6. The next steps

The actions for addressing irrigation salinity are now well established and are currently being implemented. Conversely, the plan to address dryland salinity is currently in its infancy and requires a number of further investigations. The draft West Gippsland Salinity Management Plan (WGCMA, 2005) details a four year program for developing an integrated set of on-ground actions addressing a number of natural resource management issues (including dryland salinity) (Figure 4).

The first step in the process to address dryland salinity is the definition of the groundwater flow systems and a preliminary package of management actions appropriate for each groundwater flow system, which is the subject of this study. The subsequent steps shown in Figure 4 for the four year program are described below.

6.1 Quantifying the benefits of salinity management options

As shown in Figure 4, the next step in the process to address dryland salinity is to quantify the potential salinity benefit from implementing the management actions suggested in this study. Such an approach is likely to require:

- Analysis of the groundwater flow paths contributing to the saline discharge using a combination of the groundwater flow systems, groundwater monitoring data and topographic data.
- Modelling the groundwater flow path between recharge and discharge areas and simulating the effect of various landuse changes (eg tree planting or groundwater pumping). This step should be initially kept as simple as possible using an established and legitimated modelling approach. The CSIRO 'Flowtube' model has been created specifically for this task and is a simple approach to providing information on the likely order of magnitude of landuse change impacts.
- Prioritising the management actions based on the likely impact on assets either currently impacted by salinity or potentially impacted by salinity in the future.

6.2 Land capability assessment and analysis of environmental, social and economic costs and benefits of management options

Land capability has only been addressed in the choice of management actions to a very limited extent. A much more thorough analysis is required to ensure the management actions are suited to the biophysical conditions (eg rainfall and climate). This analysis applies particularly to tree and pasture options. The analysis should include not only biophysical elements but also social and demand analysis. For instance, key questions of demand for farm forestry and commercial timber needs to be addressed as well as the need for shelter belts, increased biodiversity plantings etc.

There is already information available to help in this analysis including:

- maps of tree productivity classes for Blue Gum, Radiata Pine and Shining Gum produced by BRS (2000) and
- land capability assessments undertaken by AgVic (2002) of each of the local government areas in Gippsland.

An economic, social and environmental assessment of the management actions is also a crucial step to understanding all of the costs and benefits of the actions to aid in the prioritisation of

management actions. The analysis should include the benefits to other resource management issues such as biodiversity, soil erosion and water quality. The analysis should be as quantitative as possible but inevitably many of the parameters can only be assessed qualitatively.

Once this assessment is complete, the results can be fed into existing natural resource management programs operating in the area. In particular, the current programs to implement the various biodiversity action plans and the farm forestry activities could be greatly enhanced by the inclusion of management actions to address salinity. This will exploit the multi-benefits of single actions such as tree planting.

6.3 Capacity building

The capacity of the community to implement change is crucial to successful delivery of the planned on-ground activities and outcomes. The community and farming community need to be comfortable with the proposed land management changes. Landowners should be presented with a number of options for land management changes rather than being too prescriptive. The method adopted should build on experiences of others particularly in West Gippsland. A number of capacity building activities are recommended in the West Gippsland Salinity Management Plan (WGCMA, 2005) including community engagement activities, communication plans, field days and brochures. The salinity management plan also recommends an investigation and implementation of the best methods to build the capacity of landowners to implement change (WGCMA, 2005).

6.4 Develop innovative and cost effective methods of program delivery

Developing appropriate program delivery mechanisms will require the outputs from all previous steps. Only those management actions that show net positive economic, social and environmental benefits will be chosen for this assessment. Program delivery mechanisms should be focussed on the community's capacity to implement change. Cost sharing arrangements should be based on a combination of the ratio of public to private benefit and the incentive required to engender change in line with Government policies.

There are already financial incentives available to landowners for activities such as tree planting for biodiversity purposes. These will need to be reviewed in light of the additional salinity benefit.

6.5 Knowledge gaps

The hydrogeological environment is central to understanding the causes of salinity and appropriate salinity management. The groundwater flow systems framework presented in this study should be continually updated and reviewed as information comes to hand. For example, information from new bores drilled or pumping tests conducted should be used to update the characteristics of the groundwater flow systems presented in this document. This groundwater flow systems document should be seen as a live not static document and is likely to change as understanding of the complex hydrogeological systems evolves. This study recommends that the document be continually updated with a formal review every five years.

Some of the key knowledge gaps highlighted by this study include:

- **The relationship between the watertable aquifer and the deeper aquifers and the effect on salinity of declining groundwater pressures in the deeper aquifers.** In particular, the effect

of the Boisdale Formation on the watertable aquifer in the Clydebank region is important to understand for the future of salinity in this area. Also, the effect of the declining pressures of the Latrobe Group and Ballook Formation Aquifers in the high watertable areas around Yarram and the South Gippsland coast requires investigation.

- **The aquifer hydraulic characteristics in the high priority GFSs 4, 5, 8, 10 and 12 require further investigation.** Although there are ranges given for the aquifer hydraulic characteristics in this study, the ranges are large and the uncertainty is high. More certainty is needed in these values to ensure a greater accuracy when quantifying the impact of salinity management options (see Section 6.1). Also, the aquifer properties will aid in determining whether engineering options such as groundwater pumping are technically viable. Aquifer hydraulic properties can be obtained from pumping test information or grain size analysis of aquifer material.
- **The groundwater processes causing salinity in the Rosedale area within GFS 4.** There is significant salinity on the margins of the Rosedale township that has had very little investigation. Although this groundwater flow systems report sheds some light on the possible groundwater processes causing salinity in the area, there is still a high degree of uncertainty.
- **The extent of mapped salinity.** There are likely to be areas of salinity that have yet to be mapped. Additional mapping of saline areas is a key action in the draft West Gippsland Salinity Management Plan (WGCMA, 2005). In particular, there are likely to be areas of un-mapped salinity in the Powlett River/Bass Coast area and the Seaspray/Dutson Downs/Loch Sport areas. There is also a current study into urban salinity in West Gippsland townships that is likely to identify a number of townships requiring detailed salinity mapping (SKM, 2005c in prep). New areas of mapped salinity may change the prioritisation of GFSs presented in this study.