

NRM SOUTH

The Southern Natural Resource Management Regional Committee

SOUTHERN REGIONAL NRM STRATEGY

MANAGING WATER DISCUSSION PAPER

November 2003

NRM South has developed a series of Discussion Papers to get feedback from the community on natural resource management issues and options. Your feedback will inform the next step: development of a draft Southern NRM Strategy, expected to be released for consultation in April 2004.

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MANAGING WATER: INTRODUCTION

Fresh water resources are important assets for the people of the Southern region. The availability of high quality water has been a key consideration in the establishment of many economic activities in the Region, such as agricultural activities, the generation of hydro-electricity, and various manufacturing industries. Our water resources also supply water to our towns and agricultural areas for domestic use, and provide a valuable recreational asset for activities such as fishing, boating, canoeing, rafting and swimming. Several tourism enterprises are centred on these activities.

Many of our waterways have significant aesthetic values, and rivers such as the Derwent are icons of the Region.

A number of water uses have the potential to affect industries and ecosystems further downstream, including in estuaries and marine and coastal areas. This paper is limited to a discussion of fresh water systems, that is, all water systems above the high tide mark. Marine, estuarine and coastal issues are covered in a separate paper. However it is important to remain aware of the connections between inland water systems and estuarine and coastal areas.

It is important that community groups, on-ground water managers and local and state governments work together to achieve effective and sustainable management of our water resources. Guiding principles for sustainable water management are:

- ‘Whole-of-catchment-management’ avoids potential downstream effects of changes to water quality or stream flow
- Effective water management takes into account the whole water cycle
- It is important to balance social, economic and environmental needs while minimising, or correcting, adverse impacts, to ensure adequate supplies of high quality water for both current and future generations.
- Broad community consultation in the water management planning process provides balance, and helps resolve potential conflicts between social, economic and environmental needs.

Much work has already been done in recognition of the need for sustainable water management, and a number of programs have now been established to guide water managers and users of regional water resources towards this goal.

The aim of consultation on this discussion paper is to identify key issues and challenges relating to the management of water resources in the Southern Region, and to discuss gaps in knowledge and capacity and possible solutions. This paper is part of the process of community consultation in the development of a NRM Strategy for the Southern region, and is intended to initiate discussion and encourage feedback from community groups, on-ground water managers and other stake-holders.

CURRENT CONDITION OF SOUTHERN WATER RESOURCES

The Southern NRM Region of Tasmania contains a large number of water resources. Water quality, water availability and ecosystem health vary significantly across the region. This variation is based on the Region's natural diversity in climate, especially rainfall, and underlying variation in geology and land form, coupled with the effects of land use, especially since European settlement.

The following section is a 'snapshot' summary of the uses of water and the condition of water resources in the major catchments in the region. It is not intended to be a comprehensive description of the condition of water resources at a reach-by-reach level.

(See maps of rainfall distribution at end)

(See map of land use at end)

(See map of surface water at end)

Rivers

In this section, the rivers/catchments of the Region have been divided into four groups based on similarity of flow, land-use and water quality issues (see below). It is important to recognise that some catchments are split across the NRM regional boundaries, eg. The Macquarie River catchment (shared with the northern region), Great Lake-Brumby's Creek system (shared with the northern region), the Gordon-Franklin catchment (shared with the north-west region). Most of the area of these catchments, and the resultant land-use issues, are in other Regions, and so have not been included here.

1. East, South East and Midlands. Rivers with catchments in the south east and Southern Midlands, such as the Coal, Jordan and Carlton, and the majority of east coast rivers, have highly variable natural flows. These can range from floods after high rainfall events to non-existent flows during long dry periods. Water quality problems related to low flows coupled with intensive land use- excess nutrients, sedimentation and salinity- can be serious in these rivers. The rivers in these areas are used for agricultural purposes and town drinking water supplies, and irrigation for commercial crop production- particularly in the Coal River Valley, which provides metered water for irrigation from the Craighourne Dam. This dam was constructed to improve water availability in the valley, and as a result the Coal River is now a regulated river.
2. Derwent Catchment. The Derwent Catchment, which is the largest in the region, reaches into the Central Highlands, and so receives a significantly higher rainfall. The resulting high flows in the Derwent provide dilute and thus generally high water quality. However, elevated salinity and other water quality problems issues in some tributaries. Along the Derwent River a number of activities, including fish farms and manufacturing industries, use the river water for industrial purposes. The Derwent River also provides a water resource for hydro-electric power, and as a result its flow is highly regulated. The greater Hobart area in the Southern Region relies entirely upon catchments on Mount Wellington and in the Derwent Valley for its drinking water supply, which is managed by Hobart Water.

3. Huon Catchment. Further south, the Huon River flows into the Huon Estuary. The Huon is an important source of drinking water, recreation and tourism for the communities of the Huon Valley, and also provides water for agriculture and fish farming in the estuary. The river originates from below Scotts Peak Dam, a Hydro-electric impoundment on Lake Pedder. A large part of the catchment is in the Southwest National Park, a high rainfall area free from most human activity, providing pristine water quality. Agricultural activities in the lower reaches have some adverse effects on water quality, especially in some tributaries.
4. South West. There are several rivers in the high-rainfall areas of the far south and south west. These are known for their remoteness, high conservation and eco-tourism values. Most parts of these rivers are within the World Heritage Area. The Davey River and Old River that drain into Port Davey and Bathurst Harbour respectively, represent systems with pristine water quality. The Upper Gordon River, also in the high-rainfall area, flows into Lake Gordon, which provides a significant water resource for hydro-electric power, as well as tourism and recreational values.

Lakes

The World Heritage Area is significant for its diversity of lakes and has in many cases unique (both nationally and internationally) water environments and the geological, land-form and ecological processes that characterise them. The Central Highlands contain a vast number of lakes that provide a recreational experience to a broad range of people including bushwalkers, naturalists and fishermen.

Wetlands

Wetlands are a vital component of many terrestrial (land-based) and aquatic ecosystems, and are one of the most biologically diverse habitat types. Wetlands are recognised internationally as being highly significant for the conservation of biodiversity. They provide a number of benefits, including purification of water, breeding grounds for fish, and habitat for many species including rare and endangered species.

The Region contains a number of significant and unique natural wetland features. There are naturally saline as well as fresh water wetlands, especially in the southern part of the midlands. Many of the Region's important wetlands are in estuarine areas (discussed in detail in the 'Managing Marine, Coastal and Estuarine Systems' discussion paper), but they are noted here because they can be significantly affected by water management upstream, particularly by changes to water quality and flow:

- There are 4 Ramsar wetlands (ie wetlands listed under the international RAMSAR Convention) in the Region, three estuarine and one fresh water, all of which are regarded as being in good condition. The freshwater wetland is in the north-west corner of Lake Crescent (trend – improving).
- Of the 27 DIWA (Directory of Important Wetlands in Australia)-listed wetlands for the Southern Region, the condition and trend of four are unknown, three are degraded, with

one showing a declining trend. The remaining wetlands are either in good or in near-pristine condition, all showing a static or improving trend.

- There are an additional 82 wetlands in the Region that are regarded as being significant, but are not included on existing lists. Of these, 36 are in near pristine condition (trend – static 100%), 27 wetlands in good condition (trend - static 48%; declining 30%; improving 22%), 5 wetlands in fair condition (trends - rapidly declining 20%; static 80%), 4 in degraded condition (trend - extinction 100%). The quality of 10 is unknown.

Ground water

There are 12 groundwater flow systems in the Region, varying in water quantity and quality depending on the type of rocks and soils present, the hydrogeological setting, the amount of rainfall, and land use practices. The natural groundwater quality is generally relatively good (ie total dissolved solids <500 mg) in the rock sequences of this Region which are located in areas of relatively high rainfall (>600 mm). Groundwater is generally of a lower quality in the rock sequences which occur in lower rainfall areas, and in the coastal areas where groundwater pumping can cause sea water intrusion. Concentrations of bacteria, nutrients (such as nitrogen and phosphorus), pesticides and hydrocarbons will vary locally depending on current and past land use practices, but the details are largely unknown.

Some of the Ground Water Flow Systems in the region may have already been affected by salinity and some others could be under threat. Information on the level of impact from direct discharges of saline groundwater to stream base flows has never been collected.

There are approximately 2650 bores historically drilled in the region that may supply water for domestic, irrigation, stock, industrial, recreational and environmental uses. No major towns are dependent on groundwater in the region but the resource is important for stock, domestic irrigation and the bottled water industry.

CURRENT RESPONSES & POLICIES

A number of statutory instruments are used to manage water quality, availability and ecosystem health in Tasmania. Many of these have been developed in response to our national and international obligations to manage water resources sustainably. See the *Strategic Framework Discussion Paper* for a comprehensive summary of the policy, legislative and planning framework.

The *Water Management Act 1999* is one piece of legislation particularly relevant to water managers. This act provides a number of measures to help address issues relating to the water resources of the region, including groundwater. The legislation has requirements to manage the resource in a sustainable manner, to provide for aquatic ecosystems and also to provide a framework for the development of **Water Management Plans**. The water management planning process has a strong community basis where community views help shape the plan.

In the Southern Region, **Water Management Plans** are now under development for the Clyde Catchment, Lakes Sorell and Crescent and the Little Swanport Catchment.

There are also several **policies and other non-legislative responses** which have been developed by both on-ground water managers and the state government to deal with water management issues:

- The **State Policy on Water Quality Management 1997 (the Water Policy)** was introduced in response to the **National Water Quality Management Strategy**, which provides a nationally consistent approach to water quality management. The Water Policy provides a strategic framework for the management of water quality in Tasmania. It sets a framework for setting **Protected Environmental Values (PEVs)** and **Water Quality Objectives (WQOs)** (resource condition targets) and guides the management of both point and diffuse sources of pollution. Activities for which the Water Policy provides guidance include: dairy effluent management, works in streams, road construction and maintenance, forestry management and soil management on agricultural land. Protected Environmental Values have been set for the majority of catchments in the southern region and reflect current community water values and uses collected at the time PEVs were set. The PEVs have been formally endorsed by Councils and the Board of Environmental Management and Pollution Control and are used as a basis for setting WQOs.
- Hydro Tasmania undertakes a number of programs and initiatives in relation to its operations, guided by its Aquatic Environmental Policy. Programs include routine assessments of waterway health and quality, and community-based reviews and assessment of Hydro Tasmania's water management practices. The objective of these programs is sustainable water management. Hydro Tasmania liaises closely with other agencies, particularly DPIWE on issues of environmental flows, water allocation, and water management planning, and IFS on fishery health, migration, pest species, and threatened species issues.
- The Tasmanian and Australian Governments are working together to deliver the **National Action Plan for Salinity and Water Quality (NAP)**. This national plan targets salinity and other water quality problems across Australia. The "Tasmanian NAP Region" covers most of the Southern Region lying north and east of Sorell, Bridgewater and Hamilton, and a large part of the Northern NRM Region (see map). NRM South is working in partnership with the Northern NRM Region on issues specific to the NAP. In partnership with the State Government, national NAP funding is already supporting several important projects including: the establishment of Conservation of Freshwater Ecosystem Values (CFEVs) for freshwater resources; and two significant projects aimed at engaging and building capacity in the community to undertake water monitoring. These projects will cover all of Tasmania, not just the NAP region. They will provide significant resources towards a better understanding, and increased community participation, in water management in the Southern Region.
- **Other Statewide and local programs** have been developed to combat salinity, many in partnership with community groups and land managers. See the '*Managing Soils Discussion Paper*' for details.

- Across the region, a number of catchment management and natural resource management plans have been produced in the last few years, including: the **Derwent Catchment Natural Resource Management Plan**, three **Hobart Water Catchment Management Plans**, the **Huon Valley Draft Natural Resource Management Strategy**, the **Coal River Catchment Management Strategy**, and the **Little Swanport Catchment Management Plan**.
- Guidelines for assessment, and approval or refusal, of new **applications for water licences and allocations** have been recently developed and are being implemented.
- **Proposed dams and water storage developments** are now assessed and approved by the Assessment Committee for Dam Construction (ACDC).
- The **Conservation of Freshwater Ecosystem Values Project** has been initiated by DPIWE to provide a strategic framework for the management and conservation of freshwater dependent ecosystems values, and to recommend a range of management tools to conserve freshwater values on both Crown and private land.
- The Water Use Sustainability Project managed by DPIWE will facilitate water management in priority catchments by conducting extensive water use surveys to bring historical usage into the licensing system and to ensure future takes are appropriately metered.
- **Rivercare** is a statewide program that commenced under NHT to provide funding for community based rivercare projects. The Rivercare Technical Extension project, now ended, was funded under the Australian Government Rivercare Program to provide technical support to funded community groups.
- **Waterwatch** is an educational and community organisation which encourages involvement of the community –both students and adults- in monitoring and protecting the water quality and riparian zones of waterways. Waterwatch groups have established many valuable ongoing monitoring sites in the Region.

VALUES OF WATER

Water resources, in the forms of rivers, lakes, wetlands and ground water supplies, are very important to the communities of the Southern Region. Communities across the Region have identified Protected Environmental Values (PEVs) as part of the implementation of the State Policy on Water Quality Management (1997). PEVs reflect values and uses of surface water quality and have been completed for most catchments in the Region. The following list describes the values (including uses) that have been identified for water resources across the Region. Some of these have already been set as PEVs for specific catchments.

It is important to note that values of water vary geographically, and so a suggested value may be relevant in some parts of the Region but not in others. Suggested values for water in the Region are:

- Access to water is essential for primary industries and aquaculture.
- Water has a variety of industrial uses.

- A high quality supply of fresh water is essential for domestic uses, most importantly for clean drinking water.
- Waterways are important for recreation - both for tourists and locals-eg. fishing, boating, swimming.
- Water has cultural and spiritual values.
- The availability of high quality fresh water is essential for aquatic ecosystem health and biodiversity.
- Groundwater systems are part of the water cycle and provide some important services (eg. the removal of contaminants, provision of base flows to surface waters).
- Water bodies and wetlands provide water supplies and habitat for a range of species that are not 'aquatic' species (eg. Drinking water for Tasmanian wildlife, habitat for migratory birds).

QUESTIONS

Do you agree with the Values proposed? Yes / No

What changes would you like to see to this statement of Values?

Would you like to suggest other Values?

STRATEGIC FRAMEWORK: GOALS, OUTCOMES & TARGETS

If you are interested in seeing how management of water links to the national standards and targets framework for natural resource management, please refer to the NRM South Discussion Paper on Strategic Framework. The *Strategic Framework Discussion Paper* also contains information on the nationally agreed indicators for measuring achievement of resource condition targets.

At the state level, goals and some targets for management of water resources have been set through the Tasmania *Together* process. The Southern Regional Goals are directly related to the Tasmania *Together* Goals (see the *Strategic Framework Discussion Paper*).

Effective water management will achieve the following proposed Southern Regional Goal:

Goal 2. Maintain and improve the condition of the Southern region's natural assets

It will also assist with delivery of all eight of the agreed National Outcomes (also see *Strategic Framework Discussion Paper*).

The National Framework requires regional NRM strategies to set 'Aspirational Targets'. These are 'stretch' targets, to be achieved over the long term, for example, 50 years.

Proposed Aspirational Target for Water Management in the Southern Region.

To maintain, or enhance, the ecological condition of our water resources and to ensure that future generations have access to a securely allocated, high-quality water supply.

QUESTION

Do you agree with this as an Aspirational Target to achieve over the next 50 years?

Yes / No

If not, what would you like to suggest instead as an Aspirational Target?

NRM South is also required to establish specific, measurable Resource Condition Targets (10 –20 years) for:

- inland aquatic ecosystems integrity
- nutrients in aquatic environments

- turbidity / suspended particulate matter in aquatic environments
- surface water salinity in freshwater aquatic environments.

We have three years to do this if there is insufficient baseline information to do this now.

QUESTIONS

Based on our current knowledge, how well can we set Resource Condition Targets for:

- 1. Inland aquatic ecosystems integrity**
- 2. Nutrients in aquatic environments**
- 3. Turbidity/suspended particulate matter in aquatic environments**
- 4. Surface water salinity in freshwater aquatic environments?**

What should these targets be?

MANAGING WATER: KEY ISSUES, GAPS AND CHALLENGES

Declining water quality and reduction in flow can result in loss of productivity and profitability for agricultural, manufacturing, tourism and aquaculture industries, as well as affecting water supplies for domestic use. Drinking water supplies, for example, are highly dependent on the protection and sustainable use of drinking water catchments. Declining water quality and flow also adversely affect the health of freshwater ecosystems, and reduce biodiversity.

It is important to note that the issues below vary geographically, and so an issue or information gap may exist in some parts of the Region but not in others. For example, there are potential problems of salinity in most parts of the region but they are more likely to emerge earlier north of Hobart. The key issues that have so far been identified as either affecting or having the potential to affect the values of water in the Region are:

- 1. Water quality decline due to various land uses (eg. agricultural impacts, urban stormwater runoff, sewage treatment plant effluent, landfill sites, land clearing and road construction)**
- 2. Impact and management of salinity in surface waters and ground water**
- 3. Water availability- surface water allocation and groundwater extraction**

4. **Effects of dams and other stream alterations on water quality and freshwater ecosystems**
5. **Changes in land use and potential effects on the water cycle**
6. **Conservation of river-side (riparian) habitat and aquatic ecosystem health**
7. **Need for effective coordination and integration of monitoring activities, improved access to information and effective communication between industries, local and state government and community groups.**

QUESTION

Do you agree with these seven issues and challenges ?

YES/ NO

What Issues or challenges should be added, changed or removed from the list?

EXPLANATION OF KEY ISSUES AND CHALLENGES

1. Water quality decline due to various land uses (eg. agricultural activity, urban stormwater runoff, sewage treatment plant effluent, landfill sites, land clearing and road construction)

Agricultural activity

Declining water quality can result from agricultural activity if appropriate management systems are not in place. Agricultural activities that can impact on water quality include:

- poor management of riparian zones,
- stock access to streams,
- dairy effluent,
- practices that cause erosion (eg. intensive cropping),
- fertiliser, pesticide and herbicide application,
- soil salinity,
- releases from water storages,
- instream modifications
- irrigation.

These activities can result in the following:

- increased nutrient loading (ie. high total nitrogen and total phosphorus concentrations)
- increased sedimentation rates (ie. higher turbidity)
- increased surface water salinity
- low dissolved oxygen
- high faecal coliform levels (ie. *E.coli*).

Pollution from landfill

Until recently (the last 10-15 years or so) landfill sites were possible repositories of high organic waste (animal and vegetable product) and hazardous wastes such as PCBs, pesticides, oils, and heavy metals. The leachate even from closed landfills is still in some cases entering waterways

Groundwater pollutants

Problems with groundwater quality occur when activities or infrastructure that are potential sources of pollutants are poorly sited, engineered and/or maintained. Groundwater generally moves slowly through the ground, and once contamination occurs, clean up is very difficult, is very expensive and is not often very successful.

Common point sources of pollutants include:

- septic tanks
- dairy effluent ponds
- landfills
- petroleum based fuel and oil tanks
- animal waste burial sites
- certain manufacturing and processing industries
- mine tailings sites.

Diffuse sources of pollutants include

- application of fertilisers
- pesticides
- other agricultural wastes such as dairy effluent, milk and blood products
- waste water reuse schemes.

Groundwater quality can also be compromised by over extraction where water levels are drawn down and either oxygen or contaminated surface waters is introduced into the aquifer.

Urban issues

The management of stormwater, and of sewage treatment plant effluents, is an important factor influencing water quality in urban regions. Stormwater frequently contains sediments, faecal coliforms (*E. coli*), nutrients and pollutants from roadways such as hydrocarbons and heavy metals. These have significant impacts on water quality.

The reuse of effluent is currently being encouraged by the state government, and funding has been made available for such schemes.

Land clearing, road construction and poorly managed forestry operations

The negative impacts associated with inappropriate clearing of vegetation –riverside (riparian) vegetation in particular- are well known and include:

- loss of riparian (river-side) habitat
- degradation of aquatic habitat (loss of shade, increased temperatures, decrease in organic inputs)
- streambank instability
- increased threat of invasion by weeds
- reduced water quality (increased turbidity, increased nutrients).
- Sediment from road construction and maintenance – especially of gravel roads- is known to have significant potential impacts on rural waterways.

Land clearing for crops, stock access to streambanks, road building and poorly managed forestry operations all have the potential to cause the problems listed above. Until recently there has been an extensive loss of native riparian and wetland vegetation through land clearing in the Region, however state-wide controls on the clearing of trees have now been introduced. In forestry operations enhanced streamside reserves are routinely applied to protect fauna. The Forest Practices Code provides for the maintenance of adequate buffer widths along rivers to protect the aquatic environment and maintain channel stability.

Knowledge / capacity gaps and possible actions

Knowledge / Capacity Gaps	Possible Actions	Do you agree with this action?	Is this Action Urgent?	Is this Action Important?
Need to reduce overall impacts of agriculture on water quality.	Improve dairy effluent management, implement guidelines for erosion control from intensive cropping, and guidelines for management of riparian zone.			
Lack of detailed information about nutrients and faecal material contaminating waterways via drainage lines put in place to increase productivity of the land.	Identify key sites / activities that contribute to the nutrient and bacterial load to rivers and estuaries from agricultural land			
Options for on-farm retention of such pollutants need further investigation.	Investigate and implement possible alternative land management practices			
There is a lack of adequate data to set Water Quality Objectives (WQOs).	Determine which WQOs can be set with existing data. Interim levels may need to be applied, determined			

Knowledge / Capacity Gaps	Possible Actions	Do you agree with this action?	Is this Action Urgent?	Is this Action Important?
	from smaller data sets or using default national values. Undertake further intensive stream monitoring, inter-related with point and diffuse sources of pollution data as part of a whole of catchment assessment. Use this data to fill gaps in the required data for WQOs.			
There are not sufficient sites monitoring groundwater quality	Expand the groundwater monitoring network to include more sites, particularly in areas where significant groundwater stress is known (eg. Huonville and Dolphin Sands).			
A baseline condition for groundwater quality has not been determined	Collate water sample analyses and other bore data from bore owners who have had their groundwater tested in order to determine a baseline condition.			
State stormwater management strategy requires implementation at regional level.	The Derwent Estuary Program is developing a model stormwater management plan for an urban area (involving a number of councils and industries) – this could be used as a model for other urban catchments.			
There has been very little work in the Region to characterise the impact of sewage and stormwater discharges on river health.	Continue the current Derwent Estuary Program’s stormwater monitoring program			
	Extend this program into other urban catchments			
Some sewage treatment plants are not performing to the interim discharge requirements. Wastewater systems issues needing investigation include: 1. Sustainable effluent reuse 2. Septic tank disposal system issues 3. Waste Water Treatment Plant upgrade options	Ensure effluent reuse is sustainable by implementing established framework for the assessment and ongoing management of reuse schemes.			
	Identify areas impacted by septic tank effluent and implement remediation options.			
	Identify wastewater treatment plants that require further upgrade and implement upgrade options.			

Knowledge / Capacity Gaps	Possible Actions	Do you agree with this action?	Is this Action Urgent?	Is this Action Important?
Some landfill sites are ongoing pollutant sources to groundwater and surface waters.	Identify problem sites			
	Commence remediation on a risk basis			
Assess the impacts on water quality of poorly managed agricultural and forestry activities (eg. Sediment loss in road construction, cultivation and logging activities, runoff from herbicide and pesticide use).	Maintain and improve compliance with agricultural guidelines and the Forests Practices Code, which has ongoing reviews.			
Sediment from road construction and maintenance – especially of gravel roads- is continuing to have significant potential impacts on rural waterways.	Facilitate implementation of Council guidelines at regional level.			

QUESTIONS

*How important do you believe the issue of **water quality decline due to various land uses** is in the Southern Region ?*

Are there other Knowledge or Capacity Gaps that should be listed?

Do you think the Actions / Tasks adequately address the issue?

Are there any other Gaps, Actions or Tasks that should be listed?

Impact and management of salinity in surface waters and ground water

Salinity is a complex issue. Because of its multiple impacts, the issue of salinity needs to be addressed systemically. Each Discussion Paper will consider the impacts of salinity, as relevant.

Sources of salinity

Salinity can only result if a saline ground water system receives extra water, a salt store is mobilised, or a new source of salt is adding salt to soil or water. Where there is a salt store or a saline ground water, any process which increases the available water in the soil can increase the leakage of water to groundwater, and flush salt out into surface waters or soil systems. Salinity can therefore affect domestic, irrigation, stock, aquacultural, industrial, recreational and environmental uses of water resources. A substantial part of the known land with salinity in the Region is in the Derwent catchment upstream of Hobart and in the Coal River Valley. This catchment is the most important water supply for Hobart and four other municipalities. As yet, the likely future impact of salinity in the Derwent Catchment is unknown.

Processes likely to increase salinity problems in surface or groundwater in the Southern NRM Region include:

- Extreme tree decline. As trees are major users of rainfall and soil moisture, the current losses of trees in the region (particularly in the agricultural areas of the Midlands) may have produced an increase in the amount of water entering some ground-water systems, and this may already be having a significant impact on salinity in some areas.
- The collection and concentration of saline water in farm dams and the disposal of this water is a threatening process and an emerging issue.
- The proposed significant increase in the use of wastewater for irrigation in the region, unless carefully managed, could pose a significant salinisation threat. This threat is due to the accumulation of added salts, the potential mobilisation of salt stores, and the potential recharge of fresh and saline ground waters and through surface flushing of salt into waterways.
- Run-off and drainage from saline land or discharge from saline ground waters can impact on surface water quality and quantity.

Current salinity levels and monitoring activities

The DPIWE has 8 continuous water quality monitoring stations in the Region, and about 200 sites where water quality including salinity has been measured for the Monitoring River Health Initiative. It has also completed two State of the Rivers Reports. This data shows that water quality varies in response to the point and diffuse source influences within the catchments. Elevated salinity is one of the site-specific stressors, which in some sub-catchments requires appropriate management programs to identify the sources and to implement action plans.

Enhanced monitoring is required to identify reference streams, water quality targets and to identify specific locations of current sources of salinity. Default trigger values in national guidelines for salinity have been provided for the protection of water ecosystem values and other environmental values, such as primary production, including aquaculture and

raw water for drinking water purposes. For salinity in fresh water aquatic environments the national draft indicator needed for monitoring and evaluation is total dissolved salts (or electrical conductivity) plus flow. For surface water, some key salinity affected catchments do have adequate data for indicative interim targets to provide an early warning of changes in salinity, but many do not.

Salinity in groundwater

Some of the Ground Water Flow Systems in the region may have already been affected by salinity and some others could be under threat. Information on the level of impact from direct discharges of saline groundwater to stream base flows has never been collected.

An adequate understanding of our ground water flow systems is vitally important, as the National Dryland Salinity Assessment 2000 has shown that an understanding of how our groundwater systems respond to changing land management is needed before recommending broad scale land management changes. If we do not have this understanding first, then much of the public and private investment in improving salinity management will be wasted.

Knowledge / capacity gaps and possible actions / tasks

Knowledge / Capacity Gaps	Possible Actions / Tasks	Do you agree with this action?	Is this Action Urgent?	Is this Action Important?
Impacts of salinity on water quality in surface and ground water need to be further investigated.	Consolidate data and undertake further analysis to obtain the total amount of salt being discharged per year as a measure of salinity trends in each catchment.			
	Conduct further spot monitoring and event-based checks to establish sources and locations of saline discharge to streams.			
	Undertake studies of our groundwater flow system, particularly in regard to salinity and changing land management practices.			
	Upgrade the MRT (Mineral Resources Tasmania)'s groundwater monitoring network.			
	Create more extensive networks of bores to monitor groundwater systems.			
Extent and rate of change of salinity in surface waters is largely unknown	Establish a robust baseline assessment, monitoring and evaluation program, in order to objectively report on stream			

Knowledge / Capacity Gaps	Possible Actions / Tasks	Do you agree with this action?	Is this Action Urgent?	Is this Action Important?
	condition, monitor trends and predict where new salinity will appear in the catchment.			
Assessments of critical water assets at risk from salinity and level of risk threatening these assets are needed.	Complete studies of water assets at risk and quantify level of risk.			
Councils and partner farmers in the region who are using waste water re-use need to implement best management practice to reduce salinity risk.	Establish a project to research and extend best management practice for waste water in regions of high salinity risk.			

QUESTIONS

How important do you believe the issue of salinity in surface waters and groundwater is in the Southern Region ?

Are there other Knowledge or Capacity Gaps that should be listed?

Do you think the Actions / Tasks adequately address the issue?

Are there any other Gaps, Actions or Tasks that should be listed?

Water availability- surface water allocation and groundwater extraction

Surface water

A significant, and increasing, volume of water is extracted from many rivers and streams during the summer period, in a number of catchments in the Region. There is a growing recognition of the need to maintain environmental flows to support healthy aquatic ecosystems and biodiversity, and to support the long-term maintenance of water resources for economic and social uses. Water managers are increasingly realising that some streams cannot support further consumptive use.

It has been suggested that further water use in some areas could be based on other sources of water such as groundwater or surface water taken into storage over the winter period for later use during summer. However, once the needs of the environment are provided for, it is likely that some of the smaller streams are approaching full extractive capacity, even in winter, and so may be unable to provide further reliable winter water for extractive uses.

Groundwater

There is very little information on the available groundwater resources across the Region, or indeed in the State. The National Land and Water Audit 2000 identified that, overall, groundwater use within the region was relatively small when compared to the total potential available groundwater resources.

However, the demand for larger bores to provide irrigation supplies is growing. Increasing groundwater use increases potential adverse effects on groundwater dependent ecosystems, including over pumping and over development of the groundwater resource, which can:

- lower the water table below critical root zone depths
- de-water habitat
- reduce flow to streams and wetlands
- impact on water quality values which are critical for ecosystem health.

Further information is needed to determine sustainable levels of use of groundwater resources. There are number of specific areas where groundwater development is relatively intense, and these could be prioritised for management strategies. These include Dolphin Sands, the Sorell area and the Huonville area.

Knowledge / capacity gaps and possible actions / tasks

Knowledge / Capacity Gaps	Possible Actions / Tasks	Do you agree with this action?	Is this Action Urgent?	Is this Action Important?
Need for accurate water use information, including groundwater use.	Establish streamflow monitoring stations where critical need is recognised.			
	Start metering of direct water takes from rivers, to assist with monitoring and compliance in key catchments.			

Knowledge / Capacity Gaps	Possible Actions / Tasks	Do you agree with this action?	Is this Action Urgent?	Is this Action Important?
	Establish additional groundwater monitoring boreholes in areas where significant groundwater use is known, such as Dolphin Sands, Sorell and Huonville.			
Need for information on environmental water requirements.	Assess environmental water provisions for catchments impacted on by farm dam development.			
	Develop and implement a monitoring program to demonstrate the ecological impact of the environmental flow provisions.			
	Integrate monitoring with other similar activities underway in the Region.			
	Develop and implement Water Management Plans			

QUESTIONS

*How important do you believe the issue of **water availability -surface water allocation and ground water extraction** is in the Southern Region?*

Are there other Knowledge or Capacity Gaps that should be listed?

Do you think the Actions / Tasks adequately address the issue?

Are there any other Gaps, Actions or Tasks that should be listed?

Effects of dams and other stream alterations on water quality and freshwater ecosystems

Hydro-electric power generation

Through its operating practices for management of lakes and downstream releases, hydro-electric power generation affects lake levels, downstream flow volumes and patterns of release, with consequent implications for water quality and in-stream biota (life). A range of issues arise from these alterations, each individual to the catchment and land-use characteristics and features, and dependent on a number of factors such as lake/channel morphology, local climatic conditions, operational issues, other waterway values, and practices of other users

Hydro Tasmania is taking a pro-active approach in aquatic environmental management, with a view to achieving long-term sustainable water management. Its Water Management Review Program is a long-term, systematic and highly consultative process assessing the implications of its present practices on community and ecological values, with the aim of where possible improving these values. Because aquatic environment issues associated with Hydro Tasmania operations are often complex, the program allows underlying processes and factors to be discerned and analysed, and options to address the issues considered in close consultation with users. This process has been highly successful in the Great Lake – South Esk catchment, where a program of commitments to improve waterway values was developed and is presently being implemented; the Derwent-Nive system is now under review. Over the past ten years, Hydro Tasmania has introduced a number of measures in the southern NRM region which improve waterway values, for example: flow management measures at Penstock Lagoon which have improved water quality and recreational fishing; constraints on lake level fluctuations at Lake St Clair to address shoreline erosion; provision of water allocations for irrigators in a number of waterways; elver harvesting downstream of Meadowbank Dam for re-stocking of Tasmanian waterways; provision of sufficient flow downstream of Meadowbank Dam to prevent salt wedge intrusion affecting the Bryn Estyn water treatment plant and the Boyer Mill; provision of water for the SALTAS hatcheries; and at least eight lake level agreements in the Derwent catchment alone to address various issues such as water quality, weed invasion; recreational fishing and irrigation abstraction.

Farm dams and other channel disturbances

Dam releases from farm storages can also influence water quality and aquatic ecosystems, through increased sedimentation, nutrients and salinity. There are a number of stream channel disturbances other than dams, all of which can damage fresh water ecosystems. Issues include:

- Poorly planned clearing of woody weeds such as willows
- Inappropriate removal of stream timber (woody debris)
- Stream channelisation
- Poor design and inappropriate use of in-stream structures
- Gravel extraction

Fish passage

The migration and dispersal of fish species is often necessary for their reproductive success and survival. Many native and introduced Tasmanian fish rely on seasonal migration within freshwater systems or between fresh and salt water for reproduction. Fish passage is potentially obstructed by flow regulations, dams, weirs, channelisation, bridges and culverts, clearing of riparian vegetation and in-stream works which change flows or the amount of instream rocks or woody debris. New dams are now required to contain appropriate fish-pass facilities (fish ladders), but many existing dams do not provide these.

Fish species in the region which might be affected by the above include spotted and climbing galaxias; Tasmanian whitebait; the Great Lake, Shannon and Western paragalaxias; lampreys; Australian grayling; brown and rainbow trout; blackfish.

Knowledge / capacity gaps and possible actions / tasks

Knowledge / Capacity Gaps	Possible Actions / Tasks	Do you agree with this action?	Is this Action Urgent?	Is this Action Important?
The downstream impacts of releases of water from storages, including on estuarine processes (total catchment flow requirements), need to be better understood.	Continue research into environmental water requirements of streams, estuaries and groundwater dependent ecosystems, and the impact of farm dam development on streams, which is currently being done through a NAP funded project in Little Swanport.			
In many southern catchments, only base environmental flow requirements have been determined. Information gaps exist on what other components of the flow regime are required to sustain river ecosystems (eg channel maintenance flows, biological triggers, flushing flows).	Undertake further research into flow regimes required to maintain river ecosystems (as is being done through a NAP funded project in Little Swanport).			
Need for information on the number of streams with farm dams preventing fish passage.	Create a database of all instream barriers to fish passage in the Region, for the purpose of management and habitat restoration.			
Best practice stream management could be more widely adopted to prevent stream channel disturbances	Encourage adoption of best practice stream management to prevent stream channel disturbances.			

QUESTIONS

*How important do you believe the issue of the **effects of dams and other stream alterations on water quality and freshwater ecosystems** is in the Southern Region?*

Are there other Knowledge or Capacity Gaps that should be listed?

Do you think the Actions / Tasks adequately address the issue?

Are there any other Gaps, Actions or Tasks that should be listed?

Changes in land use and potential effects on the water cycle

There is a community concern that conversion of shallow rooted pastures to tree crops and plantations in a significant proportion of any catchment (or sub-catchment) may result in an increase in groundwater uptake, a decrease in surface water flows, and thus more frequent restriction of water takes.

The connections between surface water and ground water systems are often poorly understood. Groundwater is an integral part of the hydrological cycle and needs to be considered as part of surface water and land use management strategies, as it provides the link between what we do on land and what happens in our rivers and streams.

Forests and tree plantations are often directly dependent on groundwater systems for their water supply. Changes in land use that result in changes in the current total water use by plants can both increase and decrease the proportion of rainfall in the catchment that enters rivers and streams.

Many stream degradation issues are a result of past forest removal and the resulting increase in flows. Tree crops and plantations may reduce water flows and so ameliorate past land degradation, however under certain circumstances, the extent of this change in land use may reduce the water yield of the catchment to the extent that the reliability of the water allocations of current water licence holders in the catchment may be reduced.

It is difficult to determine the extent to which this may occur without further studies.

Knowledge / capacity gaps and possible actions / tasks

Knowledge / Capacity Gaps	Possible Actions / Tasks	Do you agree with this action?	Is this Action Urgent?	Is this Action Important?
Need for reliable and long term information on surface water and groundwater quantity, including changing trends as a consequence of climate change and land use impacts.	Undertake long-term assessment of the impacts of farm forestry and other land uses on water yield in water supply catchments.			

QUESTIONS

*How important do you believe the issue of **changes in land use and potential effects on the water cycle** is in the Southern Region ?*

Are there other Knowledge or Capacity Gaps that should be listed?

Do you think the Actions / Tasks adequately address the issue?

Are there any other Gaps, Actions or Tasks that should be listed?

Conservation of river-side (riparian) habitat and aquatic ecosystem health

Reserves

There are approximately 400 kilometres of river reserves in the Region. Sections of many rivers are also protected in a range of formal reserves such as National Parks, Conservation Areas and the World Heritage Area. Altogether about 70% of the Region's stream lengths are in a natural condition. The World Heritage Area contributes significantly to this figure and if excluded the proportion drops to 53%. In many other areas the health of rivers and wetlands is significantly impaired, usually as a direct result of human activity.

Environmental condition

Systematic information on the environmental condition of rivers and wetlands in the Region is poor, and often anecdotal. A recent workshop (Dunn 2002), using the condition of riparian vegetation as an indicator of river health, showed that condition was good and remaining static for three bioregions, Central Highlands, Southern Ranges and Western, whilst in the South East Bioregion, riparian vegetation is in fair condition, but in decline.

Rivercare plans produced for the Region indicate that rivers and wetlands are often in poorest condition on the lowland, floodplain environments of the Region. Native riparian vegetation is often absent and where it is found is usually reduced to small fragmented patches. Willow, hawthorn and gorse make up a significant proportion of the riparian zone. The lack of riparian vegetation is often consistent with a degraded aquatic environment and channel degradation through streambank and bed erosion.

To date 253 sites have been assessed as part of the river health program using aquatic species composition and habitat as surrogates for stream health (AUSRIVAS). Of these,

68% were assessed as being equivalent to reference (unimpaired) or above, 26% of sites were significantly impaired, 5% were severely impaired and 1% of sites were impoverished.

Salinity

In 2000 it was estimated that, along with the Pittwater/Orielton Lagoon Ramsar site, there were 8 wetlands on the registrar of national significance in the Southern Region which are in Land Systems containing areas of salinity. It is not known if these wetlands coincide with the actual land or ground water systems within these Land Systems where salinity is changing or will change in the future. Therefore the level of risk to the ecosystems of these wetlands is not known.

Threatened species

There are 96 plant species and 31 fauna species listed on the schedules of the *Threatened Species Protection Act 1995* that occur in water systems in the Southern Region. These figures are approximations as they represent only the available data, and consequently there may be more species than currently recorded.

Aquatic plants

Low flows, coupled with elevated nutrient levels, can lead to increased introduced aquatic plant and algal growth, and a decrease in the diversity of native species. The aquatic weed *Elodea canadensis* (Canadian pondweed) is present in some streams in the region, and is likely to become more widespread if water quality declines, at the expense of native plants. Native aquatic plants provide an important habitat and food source for native fish and invertebrates and can promote an increase in their numbers.

Introduced species

Issues relating to management of introduced aquatic plants and animals are covered in the '*Managing Weeds, Pests and Diseases*' discussion paper, and so are not discussed in detail here. Introduced species which cause or have the potential to cause serious ecological problems in waterways in the region include:

- Willows
- Canadian pondweed, *Elodea canadensis*
- Trout
- Redfin perch
- European carp
- Mainland yabbies

It is important to maintain the pest-free status of waterways or parts of waterways that do not currently contain introduced plant or fish species.

Knowledge / capacity gaps and possible actions / tasks

Knowledge / Capacity Gaps	Possible Actions / Tasks	Do you agree with this action?	Is this Action Urgent?	Is this Action Important?

Knowledge / Capacity Gaps	Possible Actions / Tasks	Do you agree with this action?	Is this Action Urgent?	Is this Action Important?
The current condition and status of wetlands in the Region is poorly understood. This is especially the case in the midlands, where several significant wetland complexes exist.	Determine the condition and status of key wetlands in the Region.			
The monitoring river health program is ongoing in many catchments. More intensive data collection is needed in priority areas needing remedial action.	Continue the monitoring river health index program with a focus in those regions identified on a priority basis as requiring remedial action.			
There is a need to continue, and improve on, the biophysical stream characterisation process started in recent Rivercare Plans.	Maintain the Rivercare Planning process at the regional level as an essential component of Rivercare Projects and other development-based projects.			
Riparian land condition, including vegetation, is poorly mapped for the State and consequently it is difficult to derive useful information that can be applied to a strategic management framework.	Undertake more intensive sampling in order to assess the biological condition of catchments that are of regional management concern within the Region.			
While the 'State of Rivers' program has provided a comprehensive assessment of river health at the catchment scale, the spatial coverage of this work in the Southern Region is limited (Draft Coal River, Draft Jordan River).	Extend the SoR program into other priority catchments.			
The current AUSRIVAS habitat assessment does not provide a holistic assessment of river condition.	Develop or adopt a methodology to characterise physical in-stream habitat and include this in an assessment of river condition.			

Knowledge / Capacity Gaps	Possible Actions / Tasks	Do you agree with this action?	Is this Action Urgent?	Is this Action Important?
There is little information on groundwater dependent ecosystems.	Collate data from work in forestry operation areas and karst systems on reserved land, which might provide baseline data.			
	Undertake a detailed survey to assess the status, condition and threats to groundwater dependant ecosystems for the Southern Region.			
There is little community understanding of the values and requirements of groundwater systems.	Increase community awareness of the importance of groundwater in the hydrological system and the needs of groundwater dependent ecosystems			

QUESTIONS

*How important do you believe the issue of **conservation of river-side habitat and aquatic ecosystem health** is in the Southern Region ?*

Are there other Knowledge or Capacity Gaps that should be listed?

Do you think the Actions / Tasks adequately address the issue?

Are there any other Gaps, Actions or Tasks that should be listed?

Need for effective co-ordination and integration of monitoring activities, improved access to information and effective communication between industries, local and state government and community groups.

Evaluation of water quality and availability, including in groundwater supplies, and of the associated health and biodiversity of freshwater ecosystems, is a means of identifying how we are progressing towards the goal of sustainable use of our water resources.

In the past, water monitoring has been undertaken independently by a number of industries, state and local government organisations and community groups. Communication between groups and integration of monitoring data has often been poor, resulting in data gaps, inefficiencies and difficulties with access. A need has been identified for a centrally managed, collaborative water quality monitoring system. In response to this, an effective water quality monitoring network is presently under development to support NRM. This will be realised with the implementation of the State Water Quality Monitoring Strategy. Without good quality and uniform baseline monitoring it is difficult for regions to get an idea of the effectiveness of management measures.

Current studies and water quality monitoring programs across the Region consist of:

- Regional studies, including:
 1. The Australia Wide Assessment of River Health program
 2. The State of Rivers Program
 3. The Derwent Estuary Monitoring program
 4. The Lake Sorell and Lake Crescent Rehabilitation Program.
- NRM projects
- Waterwatch water quality monitoring
- Catchment management plans
- Monitoring by Hobart Water for water supply quality
- Hydro Tasmania operational monitoring
- Industries and councils effluent monitoring
- Recreational area monitoring by Council.

Knowledge / capacity gaps and possible actions / tasks

Knowledge / Capacity Gaps	Possible Actions / Tasks	Do you agree with this action?	Is this Action Urgent?	Is this Action Important?
Implementation of the State Water Quality Monitoring Strategy requires effective water quality data management and community access.	Integrate water quality data from different sources including ambient with point and diffuse sources of pollution.			
	Use a GIS based system to make this information accessible.			
	Produce an interactive Web platform.			

Knowledge / Capacity Gaps	Possible Actions / Tasks	Do you agree with this action?	Is this Action Urgent?	Is this Action Important?
Support is needed for a new Water Initiative (partially funded by The National Action Plan), which will allow an expanded stream flow, water quality and river health monitoring network on a statewide basis.	Assist the expanded monitoring network and river health assessments part-funded by the new Water Initiative.			
	Link the State baseline monitoring to Regional monitoring through a monitoring strategy.			
There is a need to consider land and water management as an integrated whole	Put in place regular communication mechanisms between water management and land management structures to build culture of thinking systemically.			
There is a need for increased industry involvement in river management and protection.	Establish an awareness program that targets key industry groups on the issues of river and wetland management, and how they can help improve the management and protection of rivers.			
River management, conservation and rehabilitation groups and stakeholders need technical and scientific support	Provide multi-disciplinary technical and scientific support for river management, conservation and rehabilitation initiatives to stakeholders (Regional Committee, councils, community groups, landowners).			

QUESTIONS

How important do you believe the issues of co-ordination and integration of monitoring activities, access to information and communication between industries, local and state government and community groups are in the Southern Region ?

Are there other Knowledge or Capacity Gaps that should be listed?

Do you think the Actions / Tasks adequately address the issue?

Are there any other Gaps, Actions or Tasks that should be listed?

QUESTION

What other measures should we implement in the Southern Region to manage our water systems effectively?

ISSUE	Knowledge/ capacity gaps	Actions / Tasks	Is this Action Urgent?	Is this Action Important?

QUESTION

What are the five most important and urgent things we should do to make sure we manage our freshwater effectively?