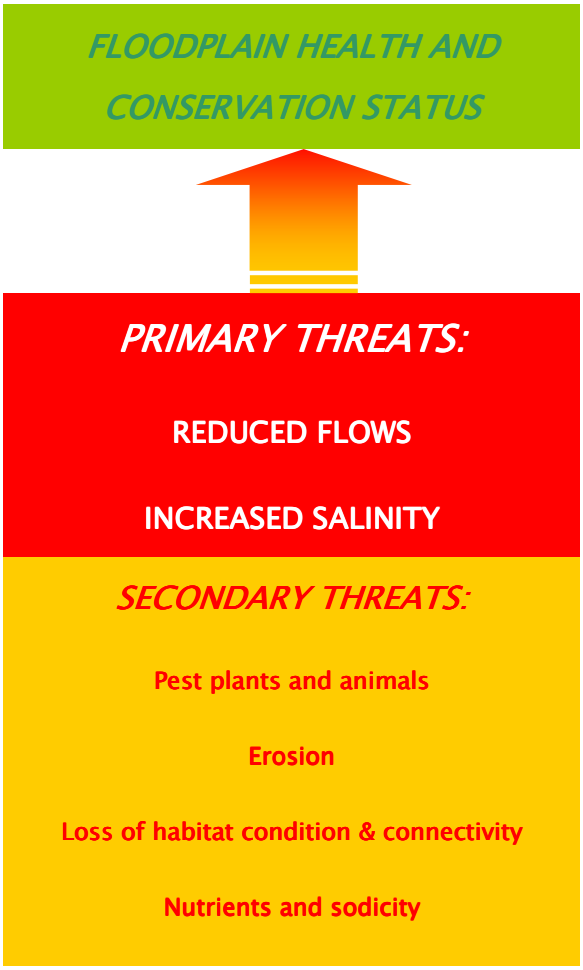
soils (caused by increased groundwater recharge in dryland and irrigation areas); and

- High weir pools which can also produce raised groundwater in some areas and are expected to contribute to salt accumulation in floodplain soils.

These processes have worked together to result in reduced plant water availability and when combined with drought conditions that have occurred in recent years, have been devastating to floodplain vegetation health, resulting in reduced habitat values for key species and overall poor floodplain values. The threat of reduced water availability is considered to be the primary threat to values of floodplain assets. The analysis of threats to floodplain values in this project have therefore focused on the primary threats to floodplain health and condition which are considered to be reduced floodplain flows and increased salinity (Holland et. al., 2005).

Reduced surface water flows, combined with the introduction of floodplain barriers have also resulted in altered connectivity between the river and floodplain wetlands. This is a particular threat to wetland values and the recruitment of key fish species but it also interrupts nutrient and energy pathways through the river-floodplain continuum. It is very difficult to identify the threat of reduced connectivity of flows between the river and wetlands and between floodplain wetlands with the data available. This may be best considered at smaller scales of planning. For the purpose of this analysis it is assumed that strategies that deal with the threat of reduced flows will also deal with the threat of reduced connectivity.

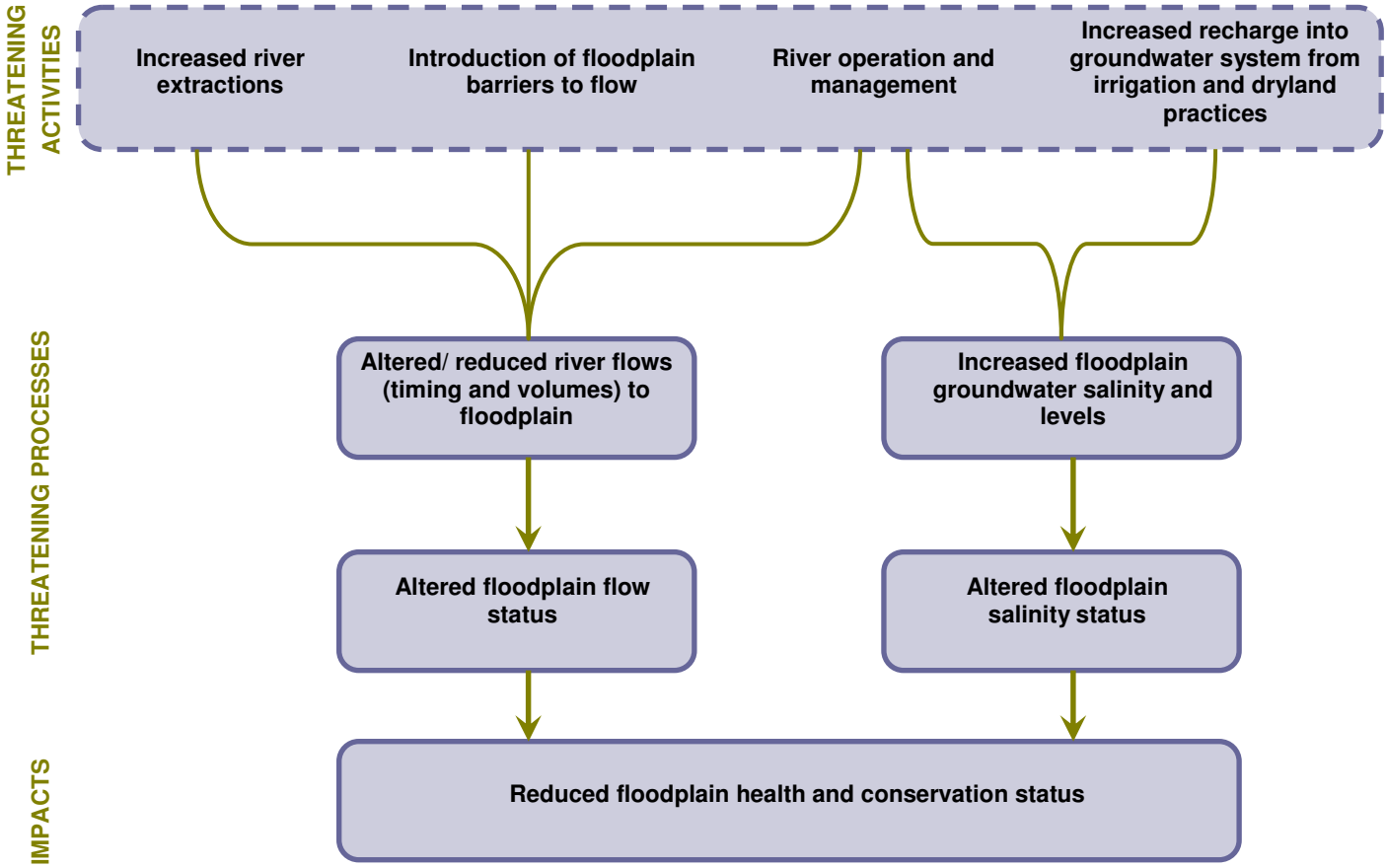
Figure 3 below indicates the **primary threats** and **secondary threats** that impact floodplains. The **induced effect of the threat** has been identified here rather than the threatening action itself (i.e. actions such as grazing and recreation pressures are not mentioned). For the purposes of this project, the threat analysis has focused on the induced threat and impact. There are some other threats to values including excess flooding for some wetlands upstream of locks, pest plants and animal infestations, excess nutrient, sodicity, erosion, grazing and recreational impacts. These are considered to be secondary threats beyond the scope of the project's objectives and are thus not specifically considered in this analysis.



- **Figure 3 Primary threats and secondary threats to floodplain health and conservation status.**

All of the above (primary and secondary) threats can contribute to a decline in habitat condition and the connectivity of habitat across the floodplain and between the river and the floodplain. It is proposed that dealing with the primary threats to floodplain values will result in improved vegetation condition and therefore improved habitat connectivity.

Figure 4 below illustrates the **dominant threats** to floodplain health beginning with the threatening actions which lead to the induced effect of the threat, and then the consequence of the threat.



- **Figure 4 Dominant threat processes on the River Murray floodplain**

The threat analysis focussed on the primary threats to floodplain values - reduced flooding and increased salinity.

The analysis of the 'flow threat' used the River Murray Floodplain Inundation Model (FIM) flood threshold data, DEH vegetation community data and DEH tree health data to look at the spatial distribution of tree health across the floodplain and its dependence on flood threshold. The following flow threat classes were derived:

- Flood threshold < 50 000 ML/d = low flow threat (<40% unhealthy from reduced flooding).
- Flood threshold 50 - 80 000 ML/d = medium flow threat (40-70% unhealthy from reduced flooding).
- Flood threshold >80 000 ML/d = high flow threat (>70% unhealthy from reduced flooding).

The Floodplain Risk Methodology (FRM) was used to assess 'salinity threat' and if was likely to be managed or modified. This depended on the degree to which irrigation as opposed to

long-term weir pool height was driving the potential salinity risk and the potential benefits from planned salt interception schemes. The following salinity threat classes were derived:

- High salinity threat = category 1 (High FWIP, High Weir Pool, no fresh lens) and category 2 (High FWIP, Low Weir Pool but no SIS);
- Medium salinity threat =3 (High FWIP, low Weir Pool and SIS planned), 4 (High FWIP, High Weir Pool, fresh lens); and
- Low salinity threat = 6 (Low FWIP, low Weir Pool).

More detailed information regarding the approach to the threat analysis is provided in the companion data report (Miles *et. al.,* 2007).

3.3.4 Feasibility to deliver environmental flows to floodplains

Given that the core objective of the project is to prioritise floodplain areas for environmental water management and delivery, a basic assumption is that if flows can be delivered to an area then there is a high feasibility that the primary threats can be managed or mitigated, particularly with regard to flow threats. This assumes that if the physical environment is improved then ecological processes will follow. Alternatively, if primary threats are not able to be managed then ecological improvement will not be achieved.

Amelioration should focus on dealing with primary threats to values and must deal with groundwater conditions or surface water conditions that result in reduced soil water availability and altered floodplain connectivity (river-floodplain-wetland). Without addressing these threatening processes protection or rehabilitation is unlikely to be successful.

In terms of groundwater management this would require that groundwater recharge is prevented from entering the floodplain groundwater system, or should this have already occurred that groundwater is locally lowered or freshened.

In terms of surface water this would require that flows sufficient to satisfy ecological processes, and leach salt from the soil, are able to be delivered to the site.

The degree to which floodplain salinisation can be managed by groundwater or surface water management alone is unknown and so for the purpose of this analysis it is assumed that management must include a combination of groundwater and surface water management to effectively deal with threats. It is also important that any analysis of environmental watering opportunities is linked to the primary threats occurring at a given site.

A broad analysis of environmental flow options and flow bands and their corresponding potential to deliver ecological flow requirements. Three feasibility scenarios were identified to inform prioritisation taking into account the role and function of the RMEM.

The focus of RMEM operations is locally managed environmental flow actions, which could include weir pool manipulation, pumping and gravity feeding of water into wetlands, creeks and floodplain depressions. However the RMEM is also concerned with identifying priority

areas that may be watered by system-wide actions. Table 4 below summarises opportunities to deliver environmental flows under different flow bands. Some of these actions can be undertaken in parallel to maximise outcomes (e.g. weir pool raising and pumping, weir pool raising and storage releases).

- **Table 4: Opportunities to deliver flows**

Flow band (GL/day)	Weir raising	Weir lowering	Barrage releases	Pumping to wetland and floodplain depressions	Freshwater injections into groundwater	Gravity diversions to wetlands and creeks??	Management of flows through floodplain infrastructure	Wetting/ drying pool level wetlands	Uncontrolled flooding	Top up storage releases and pre-releases	Implement changed river operating rules
<7	Y	Y	Y	Y	Y	Y		Y			Y
7-15	Y		Y	Y	Y	Y		Y		Y	Y
15-30	Y		Y	Y	Y	Y				Y	Y
30-40	Y		Y	Y	Y	Y				Y	Y
40-50	Y		Y	Y	Y	Y	Y			Y	
50-60	Y		Y		Y	Y	Y			Y	
60-80			Y				Y		Y	Y	
80-100			Y						Y		
>100									Y		

Three feasibility scenarios were proposed as part of the prioritisation analysis:

Scenario 1: Areas in which local managed flow activities are the expected focus - An analysis of flow opportunities by flow bands (Table 4) indicates that managed flow opportunities are most likely to be useful in the <50,000 ML/day flow band. It is proposed that the areas defined by the FIM model when run at maximum weir raising capacity at maximum flow (prior to overtopping weir) be used to define scenario 1.

Scenario 2: Areas that are less able to be directly managed by the RMEM and which system-wide actions are the expected focus - Above 50,000 ML/day flows are generally going to be unmanaged by local environmental actions. Uncontrolled flooding, complemented by system-wide actions are more likely to be opportunities within these flow bands. There may be areas outside of the 50,000 ML/day flow band that could be a priority for locally managed delivery of environmental flows, but this should be based on values and the degree of threats. It is proposed that the area defined by the 80,000 ML/day flow band be used to define scenario 2. This is the flow range in which black box health is currently good.

Scenario 3: Areas that are unlikely to get managed flows and will essentially be left to its own devices - Above 80,000 ML/day flow band. Could be a focus for environmental watering if was considered to be high value.

Within the context of changing climatic conditions and water resource availability the potential to target areas is going to be severely limited outside of the 50,000 ML/flow band,

and more so outside of the 80,000 ML/day flow band. Decision-makers need to ensure that managed environmental flow activities can be targeted to areas that are likely to get naturally sustainable flows, as a stop gap, to assist with drought proofing the floodplain and to target effort to areas when flows are able to be managed.

The scenarios also recognize that above 80,000 ML/day there may be high value areas that could be a focus depending on the available technology and infrastructure which will be influenced by economic feasibility.

More detailed information regarding the approach to the analysis of flow opportunities as an element of flow threat and is provided in the companion data and analysis report (Miles *et. al.,* 2007).

3.3.5 Determining floodplain priorities

The assessment of floodplain priorities was undertaken via GIS analysis of values, threats and opportunities datasets. While each of these data sets can be considered as stand-alone datasets, they were queried in different ways to indicate priorities for environmental water delivery and management.

A set of queries were developed to analyse the datasets and to prioritise on the basis of values, threats and feasibility scenarios and recommended management options (i.e. whether the site should be protected and maintained or rehabilitated). These queries are outlined in more detail in the companion data and analysis report (Miles *et. al.,* 2007).

The method recognises that the values and threats datasets can be analysed in different ways depending on the purpose of prioritisation and this will be influenced by the environmental and water resource conditions prevalent at the time of decision-making. Throughout the consultation for this project it was clear that floodplain priorities needed to be contextualised by their management objectives – were floodplains being prioritised for maintenance and protection or rehabilitation? The following categories guided prioritisation queries to align with management objectives:

Priorities for maintenance/ protection:

Priority areas for maintenance and/or protection are defined as areas where environmental flows are most likely to maintain and/or protect environmental values as follows.

- There is a need to protect/maintain all high value sites.
- Priorities for maintenance and/or protection are influenced strongly by flow feasibility.
- However where there is a high salinity threat, these areas are given a lower priority rating and are noted for protection from future salinity threats.

Priorities for rehabilitation:

Priority areas for rehabilitation are defined as areas where environmental flows are most likely to achieve environmental outcomes as follows.

- Moderate and low value areas indicate priority for rehabilitation. Low value areas will be a lesser priority than moderate value sites.
- Rehabilitation priorities are strongly influenced by the combination of threats and the feasibility.
- Areas where a low flow threat/high flow feasibility occurs are always a high priority and would only have a reduced priority where a high salinity threat occurs.
- Areas that are under moderate threat from salinity threat are prioritized subject to SIS being implemented.

4. Results, observations and validation

4.1 Results and observations

Based on the prioritisation criteria the following areas have a significant proportion of locations rated as high priority for rehabilitation and maintenance:

- Parts of the Chowilla floodplain
- Floodplain areas from upper Woolenook Bend to Lock 6 (mainly limited to approx 1.5 km either side of the river).
- Parts of Pike River floodplain
- Floodplain areas between Spectacle Lakes and Lock 4 (including Loxton/ Bookpurnong and Katarapko floodplain areas).
- Narrow gorge floodplains from below Lock 3 to Morgan and between Swan Reach and Blanchetown.

Based on the prioritisation criteria the following areas have a significant proportion of locations rated as low priority for rehabilitation and maintenance.

- Gurra Gurra floodplain
- Ral Ral floodplain
- Loch Luna floodplains
- Narrow gorge floodplains above Mannum
- The areas directly above Lock 3, Lock 4 and Lock 5 - due to the predicted risks of high weir pool levels on floodplain groundwater levels and salinisation.

Note: It is recognised that within these floodplain units there may be priority areas for action.

An example of the results are summarised in Figures 5 to 7 and more detail on interpretation of the results is provided in the accompanying data and analysis report (Miles *et. al.,* 2007). It should be noted that these results do not constitute Board priorities but will be used to inform policy and planning on environmental flows decisions including development of the *South Australian River Murray Strategic Watering Plan*. The Strategic Watering Plan will include consideration of these priorities in conjunction with community values for the floodplain, wetland prioritisation, in-channel prioritisation and other site based information.

4.2 Validation against other datasets

The results of the analysis have been compared and validated against a series of complementary datasets, including:

- Chowilla prioritisation
- National Parks and Heritage Agreements

- Ramsar sites
- Interim regional priority wetlands and watering sites
- National and Internationally important wetlands

This technical validation process is detailed in the companion data and analysis report (Miles *et. al.,* 2007).

4.3 Validation using stakeholder knowledge

The project steering committee guided and directed the project, making substantial contributions to the technical and conceptual development of the approach to prioritisation. The project steering committee acted as the first line of review and assessment.

While the project approach and outputs were regularly tested with the project steering committee, it was agreed that a wider range of technical stakeholders would need to be consulted to provide input to the project and test the findings of the analysis. This wider group of stakeholders comprised the project's Technical Working Group. Consultation with this group was undertaken to foster a shared understanding and agreement regarding the project process and outcomes.

Feedback and comments obtained through the workshops were used by the project team to revise and validate the data analysis for the project. A summary of the issues requiring action from each of the workshops is provided in the consultation report. This report shows how feedback from the stakeholder consultation has been dealt with and used to revise the prioritisation analysis. More detail is provided in the Consultation Report.

Figure 6 Floodplain Unit Scale – Lock 2 to Border

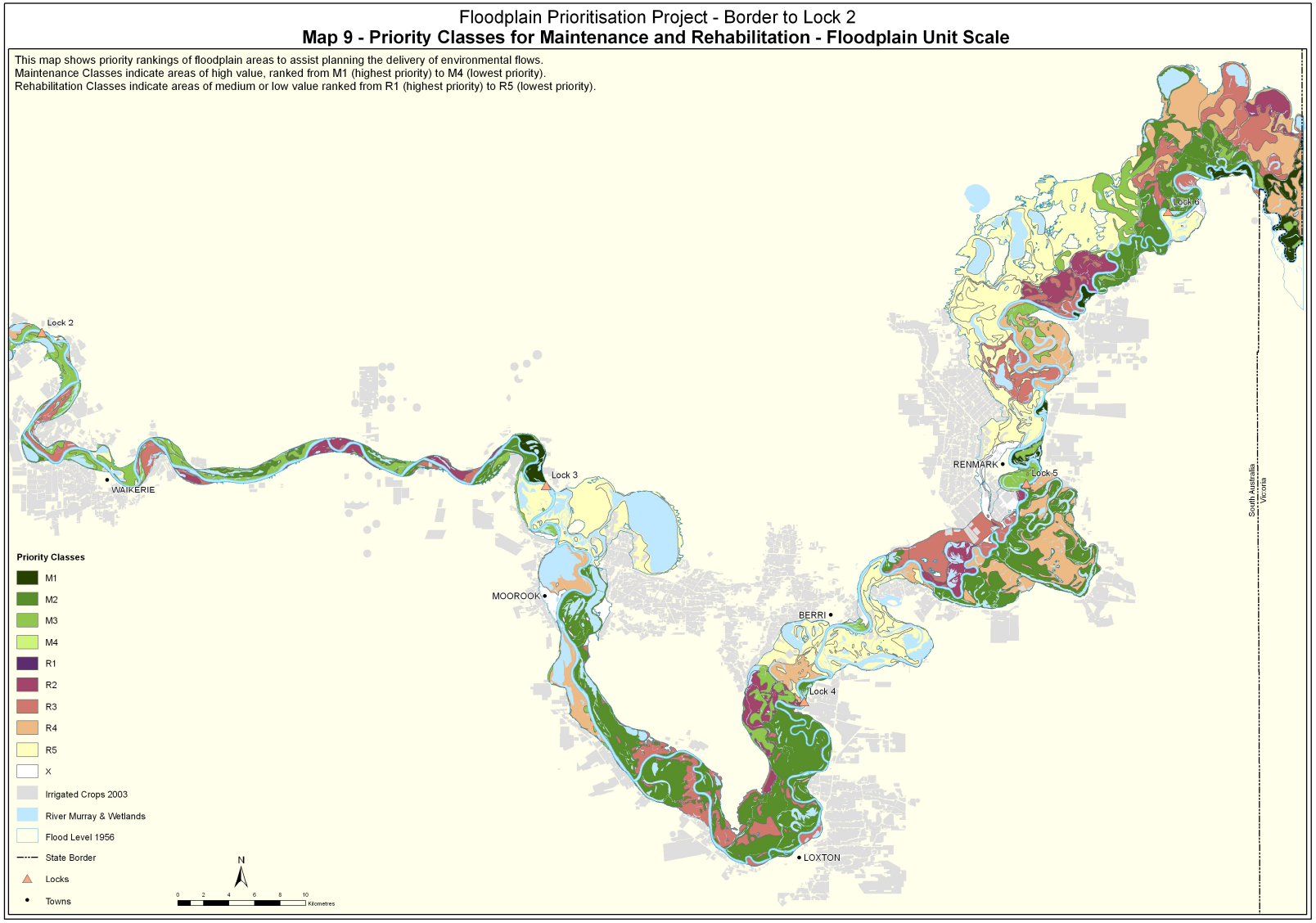


Figure 7 Floodplain Unit Scale – Nildottie area to Lock 2

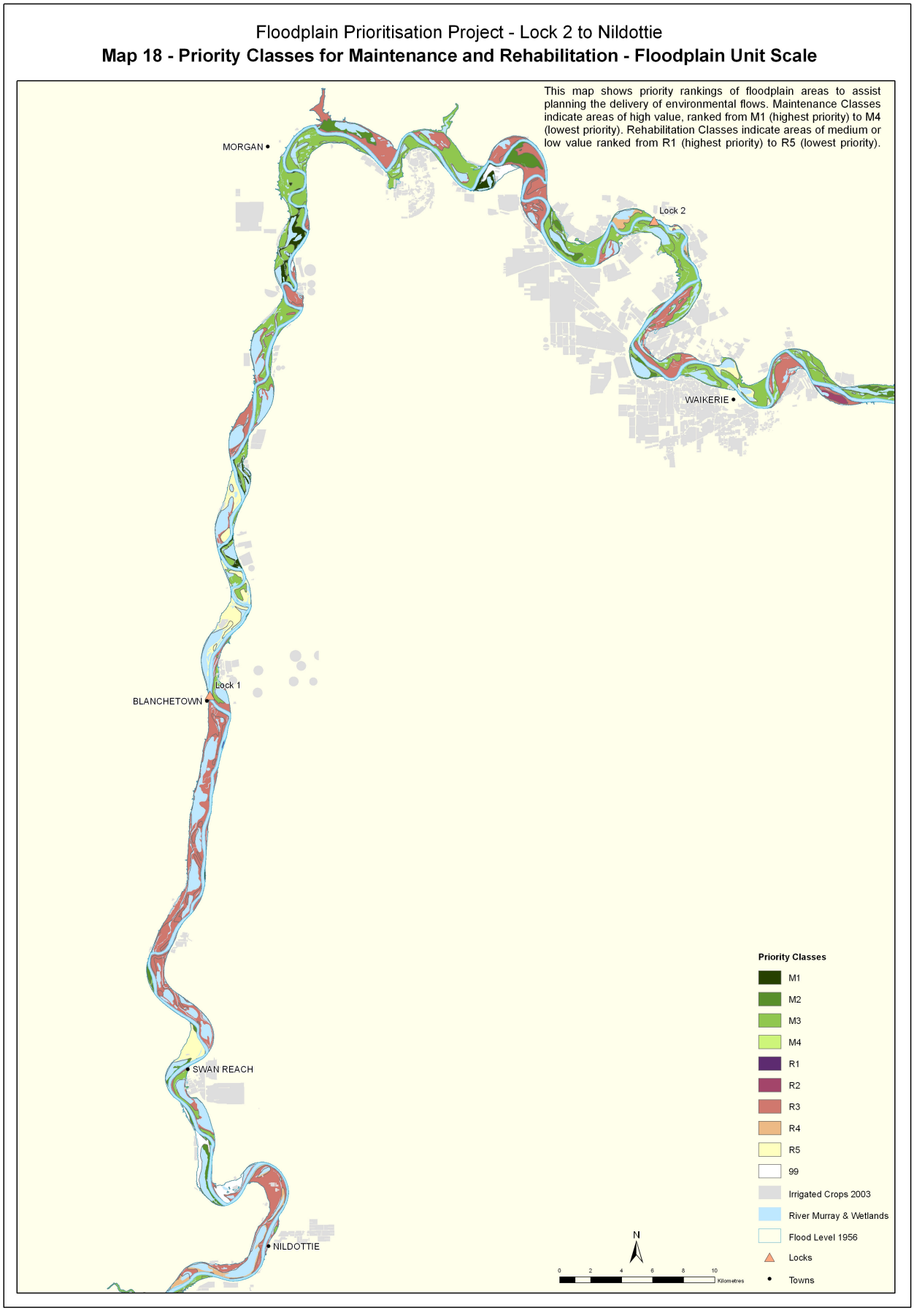
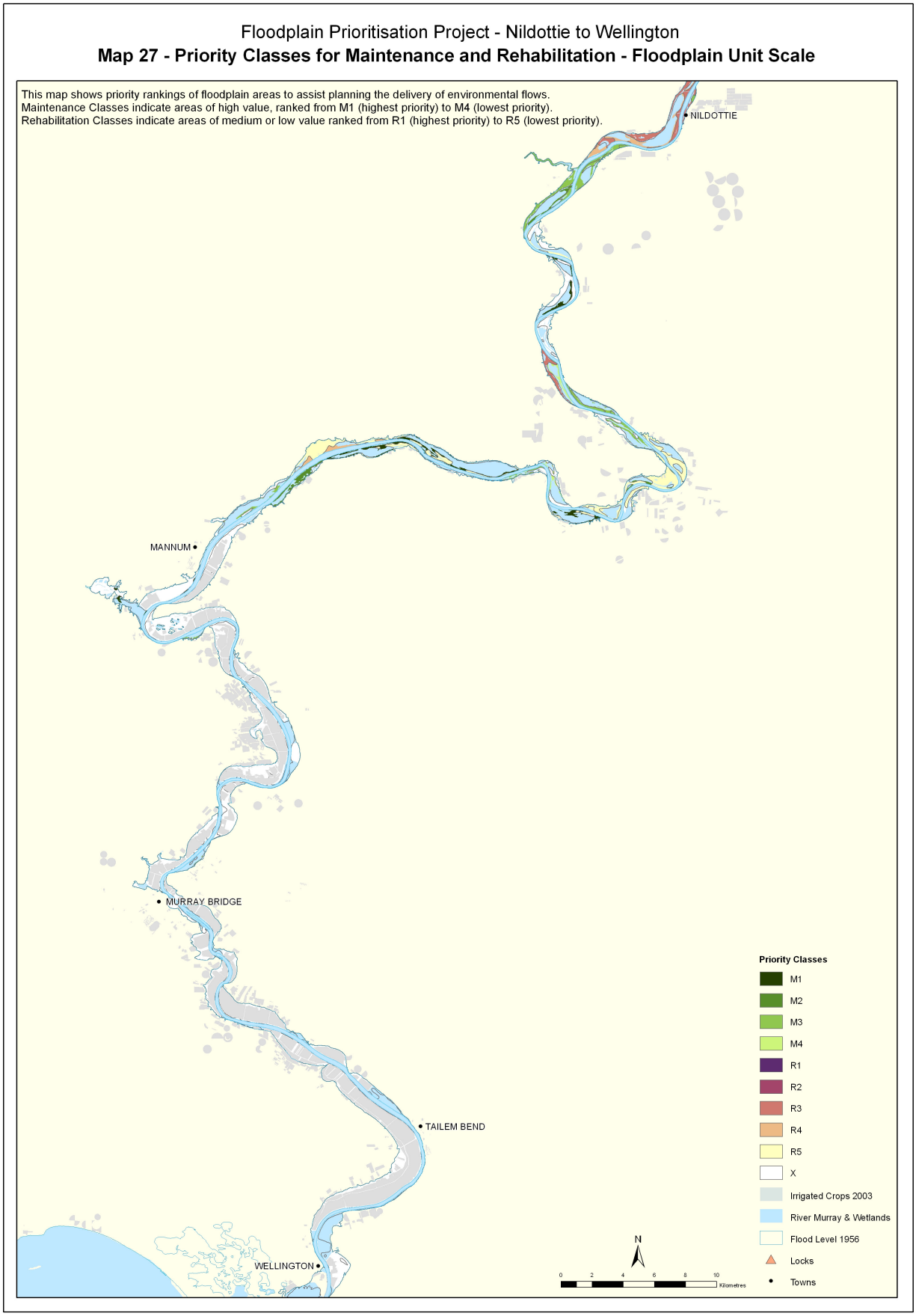


Figure 8 Floodplain Unit Scale – Nildottie area to Wellington



5. Next steps

5.1 Stakeholder consultation

As explained in sections 2.2 and 3.2, this project identifies priority floodplains for protection, maintenance and rehabilitation of environmental values. Stakeholder consultation for this project was therefore targeted towards technical experts given that the determination of strategic floodplain priorities focuses on improving ecological health.

The Board recognises however that the community also values floodplains for other cultural, social and economic reasons and that these values are important considerations in decision-making for environmental flow management and delivery. The Board also recognises that decisions relating to environmental flows also need to take into account the values and water requirements of other environmental assets such as wetlands, rivers, lakes and estuaries. This reflects key policies in the Environmental Flows for the River Murray strategy:

- *Decision-making and prioritisation for environmental watering will consider the environmental, economic, cultural and social values associated with ecological assets and the risks and benefits of undertaking watering activities.*
- *Decisions affecting environmental flows will be made within an integrated catchment management context and will recognise relationships between rivers, catchments, coastal/estuarine systems, broader landscapes and people.*

The way in which floodplain priorities may be considered in decision-making processes is described below in section 5.2. The way in which cultural, social and economic values can be identified for consideration will be heavily reliant on community engagement and consultation. As outlined in section 2.2, these values need to be considered at tactical and operational decision-making levels - when moving beyond strategic broad-scale priorities to identify specific sites and projects for implementation, such as for example in the Annual Watering Plan.

Further stakeholder consultation, involving both the community and technical specialists, will need to occur to provide inputs to the decision-making process that will supplement the strategic environmental floodplain priorities, such as for example:

- relative values of sites – ecological, social, cultural or economic;
- relative benefits of action/projects;
- relative risks of action/inaction;
- acceptability of tradeoffs;
- management of impacts & risks;
- site history and management;
- community support and momentum;
- feasibility (economic and technical);
- readiness and urgency to take action; and
- other complementary management actions or strategic priorities.

This information is likely to be sought during consultation for the Annual Watering Plan, in the assessment of environmental watering project proposals and in regional planning processes (e.g. floodplain plans). Consultation will also occur on the South Australian River Murray Watering Plan to broadly assess how environmental priorities align with community priorities. This consultation approach reflects another important policy of the Environmental Flows for the River Murray strategy, whereby "*Priority-setting and decision-making will engage communities through involvement in the development and implementation of regional environmental watering activities".*

It is recommended that a communications strategy be developed for the South Australian River Murray Strategic Watering Plan and the Annual Watering Plan that incorporates both the gathering of information from stakeholders (as necessary) and the communication of outcomes.

A communication strategy specific to this report and its outcomes is not considered necessary as floodplain priorities, and the process for identifying them, will be incorporated and integrated with other priorities (e.g. wetlands) into the South Australian River Murray Strategic Watering Plan. However, it is recommended that a summary report and basic datasets and/or maps be produced as this will inform regional planning and assist the Board in consultation with LAP groups and the community to identify strategic floodplain priorities for investment and action[1].

The Technical Working Group has identified a number of important issues that would need to be taken into consideration in communicating floodplain priorities:

- Need to acknowledge the limitations and uncertainties and clearly document the assumptions.
- Information needs to be presented at a regional scale and should not be used at a local scale.
- Floodplain priorities have been identified at a regional scale taking into account landscape-scale processes and impacts. Therefore priorities should only be used as a guide for more localised planning which will need to consider more local-scale factors (e.g. values, threats and condition).
- Need to be clear on how this information should be used to guide decision-making and planning.
- Floodplain priorities and wetland priorities are complementary but separate datasets, but should be considered in parallel.

[1] An alternative approach would be to wait until the Watering Plan is finalised and then produce a community report & basic datasets for that which includes all of the wetland and other priorities as well. It would be more integrated and inclusive then but obviously would be delayed.

Section 5.2 below proposes how the floodplain priority information may be used and by which stakeholders.

5.2 Integration of priorities into policy, planning and decision-making processes

The floodplain priorities identified through this project should inform and/or be incorporated into the following policy and planning instruments and decision-making processes:

- *South Australian River Murray Strategic Watering Plan* – Floodplain priorities will need to be considered along with other weir pool, wetland and in-stream priorities to establish the vision, objectives and targets for the delivery and management of environmental water along the River Murray in South Australia. This plan will identify and document priority broad-scale assets for environmental watering and will support annual decision-making through the Annual Watering Plan.
- *Annual Watering Plan* – The Annual Watering Plan provides the basis for seeking environmental water donations and the distribution of environmental water to project sites and assets based on the strategic priorities identified in the South Australian River Murray Strategic Watering Plan and the likely environmental water and funding availability within that water year. Floodplain priorities will be taken into account via the South Australian River Murray Watering Plan, but datasets may also be queried for more detailed information to support annual decision-making.
- *SA MDB NRM Plan* – Floodplain priorities should be considered in the development and implementation of the SAMDB NRM Plan and in the development and implementation of relevant programs and targeted actions.
- *Basin-scale decision-making processes* – Floodplain priorities will be an input to decision-making on the use of Living Murray water, river operations and surplus flow delivery and management in South Australia.
- *Regional and local management plans and projects (e.g. Floodplain Plans and Land and Water Management Plans)* – Floodplain priorities should be used by LAP groups to guide and focus investment and action through floodplain planning processes. This process will also provide communities with the feasibility to identify and document social, economic and cultural values associated with the identified strategic floodplain priorities (based on environmental values).
- *River Murray Act 2000* – Floodplain priorities can be used to support policy-making and implementation of the Act. In particular this information could be used to support implementation of elements of the Act that are not yet activated.

Floodplain priorities and the datasets that were developed to determine them may also be used by government agencies to support and inform a variety of relevant programs and projects, for example:

- Broad areas may inform freshwater protected areas (DEH)
- Wetland inventory (DEH)
- Naturelinks (DEH)

- Assessment of grazing licenses on the floodplain (DEH)
- Tree planting and rehabilitation for the River Murray Forest Project (DEH)
- Short-term drought response (DWLBC)
- Policy for irrigation impacts on the floodplain (DWLBC)
- Priorities for regional NRM programs and projects (SA MDB Board and the Riverland Regional NRM Group).

There is potential to use the datasets and analysis to inform salinity planning and policy including further SIS development. The analysis could be revised by removing the SIS from the analysis to determine the impacts of implementing/not implementing the SIS.

This project and the floodplain priorities may also assist in building a case for funding under programs such as the National Water Initiative and in leveraging funding for further data collection and analysis (section 5.3).

5.3 Future data and information needs

As highlighted above in section 3 and in the companion data and analysis report (Miles *et. al.,* 2007), this project has been constrained by the availability of good quality data at an appropriate scale and coverage. This has meant that compromises have needed to be made, in terms of the preferred approach (i.e. from the conceptual framework) and the actual approach undertaken. The major issues, limitations and recommendations are summarised below.

No suitable data is currently available to support an analysis of environmental values relating to diversity, rarity, representativeness, importance etc. at the coverage and scale required. The assessment of floodplain values in this project is therefore based on health of the dominant tree species and presence of shrub communities as indicators of floodplain health. A key limitation of the data, aside from it only representing tree health, is its currency and accuracy given the changing conditions (notably drought) since its collation in 2002. Another limitation related to the inability to consider habitat connectivity as a key element of landscape values.

It also recommended that clear guidance be given to regional bodies and LAP groups regarding the collation and analysis of 'values' information to facilitate consistent datasets that can be used to replace or supplement existing datasets. This should include guidance on appropriate criteria, measures and methods (as per examples in section 3.3.2). Consideration should also be given to developing and managing a 'living' database or GIS-based decision-support tool that integrates environmental, social, and economic information from a variety of sources, such as the RiVERS database in Victoria (section 3.3.2). A program and method to regularly and consistently measure changes in health and condition and to evaluate the effectiveness of action should also be given consideration (e.g. such as the Index of Stream Condition – section 3.3.2).

In terms of the threat analysis, the models used are considered to accurately represent the dominant processes but there is still some uncertainty associated with the impacts of SIS due to the way that the FRM considers SIS. Some smoothing and buffering has therefore been required. Refer to companion data and analysis report (Miles *et. al.,* 2007). In addition climate change and the impact of drought on the key threats of flow and salinity have not been considered in the analysis. In fact, there is very little consideration of temporal aspects or trends in the analysis with the exception of the projected impact of SIS on the salinity threat.

As identified in section 4.2 and in the companion data and analysis report (Miles *et. al.,* 2007), the analysis has been compared to various datasets for validation. Other data identified by the Technical Working Group that could improve prioritisation is also included in the companion data and analysis report (Miles *et. al.,* 2007).

Priorities for data collection and analysis should focus on improving the information available for environmental values, ecological condition/health and habitat connectivity. A process and guidelines will need to be developed to ensure transfer and effective use of both regional and local scale information to support regional and local planning and decision-making, particularly in the absence of a centralised integrated information system.

5.4 Process for updating floodplain priorities

As identified in section 5.1 ongoing consultation with community and technical stakeholders will improve the information base on which floodplain priorities have been developed. This will include the incorporation of information from existing projects (e.g. the wetland prioritisation project) and from future projects that will address some of the data gaps highlighted above (section 5.3).

A formal review and revision of floodplain priorities will be undertaken as part of the five year review of the *South Australian River Murray Strategic Watering Plan*. However it is recommended that the datasets used to determine these priorities be updated with newly available information at least on an annual basis to support annual decision-making through the Annual Watering Plan and to facilitate the development of a 'living' database or decision-support tool (section 5.3).

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7. Acknowledgements

The following people have been instrumental in the development of the Prioritisation of the South Australian River Murray Floodplain for the Delivery and Management of Environmental Water Project.

Project Steering Committee:

- Lisa Mensforth - SA Murray-Darling Basin Natural Resources Management Board
- Matt Miles – Department for Environment and Heritage
- Ian Burns – Department for Water, Land and Biodiversity Conservation
- Peter Waanders - SA Murray-Darling Basin Natural Resources Management Board
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- Andrew West - Department for Environment and Heritage
- Gaby Eckert - Department for Water, Land and Biodiversity Conservation

8. Appendices

Prioritisation of the SA River Murray Floodplain for Environmental Flows

CONSULTATION REPORT

- FINAL
- 16 January 2007

Prioritisation of the SA River Murray Floodplain for Environmental Flows

CONSULTATION REPORT

- FINAL
- 16 January 2007

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Contents

1. Introduction

1.1 Project background

The South Australian Murray-Darling Basin Natural Resource Management Board ('the Board') has obtained NAP funding to progress prioritisation frameworks and to establish priority floodplain areas along the River Murray in South Australia. To that end, SKM has been engaged by the Board to undertake the "*Prioritisation of the South Australian River Murray Floodplain for Environmental Flows*" project.

Project objectives

This project builds on the significant body of work and thinking already undertaken in this field to facilitate stakeholder agreement on priority floodplain areas within South Australia for the delivery and management of environmental flows. The focus of this project will be to establish broad-scale floodplain priorities on the basis of environmental values and threats and opportunities to manage these threats. The information arising from this project will be used as input to environmental flow decision-making processes and high level policy and strategic documents.

Report objectives

This report provides a summary of the process and outcomes of workshops with the project's Technical Working Group held on Thursday 22 June 2006 and Wednesday 18th October 2006. The objective of this paper is to document the workshop processes and outcomes.

1.2 Consultation and participation

1.2.1 Project Steering Committee

The project steering committee comprises key stakeholders from the SA MDB NRM Board, Department for Environment and Heritage and Department for Water, Land and Biodiversity Conservation:

- Lisa Mensforth -SA Murray-Darling Basin Natural Resources Management Board
- Matt Miles – Department for Environment and Heritage
- Ian Burns – Department for Water, Land and Biodiversity Conservation
- Peter Waanders - SA Murray-Darling Basin Natural Resources Management Board
- Judy Goode - SA Murray-Darling Basin Natural Resources Management Board

Additional project team members include:

- Camille McGregor - Sinclair Knight Merz
- Andrew West - Department for Environment and Heritage
- Gaby Eckert - Department for Water, Land and Biodiversity Conservation

The project steering committee guided and directed the project, making substantial contributions to the technical and conceptual development of the approach to prioritisation. The project steering committee acted as the first line of review and assessment.

1.2.2 Technical Working Group

While the project approach and outputs were regularly tested with the project steering committee, it was agreed that a wider range of technical stakeholders would need to be consulted to provide input to the project and test the findings of the analysis. This wider group of stakeholders comprises the project's Technical Working Group. Consultation with this group was undertaken to foster a shared understanding and agreement regarding the project process and outcomes. Participants are listed in Appendix A.

Feedback and comments obtained through the workshops were used by the project team to revise and validate the data analysis for the project. This report shows how feedback from the stakeholder consultation has been dealt with and used to revise the prioritisation analysis.

2. Workshop 1

2.1 Introduction

The initial tasks of the project saw the development and application of a proposed prioritisation framework. SKM developed a detailed discussion paper which outlined the proposed Draft Prioritisation Approach while Lisa Mensforth from the Board and Matt Miles of the Department of Environment and Heritage completed a trial application of the prioritisation approach.

While the proposed approach had been tested with the Project Steering Committee it was agreed that a wider range of technical stakeholders would need to be consulted so that they would have the opportunity to provide input to the project. This wider group of stakeholders comprised the project's Technical Working Group. Consultation with this group is intended to foster a shared understanding and agreement regarding the project process and outcomes.

Following the development and trial of the Draft Prioritisation Approach, it was timely to inform the Technical Working Group of project progress and to seek input on the proposed approach and trial outcomes.

This section includes a description of the workshop process, including the distribution of preparatory materials, an outline of the workshop structure and recording process, and provides a summary of the actual workshop process.

2.2 Purpose of workshop

The purpose of the workshop was:

- To provide the Technical Working Group with an update of project progress;
- To outline the proposed prioritisation framework and approach;
- To share the outcomes of the trial application of the proposed framework; and
- To seek input and feedback on proposed approach and trial.

The workshop was held on Thursday 22 June 2006 from 10.00 am until 3.00 pm at the Board Room of the offices of the National Environment Protection Council, Level 5, 81 Flinders Street, Adelaide. It was conducted by Camille McGregor and Alison Cusack from Sinclair Knight Merz, in conjunction with Lisa Mensforth from the Board and Matt Miles from the Department of Environment and Heritage.

2.3 Participants

The workshop participants comprised the Project Steering Committee and the Technical Working Group. A small number of additional key stakeholders were also invited due to their involvement in other related projects. A list of attendees is presented in Appendix A.

2.4 Structure

A copy of the agenda for the workshop is included in Appendix B. The agenda allowed for the presentation of detailed material in the morning session, covering background to the project and an update on project progress. Presentation of the outcomes of the trial application of the prioritisation framework was scheduled for the afternoon session. Feedback and discussion sessions were incorporated into the workshop program through out the day.

2.5 Preparatory materials

On Tuesday 13 June 2006, invitees were sent an agenda and a discussion paper (Draft Prioritisation Approach) to enable participants to review the paper prior to the workshop.

2.6 Process

The meeting was facilitated by Camille McGregor (SKM). Handouts were provided to participants in both the morning and afternoon sessions. A copy of these is included in **Error! Reference source not found.**.

In summary, the morning session provided an introduction to the project and proposed framework for prioritisation. During the presentation, questions and comments were taken and responded to as they arose. Issues which needed to be resolved or discussed in a separate forum were written up on the "Parking Lot" white board. The morning session ran ahead of schedule, and so the planned items for the afternoon session were commenced prior to lunch. Lisa Mensforth and Matt Miles introduced the trial application of the framework. After lunch their presentation continued, with detailed discussion and feedback received from participants. The meeting closed at approximately 3.00pm.

2.7 Recording

The room was set up to enable recording of comments, questions and discussion on two whiteboards. In addition, Alison Cusack took detailed notes during the meeting. Camille McGregor, Lisa Mensforth and Matt Miles also took notes during the meeting at various times.

2.8 Workshop outcomes

The feedback and discussion which occurred during the workshop has been analysed and summarised here into the following sections:

1) **General feedback** – a brief discussion relating to general feedback about the project progress and process and key challenges.
2) **Next steps** – a tabular summary of comments and feedback from the TWG and recommended actions to progress the project.
3) **Additional data sources for verification** – a summary of possible additional data sources that could be used for data verification.

2.8.1 General feedback

General comments and feedback on the approach and trial were sought from the Technical Working Group. There was general agreement that the project was progressing well and that work undertaken to date was "a good first step". Some commented that it appeared to be "heading in the right direction" despite the obvious challenges.

A key challenge that was identified for the project is the definition of the relationships and understanding the processes between different elements of the prioritisation framework (i.e. values, threats and opportunities). The example given was how to relate the threat of reduced flows on vegetation health. This highlights the need for clear documentation of the assumptions made in relating different elements of the framework to one another.

The risk of introducing error into the process and analysis through oversimplification and aggregation of data was identified by the group. New data and the validation process needs to add value but be relevant to scale and objectives of the project. This issue is discussed further in section 2.10.

2.9 Next steps

This section provides a tabular summary of comments and feedback from the TWG and proposes a series of recommendations to progress the project to the next step. Comments, feedback and proposed actions have been grouped for each major element of the prioritisation framework e.g. scale, asset values, threats etc. Most actions will need to be undertaken by the project team although advice and direction from the Project Steering Committee is sought for a number of actions.

2.9.1 Scale

Currently, the proposed asset unit for use in this project is a floodplain unit. This scale has been chosen as it is the most appropriate scale at which to interrogate and analyse data. This may not however be the final scale at which floodplain priorities are identified and presented as it is uncertain that is a useful scale for decision-making or justifying trade-offs. Final priorities may be aggregated such that they are represented as series of three categories (high, medium, low) across the length of the River or as priorities for specific management objectives. Issues of scale will continue to be reviewed and revised as required throughout the project.

- **Table 5 - Issues and recommendations for 'scale'.**

	Comment / issue	Recommended action
1.1	Eventual scale (reach/floodplain unit) will depend on how the priorities are used. Need to decide if floodplain units are the right size or are they too large for some areas.	Consensus from the TWG that this would be worked out by the project team as the project and analysis progresses.
1.2	Extent of project coverage - need to clarify the extent of the floodplain project. End at Wellington or Lock 1? Inclusion of SEAs (Chowilla and Coorong & Lower Lakes)?? Gorge sites separate to floodplain sites Within channel is a gap– may assume that in channel and smaller flow bands will be dealt with if floodplain is dealt with. Inclusion of aquatic parts of the floodplain or limited to terrestrial? It was noted that threats and opportunities cover aquatic but not the values. The values will need to be contributed from the wetland prioritisation project.	**PSC to decide on extent of project coverage** and project team to apply them in the analysis and clearly document these assumptions. Refer to section 2.9.7 – Links.
1.3	Scale at which threats are assessed may influence what is considered. Link to floodplain planning and threat assessment	Refer to section 2.9.7 – Links.

2.9.2 Values

The preferred approach to assessing asset values is to attribute value to the ecological characteristics of the asset that contribute to its overall environmental health. This is based on the premise that a floodplain unit in good ecological health provides a high level of environmental services and therefore has high environmental values.

- **Table 6 Issues and recommendations for 'asset values'.**

	Comment / issue	Recommended action
2.1	Criteria: Amend Table 2 criteria in paper – change "Community values" to "Conservation values". Include other conservation mechanism or agreements e.g. pastoral leases etc. Criteria is aquatic but we need terrestrial criteria. Need to make sure in identifying values (theory) only use criteria that relate to scale and to primary salinity and drought threats. Other criteria and data sets should be excluded from this analysis and potentially considered in next scale down of planning.	SKM to make amendments to discussion paper. **PSC to advise of appropriate terrestrial criteria or agree to keep original criteria in discussion paper given that actual criteria used are terrestrial.**
2.2	Validation of values: Requires consultation with technical experts using vegetation health, aquatic values (e.g. wetlands) and geomorphology/topography.	Project team (LM/MM) to consult with technical experts as required in order to validate data sets and analysis. **PSC to provide advice regarding appropriate level of**

	Comment / issue	Recommended action
	May want to look at grid stratifying each parcel to get expert opinion, knowledge and understanding of systems for each polygon– look at the community values – understanding the data by capturing expert knowledge. May be able to provide baseline maps to facilitate collection of this information. Validation at this level is important but it may be more important when looking at the priorities. Observational data / local knowledge may be important but what value do you place on it? Need to generalise values out to floodplain units. Get away from spot based as this concerns people. Still some questions on how to integrate with broader information on conservation values and valuable sites – may be best to use as validation data?	**validation and relevant technical experts (see also section 2.10).**
2.3	Terrestrial values (tree health): High value vegetation occurs either in flush zone or high elevations. Need to cut out anything above the 1956 flood level; Issue of 'hot bush' – was it included? Need to check interpretation of non treed data sets. lignum, tea tree, herbs – high value, Chenopods – moderate value and others- low value. Could also look at implications of interpreting this veg information differently and undertake sensitivity analysis. There may be some opportunity to look at RRG health surveys (response to drought conditions) and rate of decline/ improvement in specific locations as an indicator of value (eg resilience). However was noted that the time gaps between sampling and seasonality may make this data of limited use. May be able to identify trends in communities and then prioritise based on this e.g. dead eucalyptus to chenopods therefore this indicated movement in system state. Also salt scalds/ bare ground may indicate system state of a lower rating. May be able to use NDVI- landsat – average pixels eg all black box polygons and compare health. The 2003-04 baseline survey mapped vegetation associations across the floodplain including tree health and also used DEH health assessment methods for the understorey (TS). Hafiz Stewart collected information from landholders during vertebrate survey ad we need to get this from him. It was noted that the high value areas sat in the flushed zone or high elevation and this information now needed to be combined with opportunity information to prioritise.	Project team (LM/MM) to make required amendments, consulting with technical experts and additional data sets as appropriate and document assumptions and process. **PSC to provide advice regarding appropriate level of validation and relevant technical experts (see also section 2.10).**
2.4	Aquatic values: Need to be able to plug in wetland priorities when they become available. Need to decide how to include Ramsar sites, nationally important wetlands. Concern with lack of values information and fish in particular are a big gap.	Project team (LM/MM) to make required amendments, consulting with technical experts and additional data sets as appropriate and document assumptions and process. **PSC to provide advice regarding appropriate level of**

	Comment / issue	Recommended action
	At Chowilla they have recently used diversity of topography within a site to indicate community diversity. May also be able to use diversity of flow bands to indicate diversity. Although there is little aquatic vegetation information, there is information on the riparian strip around wetlands and more is being collected through the wetland prioritisation project. This can give an indication of wetland condition. May be able to look at floodplain geomorphology and apply assumptions eg flowing primary and secondary anabranches have high value for fish, Potentially use geomorphology layer from Thompson/ Pressie to help people identify values.	**validation and relevant technical experts (see also section 2.10).** Refer also to section 2.9.7 – Links.
2.5	The RMCV project is looking at developing a broad scale condition map using data, interpretations and comments from the KBR project where appropriate, comparing to the biological survey data and looking for indicators of system state eg regenerating species. It will not incorporate diversity or rarity at this stage due to data limitations.	Refer to section 2.9.7 – Links.

2.9.3 Threats

There was general agreement that the analysis of threats to floodplain values should focus on the primary threats to floodplain health and condition, which in the context of this project (i.e. scale and objectives) are reduced floodplain flows and increased salinity (Holland et al, 2005).

- **Table 7 Issues and recommendations for 'threats to asset values'.**

	Comment / issue	Recommended action
3.1	Discussion and justification of threat analysis: Agreement that at this scale and considering the project's objectives, salinity and flow (or rise in G/W or lack of dilution flows) are the primary threats. Both of these impact on plant water availability. There is a link between the 2 threats – increased wetland salinity is related to a lack of flows as well as increased discharge. Scale and threat assessment are intrinsically linked. Primary threats are more important at broad scale and secondary threats may be more important at smaller scales. Scale and opportunities to manage threats may also differ.	SKM/LM to revise text in discussion paper to ensure appropriate level of explanation and detail.
3.2	Amend Figure 5 in paper – lower "increased floodplain and groundwater salinity and levels" to be an impact rather than a threatening process.	SKM to make amendments to discussion paper.
3.3	Flow connectivity is an important process for the floodplain so Figure 4 in the paper needs to be amended to demonstrate this. Ideas for connectivity??? How do we incorporate flow connectivity?? i.e. fish barriers, trees and herb lands.	SKM to make amendments to discussion paper. LM to consult with technical experts (e.g. Jason Higham) and incorporate additional data as appropriate.
3.4	Salinity threats:	

	Comment / issue	Recommended action
	Need to check FWIP threat modelling/coding (re: issues with Chowilla). High is 'any discharge' and report includes both 'high' and 'very high' In areas where no FWIP or weir pool threat but is degraded may be due to drought and other processes (eg Pike/Mundic just below Lock 5). Fresh layer only accounts for trees so need to include understorey layer. Use lignum as an indicator of freshening zone eg Murtho between Horseshoe and the river. Confidence in data – validation & sensitivity analysis required re freshwater lens assumptions and link between FWIP and weir pool risk outputs. May apply a confidence value to data. SIS assumptions - each LWMP areas, SIS efficiencies on them eg 100 m3/day, 80-90% efficiency therefore 10-20% inflows (includes irrigation drainage and natural inflows)	LM/MM to consult with Kate Holland (and other technical experts as required) and make amendments to analysis as appropriate.
3.5	Flow threats: Need to revise flow bands given issues with absolute values - Lisa/Matt to consult with Ian Burns. Flow bands from 30 -50 make sense but needs to be rationalised with ecological function. May need to document conceptual models to transpose flow reduction to ecological function and justify approach taken eg why is this flow a risk to this community? MFAT used collection of expert opinion – check approach and data in model to assist in validation of approach taken here.	LM/MM to consult with Ian Burns (and other technical experts as required) and make amendments to analysis as appropriate.

2.9.4 Opportunities

Estimating the environmental benefit derived from watering activities at this stage of prioritisation will be undertaken at a broad scale as the information and level of detail required (i.e. particular sites or projects) will not be available until later stages of prioritisation (in stages 2 and 3). The following broad scenarios for environmental watering actions have thus far been assessed:

- Environmental watering through weir pool manipulation to the maximum extent possible, using the Floodplain Inundation model; and
- Flooding to the maximum potential extent (assumed to be a 70,000 ML/day flow).

In addition to these scenarios, the analysis has also considered the potential to deal with the threats of floodplain salinisation using salt interception schemes (SIS), pumping to lower groundwater or groundwater freshening. These could potentially be complementary activities that will assist and sometimes even enable environmental watering activities to achieve an ecological benefit.

It is proposed that these scenarios (with or without complementary activities) will be assessed in terms of their ability to protect or enhance floodplain values and address the primary threats faced by the floodplain.

- **Table 8 Issues and recommendations for 'opportunities to deal with threats'.**

	Comment / issue	Recommended action
4.1	Weir pool raising scenario - There was some discussion on whether weir raising of greater than 50cm should be considered in the analysis and it was agreed that as it was unlikely that >50cm would occur in the next 5 years due to structural constraints that this would remain.	No action required.
4.2	Flood scenario: The 70,000 ML/day flood extent is applied with the assumption that this would be a new functional floodplain that would respond to the maximum 1 in7 years flow regime (and other more frequent flow regimes within this). Ecologically, would it be able to be sustainably flooded? There was discussion around this assumption and the logic behind it as follows. Can't assume that ecological processes will follow. Need to better link flow scenarios with environmental flow requirements (e.g. 1 in 4 yrs rather than 1 in 7 yrs). May need to develop a RG feasibility map (1 in 3 years), Black Box (1 in 7 years), pool level weir manipulation map (may be same as 1 in 3 years). May need to identify flow bands and hydrograph potential as part of 70GL/day. The scenarios assume that the ecological responses are the same for different timing and length of inundation (i.e. weir pool raising and natural flood). This is an incorrect assumption.	Project team (LM/MM) to make required amendments, consulting with technical experts and additional data sets as appropriate. **PSC to provide advice and direction.**
4.3	There was discussion around where do pumping projects fit in feasibility? May need to look at watering sites and wetland information to look for consistency with other scenarios to see if is covered.	Project team (LM/MM) to make required amendments, consulting with technical experts and additional data sets as appropriate.

2.9.5 Priorities

Priorities were determined by adding normalised ratings for values, threats, and opportunity to deal with threats. Final numbers were grouped into high, medium, low priority.

- **Table 9: Issues and recommendations for 'priorities'.**

	Comment / issue	Recommended action
5.1	Prioritisation and management objectives: Some debate around prioritising High Value/Low Threat over High Value/High Threat because of the project's objectives and eventual management actions (i.e. watering). Priorities need to be consistent with principles and policies for prioritisation and the objectives/purpose for prioritisation. Preferable to link priorities to management objectives – i.e.	Recommend consistency with policy but align with management objectives (see also Discussion Point #1 above). **PSC to provide advice and direction.**

	Comment / issue	Recommended action
	restore, rehabilitate or protect and maintain. Need to be clear on what are prioritising for – may have 2 categories of priorities (protection/maintenance and rehabilitation). Need to keep the process focused on purpose but iterative to take advantage of new information.	
5.2	Need to be clear on timeframes for review of priorities and provide opportunities for update analysis based on what comes from floodplain planning. May need to keep review period shorter for 1st iteration (less than 5 years)	**PSC to provide advice and direction.** SKM to document in report.
5.3	May need to review scoring in light of what prioritising for and potentially weight the parameters. Compare to other prioritisation outputs for consistency and possible modification of outputs e.g. fish barriers, interim wetland priorities, weir pool priorities?	See sections 2.9.6 and 2.9.7 below.
5.4	Can't assume that all threats will relate to all values – need to make sure that aggregated values dataset is meaningful and related to the threats.	See sections 2.9.2 and 2.9.3.

2.9.6 Weighting

It was agreed that weighting should not be incorporated into the analysis until further iterations of the values, threats and opportunities layers are completed. Weighting may still need to be considered during later stages of the project but it was agreed to take a 'wait and see' approach for the moment.

2.9.7 Links

During the workshop it was identified that this project has links to a number of other relevant projects which may also provide inputs to this project.

- **Table 10: Issues and recommendations for 'links to other projects'.**

	Comment / issue	Recommended action
6.1	Wetland prioritisation project – The floodplain prioritisation project deals with aquatic and terrestrial parts of the floodplain in relation to threats and opportunities but not in terms of aquatic values. Wetland values will need to be contributed from the wetland prioritisation project and in this way will inform the strategic priorities. The wetland prioritisation project will also assist in informing operational (annual) priorities and should also inform floodplain planning. These should be reflected in the Annual Watering Plan as appropriate. There is a potential for double scaling in the process e.g. using the same information to define floodplain and wetland priorities and this needs further examination (BMS).	Project team (LM/MM) to continue to liaise with Tracey Steggles & Peter Waanders.
6.2	Links between strategic priorities and tactical/operational priorities – Need to ensure that information arising from floodplain planning process is able to inform further iterations	Project team (LM/MM) to continue to liaise with Peter Waanders and Caren Martin re floodplain guidelines

	Comment / issue	Recommended action
	of the floodplain priorities.	project.
6.3	RMCV project – The RMCV project is looking at developing a broad scale condition map using data, interpretations and comments from the KBR project where appropriate, comparing to the biological survey data and looking for indicators of system state e.g. regenerating species. It will not incorporate diversity or rarity at this stage due to data limitations. There may be opportunity to undertake common/ supporting data analysis and interpretation to serve both projects.	Project team (LM/MM) to continue to liaise with Andrew West.

2.10 Additional data sources for validation

During the course of the workshop the following list of data sources were identified for possible use for validation purposes:

Values

- RMCV project (Andrew West)
- Vertebrate survey (Hafiz Stewart)
- 1956 flood extent (elevation and vegetation communities)
- NDVI (Landsat) – average vegetation condition
- Baseline survey (tree health and understory)
- Pressey Thompson (wetlands, riparian vegetation and geomorphology)
- Brett Lane & Associates (2005) – vege survey
- MDBC (2003) - red gum and black box
- Prioritisation of barriers to fish passage (Zampatti)
- DEH quadrant point data (Andrew West)

Threats

- MFAT expert opinion panel – preference curves/flow bands.

Key questions that the project team should continue to ask in relation to the introduction of new data are:

- Is the new data reliable? Does it add value and improve rigour?
- Does the benefit gained outweigh possible risks of introducing error through new data?

- Will this new data make a noticeable difference to the final priorities given the scale?
- Is it readily available and in a useable format?
- Is it at an appropriate scale? What is its extent (i.e. blanket coverage or point data)?

3. Workshop 2

3.1 Introduction

Following the first workshop (section 2) feedback was taken into account and the approach and analysis revised accordingly. This workshop was used to present the revised approach, assumptions, analysis and floodplain priorities given the feedback at the previous workshop.

3.2 Purpose of workshop

The purpose of the workshop was:

- To provide the TWG with an update of project progress, including the revised approach and analysis given feedback from the last workshop.
- To test the results of the data analysis and seek agreement for the final floodplain priorities (including approach and assumptions).
- To capture knowledge, data and information to support prioritisation and identify knowledge gaps.
- To seek input and feedback regarding the next steps.

3.3 Participants

The workshop participants comprised the Project Steering Committee and the Technical Working Group. A small number of additional key stakeholders were also invited due to their involvement in other related projects. A list of attendees is presented in Appendix A.

3.4 Structure and process

A copy of the agenda for the workshop is included in Appendix B. The agenda allowed for the presentation of detailed material and feedback and discussion sessions were incorporated into the workshop program through out the day. An outline of the workshop process is also presented in the agenda in Appendix B.

The workshop was held in Adelaide on Wednesday 18 October 2006. It was facilitated by Camille McGregor from Sinclair Knight Merz, in conjunction with Lisa Mensforth from the Board and Matt Miles from the Department of Environment and Heritage.

3.5 Preparatory materials

Minutes from the previous workshop, and agenda for the current workshop and a draft discussion paper were provided to participants in preparation for the workshop.

3.6 Recording

The room was set up to enable recording of comments, questions and discussion on a whiteboard and on hard copy maps and butchers paper. Camille McGregor, Lisa Mensforth and Matt Miles also took notes during the meeting at various times.

3.7 Workshop outcomes

The feedback and discussion which occurred during the workshop has been analysed and summarised here into the following table and actions assigned to key project officers.

Feedback from workshop	Action
Overall comments	
Does it make sense?	
Overall OK – need to acknowledge limitations and uncertainties and present the information at an appropriate scale and potentially scale up this data.	**MM – scaling up**
Don't over-interpret the detail – ringed areas are better for overall conclusion – gives right intuitive result	**MM – scaling up**
Yes – in a broad sense with some local anomalies (eg band through Pike), some problems in local areas with how SIS was modelled. SIS doesn't necessarily match with what's on the ground.	**MM – Salinity threat**
Analysis picks up on the dominant processes but some uncertainty associated with SIS impacts and model anomalies/bands.	**MM – Salinity threat**
Need to be clear on how this information will be used (eg watering plan, to guide decision making and to inform next scale down of planning) what decisions will it inform and how? Do we need to present it as scenarios? How will it be used to guide small watering projects? How will main channel icon site projects beyond weir pool manipulation interact with this process? How will we deal with lower priority sections of connected floodplain with higher priority?	**CM/LM – to deal with in report and in Watering Plan**
Need to be clear on use at regional scale and only present information at whole of river scale. 'In-between' level for interpretation – need to scale up to coarser classes before management options can be determined.	**MM – scaling up**
There is potential and opportunities to use the analysis to inform/justify SIS development. The analysis could be re-run by taking out the SIS to see what would result if SIS are not implemented. Maps with and without SIS helps build the argument.	**MM – further analysis**
Recognition that wetland priorities and floodplain priorities need to be kept as separate datasets for decision-makers to consider – no plans to integrate datasets b/c of differences in scales and values.	**CM/LM – to deal with in report and in Watering Plan**
What doesn't make sense?	
Need to be clear on timeframes – current impacts or future (2100?)	**CM/LM – to deal with in report and in Watering Plan**
Mismatch between wetland values and floodplain condition needs further examination.	**CM/LM – to deal with in report and in Watering Plan**
Lack of M1 and R1 sites needs further examination	MM – further analysis
Lock 3 – 4 impacts seem right.	**N/A**

Feedback from workshop	Action
FRM bands/anomalies	MM – further analysis
Assumption that we get a response at the larger landscape scale but does not consider smaller –scale more localised impacts such as grazing that will have an impact on the condition.	**CM/LM – to deal with in report and in Watering Plan**
Value is 'vegetation health' and it should be referred to as such so that it is clear and transparent.	**CM/LM – to deal with in report and in Watering Plan**
Generally makes sense - but 2002 information and a lot more has happened since then. Need to have a process for getting new information and updating priorities (eg 5 years to get new data and then review the prioritisation). Who will be responsible for this?	**CM/LM – to deal with in report and in Watering Plan**
Salinity threat induced by weirs or inflows require different responses.	MM – further analysis
Can you generally agree with the results of the analysis?	
Priority map generally ok	**N/A**
Highest priority areas sit comfortably but needs to be presented and communicated in an appropriate way and at an appropriate scale (i.e. probably need to scale up).	MM – scaling up
Need to clarify scale issues – shouldn't be used at a local scale – don't zoom in!	**MM – scaling up**
Need to determine process and timeframes for revision of priorities and incorporation of new data.	**CM/LM – to deal with in report and in Watering Plan**
How will information be used in decision-making?	**CM/LM – to deal with in report and in Watering Plan**
Decisions at landscape scale should consider different floodplain types	**MM – try splitting analysis by floodplain types**
How do we deal with low priority areas?	**CM/LM – to deal with in report and in Watering Plan**
Next steps – consider Florida (everglades work).	**CM/LM – to deal with in report and in Watering Plan**
Scale and study area	
Describe how floodplain has been defined (vs wetland boundaries) – when does a non-perm wetland becomes floodplain?.	MM - advice
Consider taking out below Lock 1 on the basis of wetland focus – potentially assess % of wetlands in each reach for justification. Also potentially on the basis of model limitations. Better represented in the wetland prioritisation project.	**MM - advice**
Decisions at landscape scale - potentially consider trench and broad floodplain types separately in analysis.	**MM - advice**
In scaling up for complex areas – how to ensure detail is not lost and overgeneralisation does not occur.	**MM – scaling up**
May need to scale up based on hydraulic connection.	**MM – scaling up**
Many statements in examination of maps along the lines of 'there are some	**MM – scaling up**

Feedback from workshop	Action
good bits in there' need to be clear on scaling assumptions.	
Looking at 2 system wide processes – salinity and flow. Local issues/ impediments to be addressed (beyond e flows) to get response required.	**CM/LM – to deal with in report and in Watering Plan**
Values	
Issues with using trees/ shrubs for values – accuracy, timing/ age of tree health data.	**CM/LM – to deal with in report and in Watering Plan**
Value is actually vegetation health – recognise interim criteria in broader framework of values criteria – surrogate for condition and surrogate for value	**CM/LM – to deal with in report and in Watering Plan**
Influence of drought – vegetation data is now 4 years old.	**CM/LM – to deal with in report and in Watering Plan**
RMCV project is unlikely to be ready or useful to this project however it could be used to validate the values layer	**CM/LM – to deal with in report and in Watering Plan**
What happens, how do we make decisions and is there any guidance if there is competing or conflicting wetland (aquatic) and floodplain (terrestrial) values? i.e. what happens if there are good wetlands in poor floodplains?	**CM/LM – to deal with in report and in Watering Plan**
Clarification that the wetland prioritisation project picks up both temporary and permanent wetlands.	MM - advice
Threats	
Habitat connectivity	
We need to deal with habitat connectivity as a key element of landscape values. It has potential to change values and needs further debate, discussion and analysis.	**CM/LM – to deal with in report and in Watering Plan**
Data issues are limiting our ability to fully incorporate connectivity	**CM/LM – to deal with in report and in Watering Plan**
What do we think of focusing on good areas in the middle of bad/ In the future –under climate change- isolated islands may become a more important part of the floodplain within the context of a new functional floodplain	**CM/LM – to deal with in report and in Watering Plan**
Good and bad areas are next to each other – may need to manage a bad area to facilitate management of a good area.	**CM/LM – to deal with in report and in Watering Plan**
Habitat connectivity can be dealt with at the species specific scale of analysis or through less focused smoothing procedures – this is partially a scale issue.	**CM/LM – to deal with in report and in Watering Plan**
Hydraulic connectivity could be different if you're flooding or watering so this needs to be taken into account.	**CM/LM – to deal with in report and in Watering Plan**
Drought – climate change	
Drought will impact on the key threats (flow and salinity)	**CM/LM – to deal with in report and in Watering**

Feedback from workshop	Action
	Plan
Climate change is not currently considered in the analysis – no way of doing this at this stage	**CM/LM – to deal with in report and in Watering Plan**
There is currently very little temporal aspects to the analysis – apart from the SIS aspect to salinity threat	**CM/LM – to deal with in report and in Watering Plan**
Flow threat	
Need to know how much of the 50,000 ML/day is floodplain and how much is wetlands	**MM - analysis**
Need to check FIM below Morgan (Lock 1).	**MM - advice**
Need to acknowledge that other factors influence tree health other than flow threat (e.g. groundwater, soil health) but for the purposes of this project, analysis seems ok.	**CM/LM – to deal with in report and in Watering Plan**
Need to mask wetlands out in flow threat map.	**MM - analysis**
Salinity threat	
Need to smooth out Pike and Chowilla stripes/ bands - they do not make sense.	**MM – salinity**
SIS – not clear how SIS is determined – not related to bores – benefit may be inflated in some areas. Determined that is applied to LMWP areas but may need to refine to floodplain area potentially benefited by SIS.	**MM - salinity**
SIS benefit may be in inflated compared to WINDS modelling – where flow scenarios are also incorporated.	**MM – salinity**
For the Chowilla floodplain may be able to replace with planned Chowilla scheme. May also want to check against WINDS modelling.	**MM - salinity**
Need to see maps with/ without SIS to build argument – check Murtho for SIS benefit.	**MM – salinity**
Need to remove disposal basins from analysis (these were not given any special treatment in the modelling).	**MM - salinity**
Above Mannum there is a weir pool salinity threat predicted – and this is consistent with the weir affects of levee banks of the Lower Murray Swamps	**MM – salinity**
May need to split SIS and Weir Pool threat as currently they are rated/weighted the same but they have different policy and management implications.	**MM - salinity**
Need to consider using 2100 salinity predictions based on current irrigation development.	**MM – salinity**
Analysis highlights dominance of weir pool impacts.	**MM - salinity**
Need to be clear about the language around salinity threat – i.e. is it salt in the floodplain or rising groundwater? Flow chart decision-tree needs to be clear on this.	**CM/LM – to deal with in report and in Watering Plan**
Feasibility	
Include Chowilla Creek regulator in feasibility of options	**CM/LM – to deal with in report and in Watering Plan**

Feedback from workshop	Action
Now do we consider feasibility below 50,000 ML/day	**CM/LM – to deal with in report and in Watering Plan**
Need to ensure that correct feasibility layers are used in analysis as opposed to inverse of flow threat	MM - analysis
Priorities	
Do we need to consider weighting of low value sites? Does it only need to be just a difference of 1 (i.e. R6 to R7) or could it be more? Probably not if elements (i.e. value, threat, opportunity) are kept separate.	**CM/LM – to deal with in report and in Watering Plan**
Process	
This is an in-between level of interpretation – rough cut- may need a more sophisticated process eg map High Rehab and High Maintenance classes as usually sit together, look for areas not grouped and rationalise this, break down others by value, threat, and assumption combinations (see Andrew West). 1. Simplify categorisation – combine high maintenance and rehab classes and all other classes. 2. Identify large and small anomalies 3. Examine each and readjust for categories (include other values) 4. Smooth and adjust 5. Identify final priorities 6. Drop down a scale and categorise each sub-set in detail in terms of response.	**MM - scaling**
Need to assess where we might have auto-correlation – how often are we using the same data. Sensitivity analysis comparing input data and final priorities to understand what input data has the most contribution to results.	**MM - analysis**
Could run process separately for RRG and BB ie based on different EC and Drought tolerances. Need to recognise the scale of modelling analysis and what can be done at WINDS modelling scale (eg bb/rg separate analysis).	**CM/LM – to deal with in report and in Watering Plan**
Validation	
Compare to run of river for validation	**MM – advice, CM -report**
Compare to 2005 orthophotography	**MM – advice, CM report**
Expert on-ground experience - potentially bring Mike Harper, LAPs, Wetland Officers into validation – need to be clear on scale and what are seeking from these people.	**MM – advice, CM report**
Field validation?	**MM – advice, CM report**
In the future wetland prioritisation and main channel aquatic habitat project.	**MM – advice, CM report**
Brett Lane work for MDBC (see Hugh Robertson)	**MM – advice, CM report**
Data gaps	
Need WINDS type data for the entire floodplain – lack of knowledge of groundwater processes, salinity information, geology.	**MM – advice, CM report**
RRG rescue data and floodplain data collected over consecutive years analysed to look at trends	**MM – advice, CM report**
Ecological value data – have only used vegetation health for value which	**MM – advice, CM report**

Feedback from workshop	Action
does not include aquatic values and is somewhat dated. Need to have interpreted ecological/ biological data.	
Trend over time of vege health	**MM – advice, CM report**
Update tree health data	**MM – advice, CM report**
Aquatic information.	**MM – advice, CM report**
Need to consider landscape perspective/ connectivity.	**MM – advice, CM report**
Scenario testing ie how prioritisation will work	**MM – advice, CM report**
Identify specific data inputs that will significantly improve prioritisation and work towards collecting this data	**MM – advice, CM report**
SIMRAT VS MODFLOW	**MM - advice, CM report**
Everglades example - conceptual model of terrestrial/ aquatic systems, basis for management and indicators	**MM – advice, CM report**
RMCV could be used either as a direct input or in validation.	**MM - advice, CM report**
Locations – initiatives	
Chowilla – proposed regulator	**CM/LM – to deal with in report and in Watering Plan**
Katarapko demonstration reach	**CM/LM – to deal with in report and in Watering Plan**
Floodplain plans and prioritising within floodplains – Pike, Murtho and Bookpurnong	**CM/LM – to deal with in report and in Watering Plan**
Wetland management – how does wetland management affect this?	**CM/LM – to deal with in report and in Watering Plan**
Locations - questions	
Calperum seems low. This may be because veg values low and salinity threat may falsely incorporate SIS	**MM - analysis**
Pike – upper (near the lock) seems to be salinised but not showing up. Check if anabranch creeks were included in analysis of salinity threat. Not sure if an deliver flows to lower Pike without significantly altering the flow delivery system. Much of the R3 in this area is in locations that are the more salinised parts of Pike. This is the same for Murtho.	**MM - analysis**
Disher Creek/ Berri Basin – disposal basins – cut out of analysis and put a buffer around them.	**MM - analysis**
Loch Luna – seems to be too low a priority. Further analysis indicated that because high elevation area, chenopod dominated and low feasibility. Contains areas of good health, small areas (islands) of good stuff in a low priority area.	**MM - analysis**
Downstream from Katarapko – some vegetation in this area may be rated highly eg Pyap Lagoon.	**MM - analysis**
Near Woolpunda – 2000 salinity risk not future and Woolpunda extension incorporated – may need to use 2100. Show without additional SIS at Waikerie to build case. Salinity threat should be higher as Woolpunda SIS only deals with natural inflows not development induced salinity.	**MM - analysis**

Feedback from workshop	Action
Beldora/ Spec Lakes - complexity. Areas of Samphire are a higher priority than other higher areas due to feasibility. Does this make sense? May need to scale up based on hydraulic connection. Not sure that Beldora floodplain is that good.	**MM - analysis**
Murtho – where is the justification for a floodplain SIS? Show with and without SIS for Pike and Murtho?	**MM - analysis**
Eckerts Spalsh – this is a poor area and analysis supports this however is a hydraulically linked area to Katarapko (a good area).	**MM - analysis**
Brenda Park (and other wetlands in the lower reaches)– high floodplain areas and opportunity?	**MM - analysis**
Gurra floodplain – is stuffed- correctly identified. Forget about it!	**MM - analysis**
Lyrup flats looks good – are there any plans for this area?	**MM - analysis**
Consultation and stakeholder engagement – who might use this information and why?	
Communication strategy ensure communication with stakeholders regarding use information and incorporation of community values.	**CM/LM – to deal with in report and in Watering Plan**
NRM plans and investment strategies – targeted areas for rehabilitation. This info needs to be integrated and incorporated into NRM Plan. Amy G	**CM/LM – to deal with in report and in Watering Plan**
DEH – Broad areas inform freshwater protected areas – Belinda MS	**CM/LM – to deal with in report and in Watering Plan**
River Murray Forest Project – Tree planting and rehab. Chris N	**CM/LM – to deal with in report and in Watering Plan**
Naturelinks – DEH	**CM/LM – to deal with in report and in Watering Plan**
SIS Planners and salinity planning and policy - also BSMS	**CM/LM – to deal with in report and in Watering Plan**
LAP/ Community – scaled up is more useful can inform floodplain planning processes/ attributes Communicate limitations and broad priorities to inform local planning Need to think how to release this information – watering plan? The priority is to get it out to stakeholders that will need to make decisions Be prepared that community will still want to have focus on wetlands – links with LAPs, smaller scale of management. Need to ensure that this information is communicated in parallel with wetland priorities and fed into the NRM Plan/ Watering Plan in parallel. Decision making tool/ can inform LAPs in projects – priorities for funding	**CM/LM – to deal with in report and in Watering Plan**
RM Act – policy making and development assessment. Planning	**CM/LM – to deal with in report and in Watering Plan**
Conservation and NRM Planning - where are the priorities. Board (Amy Goodman). Reference Group process?	**CM/LM – to deal with in report and in Watering Plan**

Feedback from workshop	Action
NRM Board - Wetland and Floodplain priorities	**CM/LM – to deal with in report and in Watering Plan**
Leverage for funding for data collection and analysis.	**CM/LM – to deal with in report and in Watering Plan**
Living Murray - another icon site at Katarapko?	**CM/LM – to deal with in report and in Watering Plan**
Funding opportunities – NWI (eg HCVAEs), RNWS	**CM/LM – to deal with in report and in Watering Plan**
DEH - Wetland Inventory	**CM/LM – to deal with in report and in Watering Plan**
RMEM and DWLBC - Watering plan and water recovery	**CM/LM – to deal with in report and in Watering Plan**
DWLBC - Inform short term drought response	**CM/LM – to deal with in report and in Watering Plan**
DWLBC - Policy of irrigation impacts on the floodplain	**CM/LM – to deal with in report and in Watering Plan**
DEH - Assessment of grazing licenses on the floodplain/ crown land	**CM/LM – to deal with in report and in Watering Plan**
Riverland Regional NRM Group may need to be briefed.	**CM/LM – to deal with in report and in Watering Plan**
Don't want it applied to Local use at local scale Allowing impacting activities 'want it to be used for good not evil' Decisions involving inappropriate tradeoffs – scale again – fit for purpose	**CM/LM – to deal with in report and in Watering Plan**

Appendix A Participation

Name	Position/Organisation	Workshop 22/06/06	Workshop 18/10/06
Tony Herbert	DWLBC	✓	
Mike Harper	DEH	✓	
Matt Miles	DEH	✓	✓
Lisa Stribley	SA MDB NRM Board	✓	✓
Paul Stribley	Berry Barmera LAP	✓	✓
Peter Waanders	SA MDB NRM Board	✓	
Tracey Steggles	SA MDB NRM Board	✓	✓
Nigel Willoughby	DEH	✓	
Jody Gates	DEH	✓	
Brenton Zampatti	SARDI	✓	
Kate Holland	CSIRO L&W	✓	
Ian Jolly	CSIRO L&W		✓
Belinda McGrath-Steer	DEH	✓	✓
Birgitte Sorensen	PULBC	✓	
Ingrid Franssen	DWLBC		✓
Steve Barnett	DWLBC		✓
Jason Higham	PIRSA	✓	✓
Caren Martin	SA MDB NRM Board	✓	
Hugh Robertson	Riverland LAP	✓	✓
Ian Burns	DWLBC	✓	✓
Andrew West	DEH	✓	✓
Chris Nicols	DWLBC		✓
Lisa Mensforth	RMEM Unit, SA MDB NRM Board	✓	✓
Judy Goode	RMEM Unit, SA MDB NRM Board		✓
Camille McGregor	SKM	✓	✓
Alison Cusack	SKM	✓	

Appendix B Workshops' agenda and process

B.1 Workshop #1

Item		Time
1)	Welcome and introductions (**All**)	10.00 am
2)	Project background (**Lisa Mensforth**)	10.10 am
	Why is a prioritisation approach needed? How will priorities be used and by whom? Project scope and objectives	
4)	Project progress (**Camille McGregor & Alison Cusack**)	10.25 am
	Policy framework and strategic context Proposed prioritisation approach Discussion and feedback	
5)	LUNCH	12.30 pm
6)	Trial application of framework (**Lisa Mensforth & Matt Miles**)	1.15 pm
	Initial outcomes and outputs Discussion and feedback	
7)	Where to from here? (**Camille McGregor & Alison Cusack**)	3.25 pm
	CLOSE	3.30 pm

Process

- The morning session will provide an introduction to the project and the proposed framework for prioritisation. The afternoon session will demonstrate a trial application of the framework followed by a facilitated discussion and feedback session.
- We have planned for a Discussion and Feedback session at the end of both the morning and afternoon sessions. It is here that we are seeking to generate some discussion and debate and seek any detailed input. We will be happy to take questions around points of clarification throughout the day but will encourage detailed discussion in the Feedback Sessions. The suggested process for these sessions are:
  1) Introduce feedback session – our aim is to generate broad discussion of issues and identify suitable 'next steps' including consultation with technical experts. It is a large group so we probably don't want to get bogged down in too much detail – without constraining good debate and discussion.
  2) Explain that we have some specific questions for the group but before we get into it, we'd be keen to get some general impressions and also whiteboard/parking lot people's issue or questions to make sure that we can cover off on all of them. Put people's questions/issues on the whiteboard.

3) Facilitate discussion around Lisa's questions (as per slides)
4) Come back to whiteboard and make sure we have covered off everyone's questions/issues.
5) Camille to summarise back to the group the key issues and proposed directions forward.

- We will have a 'parking lot' for questions and will also be taking notes throughout the day.

B.2 Workshop #2

Item		Time
1)	**Welcome** (**Lisa Mensforth**) *Process: Lisa to welcome and thank participants.*	10:00
2)	**Introduction** (**Camille McGregor**) Purpose of the day Project background and progress *Process: Camille to go through the agenda, outline the purpose of the meeting and deliver some of the key messages for the day. She will outline the proposed process and introduce the 'rules of engagement' for the meeting to allow open and fair debate and discussion, including recording of comments and feedback. Camille will be recording feedback during the day and will have a 'parking lot' whiteboard to capture key issues and questions requiring resolution during the meeting.* *Camille will also do a brief recap on the project including progress to date and then invite Lisa/Matt to present the next session.*	10:05
3)	**Floodplain priorities** – revised approach, assumptions and analysis (**Lisa Mensforth & Matt Miles**): **Asset values** – this is what you told us last time, these are the revisions and assumptions we've made and the data that we've used and these are the results of our analysis. **Threats** – this is what you told us last time, these are the revisions and assumptions we've made and the data that we've used and these are the results of our analysis. **Opportunities** – this is what you told us last time, these are the revisions and assumptions we've made and the data that we've used and these are the results of our analysis. **Priorities** – this is what you told us last time, these are the revisions and assumptions we've made and the data that we've used and these are the results of our analysis. *Process: Lisa/Matt will present each of the key elements of the framework addressing the feedback received from the last workshop, the revisions/assumptions that have since been made, the data used and the results of the data analysis. If participants ok with the approach taken for each element move to the next element. Questions for clarification may be asked throughout the presentation however those requiring more in-depth discussion and analysis will be put in the 'parking lot' for discussion in the following session. Only looking for general feedback during the presentation and*	10:15

Item		Time
	opportunities to look at it in more detail will be provided in the next sessions.	
4)	**What do you think - validation session** (**Camille McGregor**) For each of the asset values/threats/opportunities/priorities maps: ***6) Does it make sense? Does it match up with what's happening on the ground and align with your understanding of dominant processes?*** ***7) What doesn't make sense? What are your specific queries or concerns?*** ***8) What data or information do you have that could either support or contradict the results of the analysis?*** ***9) What are the major data or knowledge gaps?*** ***10) What else can you tell us about specific sites (i.e. future plans, management options etc)?*** ***11) Given the approach, the available data and the assumptions – can you agree with the results of the analysis? If not, what don't you agree with and why?*** *Process: Camille will facilitate this session accordingly:* *Camille will introduce this session and explain the proposed process.* *Participants will be asked to form 4-5 small random groups (depending on numbers). Each group will be given a series of hard copy A0 maps and some blank butchers paper.* *Groups will then be asked to review each of the asset values/ threats/ opportunities/ priorities maps by considering the questions above. Groups will be encouraged to draw on the maps, write comments on them and highlight any concerns on the butcher's paper.* *Matt & Lisa to join groups and Camille to rove around all groups.* *Depending on how everyone is going for timing we may need to finish off this session after lunch.*	11:30
5)	**LUNCH**	13:00
6)	**Question & query session** (**Camille McGregor/Matt Miles**) Groups report back Discussion and feedback Further GIS interrogation as necessary *Process: Camille will ask for everyone to come together and for each of the groups to report back on their review of each of the asset values/ threats/ opportunities/ priorities maps and responses to questions above. Taking each element one by one – a group will be asked to report back on the asset values analysis. Other groups will then be asked to report anything else significantly different from that already raised. Camille will note issues/questions down on the whiteboard. Matt will man the GIS and we'll go through each issue in turn until there is agreement as to how to resolve it. The process then repeats for threats, opportunities and priorities.*	13:30

Item		Time
7)	**Next steps (Lisa Mensforth)** Revised priorities & management options – project report Inclusion of priorities into policy and planning processes Stakeholder needs and consultation Links with other projects Research priorities *Process: Lisa to go through remaining steps to finalise the project and also steps beyond the project. Lisa to ask any relevant questions of the group relating to these issues to gain some general feedback.* *Lisa/Camille to thank participants and close.*	15:20
	Close	15:30